



HYPACK
a xylem brand

HYPACK® MARINE SEARCH User Manual

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WELCOME TO HYPACK® MARINE SEARCH

The HYPACK® MARINE SEARCH software package is designed to take input from a GPS and a side scan. It provides targeting and mosaicking of the side scan data, both in real time (surveying) and in post-processing.

Targets mark points of interest in your project area. To that end, each target must at least include a name and the XY position, but it can also include position, height above the bottom, length and width measurements, and a graphic image of the object. The available information depends on the program in which you mark the target.

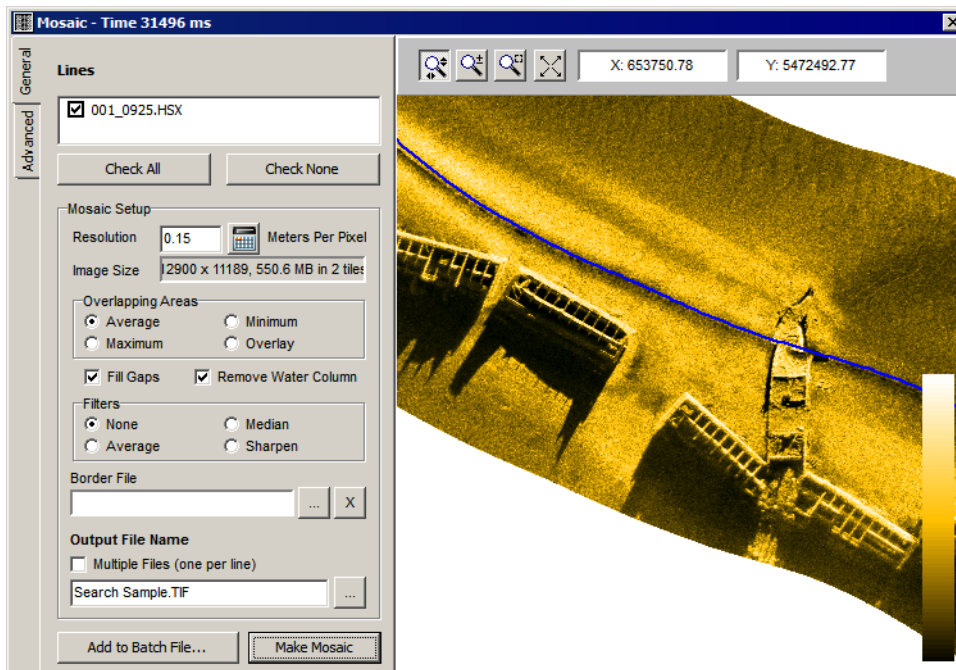
The TARGET EDITOR displays all information about each target in one window and enables you to modify target properties and attributes where appropriate.

FIGURE 1. Sample TARGET EDITOR Display

A **mosaic** is a plan view of your side scan data in Geo-TIF format.

The SIDE SCAN SURVEY and TARGETING AND MOSAICKING programs included in the HYPACK® MARINE SEARCH package allows you to perform targeting and generate a geo-referenced mosaic in real time during the survey and during post-processing, respectively.

FIGURE 2. Generating a Mosaic

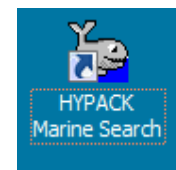
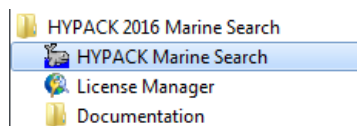


The software allows you to work on a US State Plane projection (NAD-83) in feet, or a UTM project (worldwide) in meters. It permits only a fixed layback from the GPS antenna to the side scan towfish.

STARTING THE PROGRAM

When you install the software on your computer, it creates a HYPACK® MARINE SEARCH desktop icon and a Windows® Start menu item. **To launch the software**, click on either one.

FIGURE 3. Launching HYPACK® MARINE SEARCH—Windows® Start Menu (left), Desktop Icon (right)



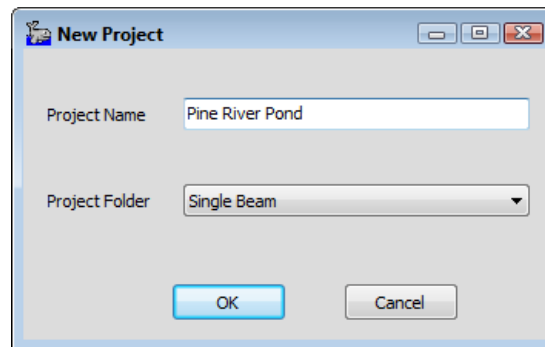
The first time you start the package, it loads a default project; otherwise, it returns to the project where you worked most recently. You can toggle between Pro and Classic views Using the View setting on the toolbar.

CREATING A NEW SURVEY PROJECT

Each time you begin a new survey, you should create a new project. HYPACK® MARINE SEARCH enables you to name your project and then stores all of the information about that survey in the project folder.

1. **Select FILE-NEW PROJECT** and the New Project dialog appears.

FIGURE 4. *Setting the New Project Name and Location*



2. **Name the project and select a folder where the project will be stored.**
 - **Project Name:** Enter a name that will remind you of the location and the date of the survey. Project names may not contain periods, back or forward slashes, question marks, less than or greater than signs, or bars.

TABLE 1. *Invalid Characters*

.	/	\	?	<	>	
---	---	---	---	---	---	--

- **Project Folder:** Enter the project group folder where your project should reside. We recommend you use the default project folder (HYPACK Marine Search).

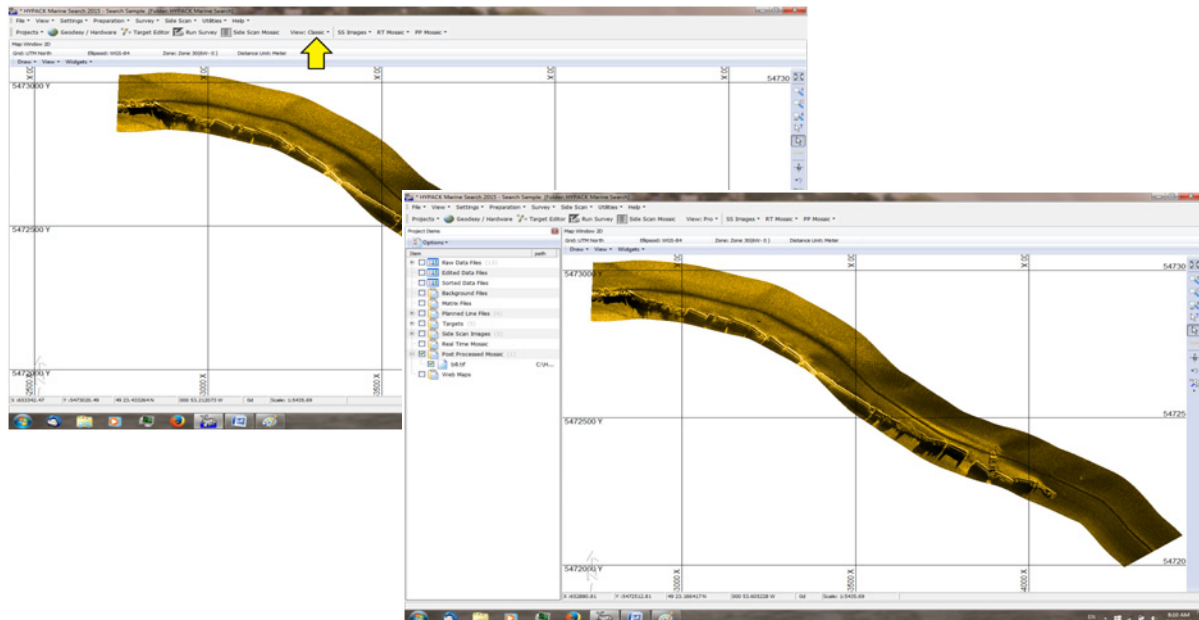
The software creates a folder in the specified location using the project name.

3. **Click [OK].**

HYPACK® MARINE SEARCH INTERFACE

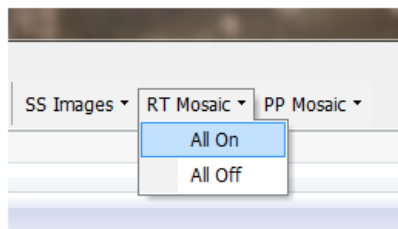
You can change the layout of the main screen between “Pro” and “Classic” views using the View drop-down in the toolbar. The “Classic” view devotes the entire window to the map view. The “Pro” view adds the Project List, where you can enable/disable files that are drawn in the map view.

FIGURE 5. Classic View (left), Pro View (right)



You can quickly turn images and mosaics on and off by using the menu items at the top-right of the main window.

FIGURE 6. Toggling Real-time Mosaics

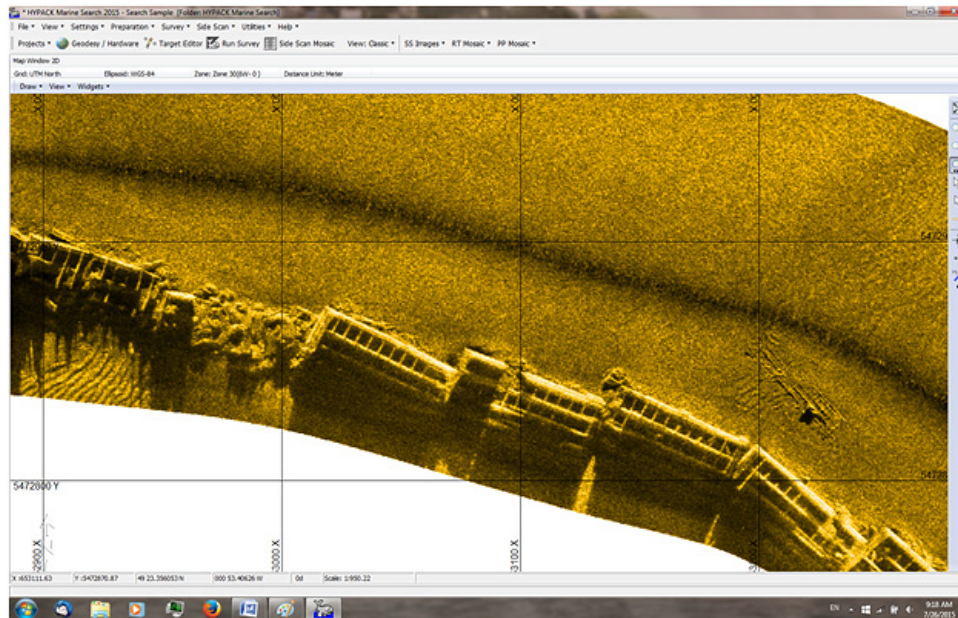


SS Images: When creating targets, you can capture an image of the target. The images can be geo-referenced (meaning you know the exact location of the image) and displayed in the main window.

RT Mosaics: These are the Real Time (RT) Mosaics created by the SURVEY program. Their resolution will be slightly less than those created in the post-processing program.

PP Mosaics: These are the Post Processed (PP) Mosaics.

FIGURE 7. Display of a Post Processed Mosaic in HYPACK® MARINE SEARCH.



GEODESY AND HARDWARE

HYPACK® MARINE SEARCH has a combined Geodesy/ Hardware program that is used to tell the software what projection grid you are working on, what equipment you have, how the equipment is connected to the computer and where it is located.

To launch the “Geodesy/Hardware” program. Click on the Geodesy/Hardware menu item. The “Geodesy and Hardware Settings” window appears.

FIGURE 8. Starting Geodesy/Hardware

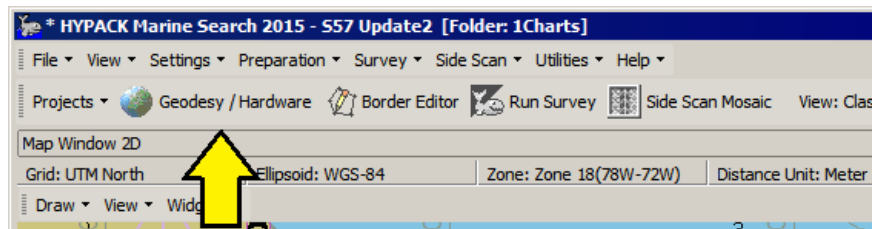
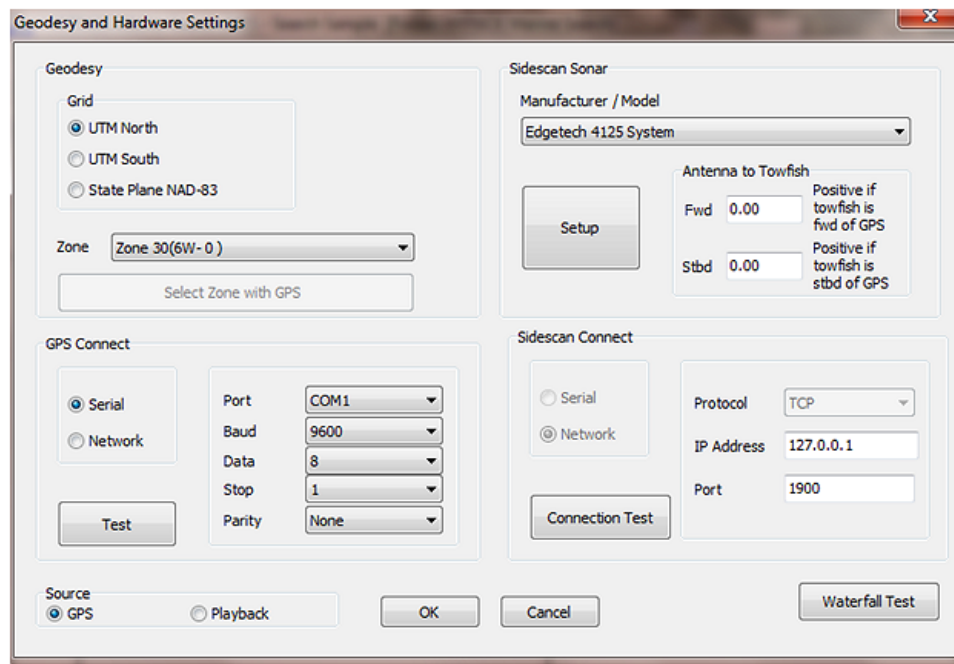


FIGURE 9. The Geodesy and Hardware Settings Window



GEODESY

HYPACK® MARINE SEARCH uses a mapping projection to go from WGS-84 Latitude/Longitude to X-Y coordinates.

Select your projection from the three choices provided:

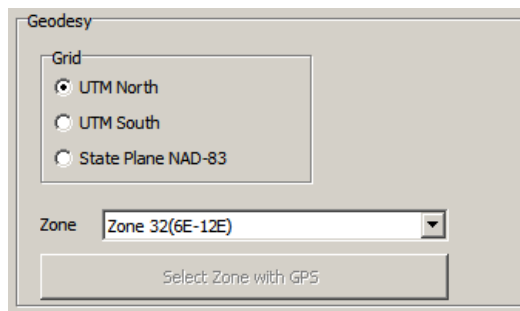
- UTM North (Northern Hemisphere)
- UTM South (Southern Hemisphere)
- State Plane NAD-83 (USA)

NOTE: *If you want to operate on a projection other than UTM or NAD-83, you need a HYPACK® SURVEY license, not a HYPACK® MARINE SEARCH license.*

CONFIGURING UTM ZONES

If you select UTM North or UTM South, you must also select the UTM Zone for your survey area. The world is divided into zones that each span 6 degrees of longitude. Select the zone that corresponds to your project location.

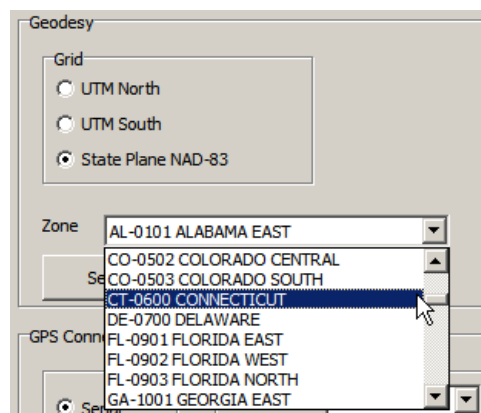
Tip: You can get your current longitude from your GPS. For example, if your GPS says the longitude is 7° 12.1365' E, select UTM Zone 32, which spans from 6° E to 12° E.

FIGURE 10. *Selecting your Projection*

CONFIGURING A STATE PLANE GRID

If you select State Plane NAD-83, you must also select the appropriate State Plane zone.

The Zone listing is populated with all available zones. Just use the drop-down list and select the zone corresponding to your project location.

FIGURE 11. *Selecting a State Plane Zone (USA)*

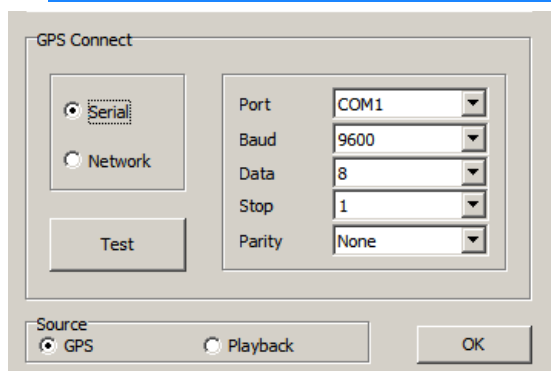
HARDWARE

GPS CONFIGURATION

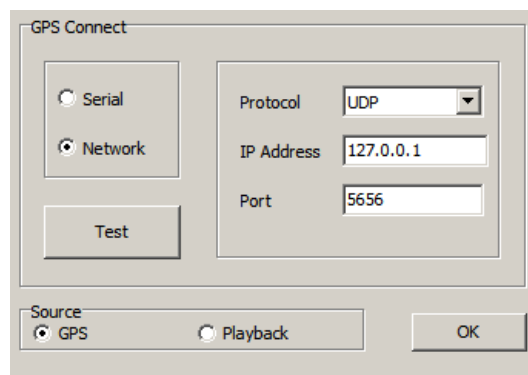
Connection Settings

HYPACK® MARINE SEARCH needs to know how your GPS is connected to the computer. It can be either a network connection, or an RS-232 serial connection. Check your GPS manual for the correct settings.

- **If your GPS has a serial connection**, specify the Serial Port (COM1, COM2, etc.) the Baud Rate, Data Bits, Stop Bits and Parity settings.

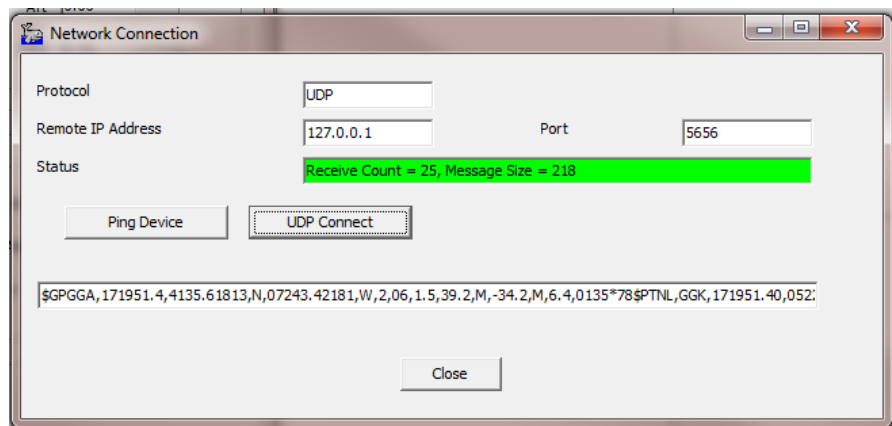
FIGURE 12. *Serial Connection Settings*

- If your GPS has a network connection, specify whether your device uses a TCP/IP or UDP connection. Enter an IP address for the GPS and the Port number from which HYPACK® MARINE SEARCH is to read data.

FIGURE 13. *Network Connection Settings*

To test either a **Serial** or **Network** connection, click [Test] to check the communications with the GPS.

- The **Serial test** opens a window that shows the raw messages as they are received.
- The **Network Connection** window allows you to “Ping Device” then “UDP Connect”. When you “Ping” a device, it checks to see if there is a physical connection between your computer and the GPS (at the specified IP address). If successful (Status field is green), you can then “UDP Connect” and see if the NMEA sentences are being properly received.

FIGURE 14. Testing the Network Connection to a GPS

GPS Output Strings

For the GPS datagrams, we would like to have the following sentences transmitted to the HYPACK® MARINE SEARCH computer:

- **\$GPGGA (1 to 10Hz):** Required. This string provides the latitude, longitude of the GPS antenna, the differential status, the HDOP and number of satellites.
- **\$GPHDT (1 to 10Hz):** If your GPS has a directional antenna, this string provides the vessel heading. Otherwise, SURVEY uses Course Over Ground from the \$GPVTG string or calculated based on change of position.
- **\$GPVTG (1 to 10Hz):** This string provides the Course Over Ground and Speed Over Ground. If HYPACK® MARINE SEARCH doesn't have heading information, it uses the Course Over Ground to orient the vessel.

NOTE: If you have cross-currents, the heading will not equal the course-over-ground and your side scan data will be skewed.

SIDE SCAN CONFIGURATION

In the Side Scan Sonar area, specify what type of side scan sonar you are using, check it's "Setup" parameters and specify where the towfish is located relative to the GPS antenna.

FIGURE 15. *Configuring your Side Scan System*

Supported Side Scan Devices

Select your model of side scan from the Manufacturer/Model drop-down listing. The following side scans are all available for use in HYPACK® MARINE SEARCH:

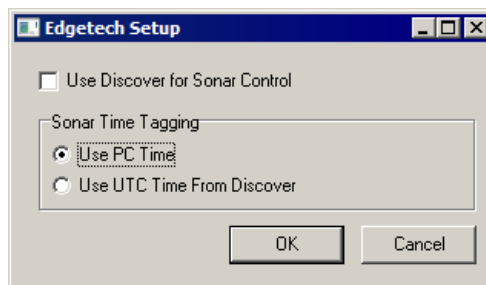
- Benthos C3D
- Benthos 162x
- CMAX CM2 (Serial)
- CMAX CM2 (USB)
- Edgetech 272
- Edgetech 4100 Series
- Edgetech 4125
- Edgetech 4200 Series
- Edgetech 4300 Series
- Edgetech 4600/6500 Series
- GeoAcoustics Digital Side Scan
- GeoAcoustics Geoswath
- Imagenex Sportscan
- Imagenex Yellow Fin
- Innomar SES
- Klein 3000
- Klein 3900
- Klein 5000
- Klein 3500 Hydroscan
- MarineSonic Sea Scan
- MarineSonic Sea Scan HDS
- MarineSonic Sea Scan ARC Explorer

- Sonartech Sonarbeam S-150
- Trittech 450
- Trittech 990
- Trittech Sea King

SONAR SETUP

To access the **Setup dialog** for your selected sonar, click [Setup] in the Side Scan Sonar frame. The setup for each sonar is different. Some devices do not require any special configuration. Other devices require detailed information that can only be entered through the Setup dialog.

FIGURE 16. Setup Dialog for the Edgetech 4100



For details on your sonar, refer to the “SideScan Interfacing.PDF” located in the \Help folder under the folder where you installed HYPACK® MARINE SEARCH.

POSITION OF SIDE SCAN TOWFISH RELATIVE TO GPS ANTENNA

HYPACK® MARINE SEARCH needs to know where the side scan sonar is located relative to the GPS antenna. You can enter the distances for the sonar as forward and starboard of the GPS Antenna.

IMPORTANT!

If you are on a State Plane grid, enter your offsets in feet.
If you are on a UTM grid, enter your offsets in meters.

FIGURE 17. Towfish Offset From the GPS—The towfish is -3.5m forward and -1.5m starboard of the GPS antenna

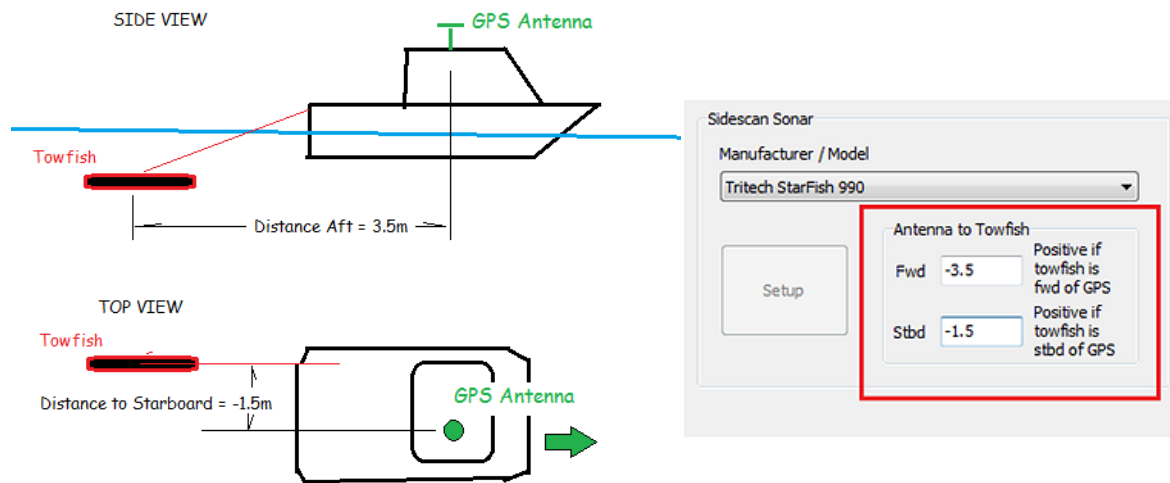
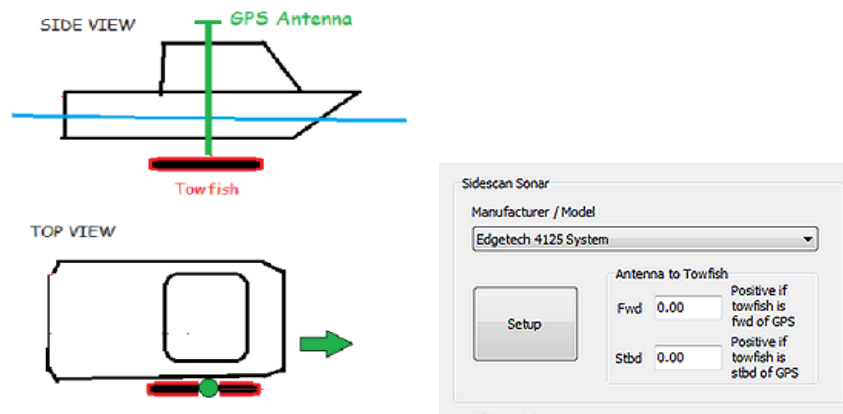


FIGURE 18. Towfish Directly Below the GPS—The Fwd and Stbd offsets are both set to 0.0.

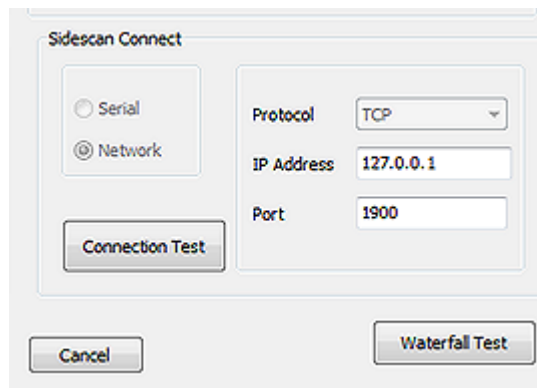


NOTE: You can modify the layback during acquisition from the Side Scan Survey window.

SIDE SCAN CONNECTION

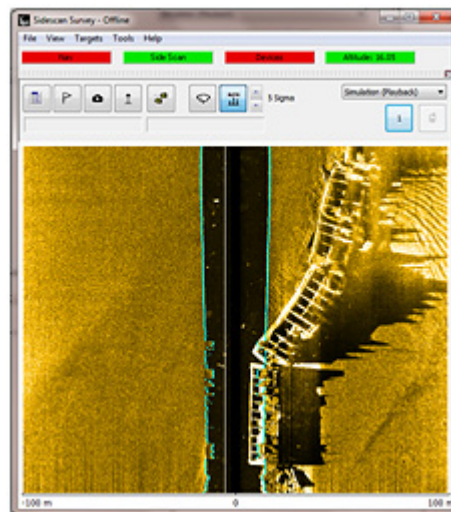
In the Side Scan Connect area of the Geodesy and Hardware Settings window, tell the program how the side scan is connected to the survey computer. The connection parameters required change automatically, depending on the type of side scan sonar you have selected.

Some sonars have a network connection that require an IP address and port number. Other sonars have a network connection that requires just a port number. Other sonars have a USB connection that does not have any parameters.

FIGURE 19. Side Scan Connections

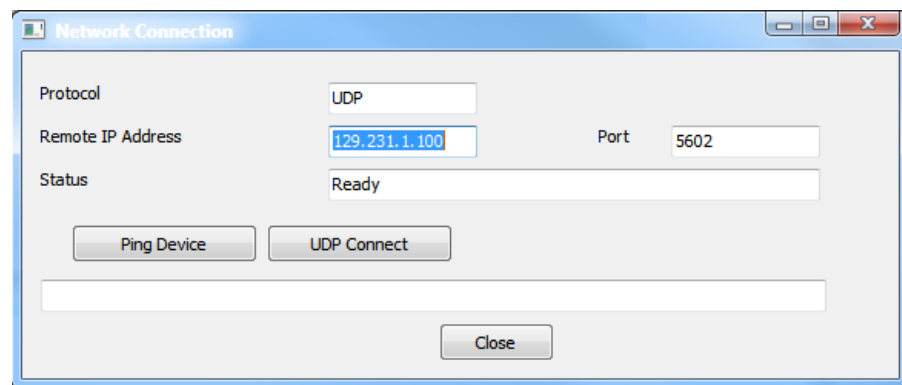
Check for the settings of your sonar in the **Sidescan Interfacing.PDF** document located in the \HYPACK Marine Search\Help folder.

[Waterfall Test] opens SIDE SCAN SURVEY to see if the connections to the side scan are correct. If you do not get this window and cannot see the side scan waterfall, troubleshoot the connections and hardware configuration.

FIGURE 20. Sample Waterfall Test

If you are using a network connection, you can test your settings to which you are connecting:

Click [Connection Test] on the Connect tab. The Network Connections dialog automatically displays the connect information you have entered in the Connect tab.

FIGURE 21. Network Test Dialog

- **For TCP/IP connections**, click **[Ping Device]**. If the designated address is found, the status reads 'Ping OK'. If not, it says 'Time out waiting for a reply'.

NOTE: If you leave the address at the default 127.0.0.1, you ping your own computer and the status message tells you it is not a remote address.

- **For UDP connections**, click **[UDP Connect]** to attempt to read incoming data from the UDP port. If the connection is successful, the status field continuously updates the number of messages and their size. Each message display in the field at the bottom, though it will not be text you can read.

Once you exit the Geodesy and Hardware Settings window, those settings become the default settings and will be copied any time you create a new project.

More Information

- [“Setting the Side Scan Layback”](#) on page 2-85

SIDE SCAN DEVICE CONTROLS

You can **control your sonar settings** from SIDE SCAN SURVEY. Device controls in the interface directly control sonar pinging, and can change the sonar range. For more complex setting changes, the controller icon accesses the full device controller window from your survey computer instead of using the device controls and without exiting the survey programs. (These tools are unavailable in playback mode.)



FIGURE 22. *SIDE SCAN SURVEY Device Controls (from right to left) —Start/ Stop Pinging, Range Controls, Device Controller Access*

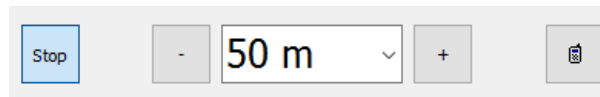
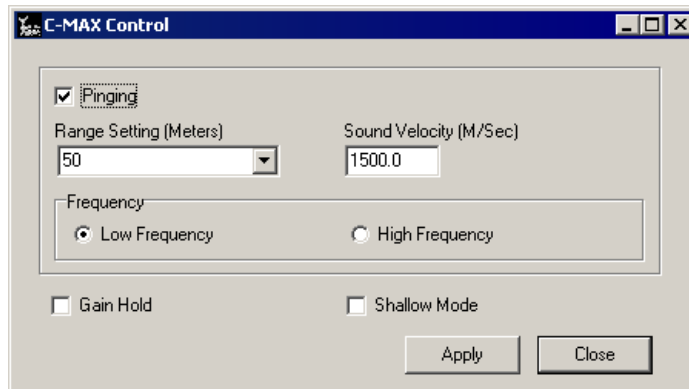


FIGURE 23. *Side Scan Device Control for C-Max CM2 Side Scan*



PLANNED SURVEY LINES

Planned survey lines (*.LNW) define where you want your vessel to go. The line file contains the grid coordinates and names for each planned line in your project area and can also contain cross section template information. Line files are typically created in the LINE EDITOR program.

Planned lines are saved with an LNW extension and are saved in the project folder. You should give each set of planned lines a unique name which will allow you to determine for what area the survey lines were created.

Although it is possible to collect survey data without planned lines, it will make the editing process more logical and assure your required coverage if you have referenced some kind of survey lines in your area.

SPACING PLANNED LINES

Line spacing for single transducer surveys is somewhat arbitrary, because full bottom-coverage is almost never practical. For sweep surveys, where full bottom-coverage is practical, line spacing is usually chosen to insure full coverage.

If your boat is equipped with a multibeam system, where the coverage of a single sweep varies depending on water depth, line spacing will often change from one survey to the next. Some simple trigonometry gives the coverage relationship with water depth.

- **Port Coverage** = Water Depth x Tan(Port Theta)
- **Starboard Coverage** = Water Depth x Tan(Starboard Theta)
- **Sweep Coverage** = Port Coverage + Starboard Coverage

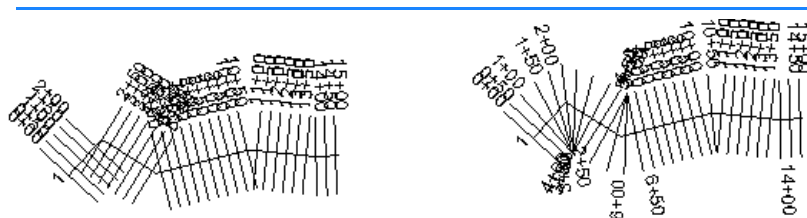
It is tempting to orient the sweep transducer with somewhat side-looking geometry, as this increases the coverage per sweep. Be careful about this because the trade-off is decreased data quality in the outer beams.

OFFSET PATTERNS FOR PLANNED LINES

Planned lines can be created in any one of several patterns using the Offsets function. All of the following patterns are available when you generate lines in the LINE EDITOR.

The **center line pattern** includes the **Smart Corners** option which rotates lines about the intersection of the planned line and the channel center line so that the line does not intersect with any other planned line.

FIGURE 24. Center Line Pattern - No Smart Corners (left), Smart Corners (right)



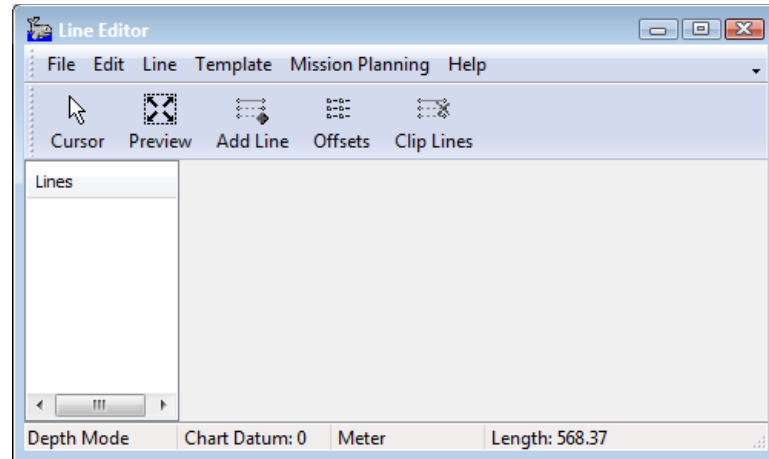
CREATING PLANNED LINES IN THE LINE EDITOR

LINE EDITOR creates planned line files. Create each line individually, or create one line then additional lines offset in a choice of patterns. There is no limit to the number of waypoints per line or lines per file.

Additionally, planned lines may be exported to a selection of third-party plan files.

To create planned lines in the LINE EDITOR:

1. **Open the LINE EDITOR.** Select PREPARATION-EDITORS-LINE EDITOR.

FIGURE 25. Line Editor Dialog

2. **Choose to enter your position information in XY or Lat/Lon format.** Select EDIT-INPUT MODE and your choice. Lat./Lon. coordinates from the local datum will be entered according to the default format specified in the HYPACK® MARINE SEARCH Control Panel.
3. **Set your line naming options.** (Optional)
4. **Define your planned lines** by entering the waypoints that describe each line. Each page on the spreadsheet represents a separate planned survey line and may be viewed by selecting the line name in the left-hand pane.
5. **Save your planned lines.** HYPACK® MARINE SEARCH planned lines: select FILE-SAVE or FILE-SAVE AS and name your file. Your data will be saved, by default, with an LNW extension to your project folder and enabled in the project files listing.

LINE NAMING OPTIONS

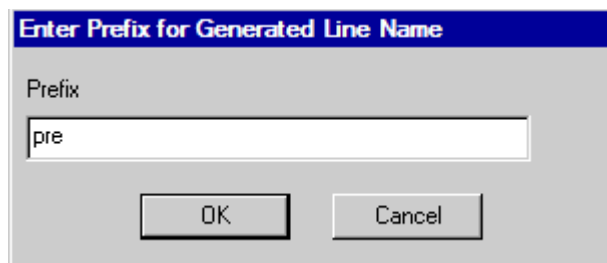
If you prefer something more than a simple line number to identify each planned line in the file, you can pre-define a text string that will be appended to the line number as specified. This feature is optional and must be set each time you enter the LINE EDITOR.

NOTE: This option is not available for lines created using center line offsets.

Defining a Prefix or Suffix

1. Select **LINE-LINE NAME PREFIX** or **LINE-LINE NAME SUFFIX**. A dialog will appear.

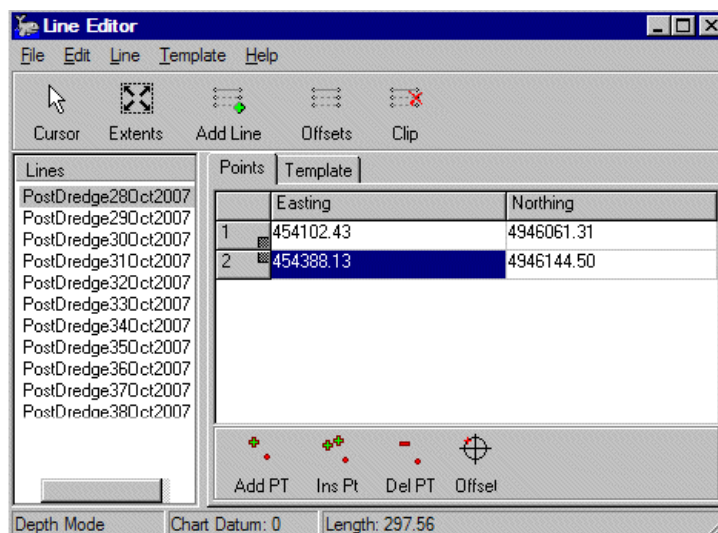
FIGURE 26. Line Name Prefix and Postfix Dialog



2. Enter the required text string and click OK.

Once a string has been entered, it will appear next to the menu selection and will be appended to all lines created after that until you change the string definition or close the LINE EDITOR.

FIGURE 27. Line Names with Prefix and Postfix

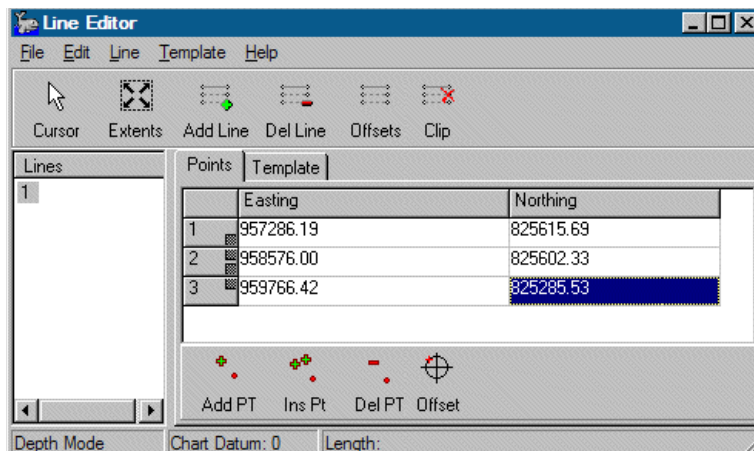


CREATING 2-DIMENSIONAL PLANNED LINES - SPREADSHEET METHOD

1. **Open the LINE EDITOR.** Select PREPARATION-EDITORS-LINE EDITOR.
2. **Create the spreadsheet** by clicking the Add Point icon once for each waypoint you wish to enter in the initial survey line. Each point will be automatically filled with the coordinates of the upper left corner of the area map.
3. **Enter the coordinates with the waypoint position information for the first line** into the spreadsheet.



FIGURE 28. Entering the Initial Line in Line Editor



4. Create your offsets.

- a. **Click on the Offsets icon.** The offsets dialog will appear.
- b. **Select the pattern of lines** you wish to use by selecting the corresponding tab.
- c. **Enter the parameters for line construction—typically, the number of offsets to be created as well as the distance or angle between them,** but the parallel and centerline patterns include additional options:
 - **To determine which way is left or right** (port or starboard) for parallel and center line offsets, imagine you are standing at the start of the initial line looking toward the end.
 - **Line Naming:** Parallel lines default to sequential numbers, but you may choose GeoNav naming. Cross line names in the center line pattern default to ###.##, but you may choose ##.###.
 - The center line pattern also requires a **chainage** on which the line numbering will be based and the **angle** at which the offsets will be generated relative to the center line.
- d. **If you are generating parallel offsets, choose whether to allow line renumbering.**



When the LINE EDITOR generates your offset lines, usually, it creates (and numbers) the offsets, in sequence, after the initial line (eg. 1,2,3,4,5). However, since you can generate parallel offsets on either side of the initial line (line '1'), they would be out of sequence (eg. 2,3,1,4,5).

To generate lines sequentially numbered, we have to renumber (rename) the lines by checking **Allow Line Renumbering**.



Tip: There are times, such as when you have generated offsets more than once, when this method of renumbering will not yield a sequential line set. If this is the case, select LINE-RENUMBER. The LINE EDITOR will renumber all of the lines in the file.

FIGURE 29. Offsets—Parallel Tab

Select Offset Method - Meter

Center Line | **Parallel** | Radial | Search Pattern | Stair Step | Extend Lines

Lines left of center: 5

Lines right of center: 8

Distance between lines: 25 e.g. 100, 50, 30 etc to create pattern

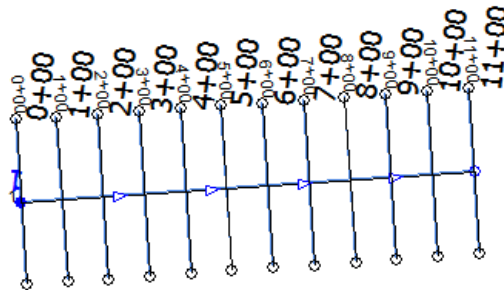
☐ GeoNav Naming

☐ Append offsets to single line

☐ Automatically calculate curve radius for segments

- e. Click **[OK]**. HYPACK® MARINE SEARCH will display your filled spreadsheet and the lines will be drawn to the screen. Alternatively, you can manually enter all of the waypoint data into the spreadsheet. (If you have a file with a lot of waypoints, you'll need a lot of time and patience for this option.)
5. **Preview your lines** by clicking the Extents icon. The LINE EDITOR spreadsheet will minimize and the area map will zoom in to the line file. Arrows show the direction of the line currently selected in the editor.

FIGURE 30. Previewing Your Lines



6. **Return to the LINE EDITOR** by clicking [Line Editor] at the lower left.
7. **Name individual lines** (optional):
 - Select LINE-LINE NAME and provide the name in the dialog that appears.

OR

 - Right-click on the current line name, select 'Rename' and enter the new line name.

8. **You may edit your lines, in the spreadsheet or with the cursor**, if you wish. Continue to preview and edit until your lines are satisfactory.
9. **Save your file.** Select FILE-SAVE or FILE-SAVE AS and name your file. Your data will be saved, by default, with an LNW extension to your project Folder and enabled in the project files listing.

NOTE: You may start again by selecting FILE-CLOSE. Confirm that you do not wish to save the file and the LINE EDITOR will return to the point when you first launched it.

More Information

- [“Offset Patterns for Planned Lines”](#) on page 2-16
- [“Editing your Planned Line File in the Line Editor”](#) on page 2-29
- [“Creating 2-Dimensional Planned Lines Using the Cursor and Offsets Method”](#) on page 2-21

CREATING 2-DIMENSIONAL PLANNED LINES USING THE CURSOR AND OFFSETS METHOD

You can interactively create planned survey lines in the LINE EDITOR:

1. **Open a Background File** of your survey area.

FIGURE 31. Sample Background File

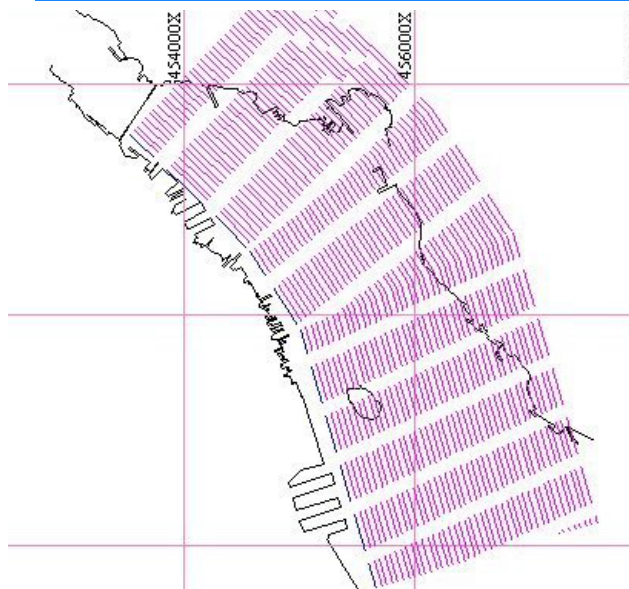


2. **Open the LINE EDITOR.** Select PREPARATION-EDITORS-LINE EDITOR

3. **Create your initial planned line.** Click the Cursor icon and the LINE EDITOR will minimize.
4. **Click in the area map to mark each waypoint in the initial line.**
5. **Restore the LINE EDITOR** by clicking [Line Editor] at the bottom left. You can review the points of your first line, and then continue.
6. **Create your Offset Lines.**
7. **Preview your lines** by clicking the Extents icon. The LINE EDITOR spreadsheet will minimize and the area map will zoom in to the line file.



FIGURE 32. *Planned Lines Preview on HAL.DIG*



8. **Return to the LINE EDITOR** by clicking [Line Editor] at the lower left.
9. **Save your Line File.** Select FILE-SAVE or FILE-SAVE AS and name your file. Your data will be saved, by default, with an LNW extension to your project Folder and enabled in the project files listing.

More Information

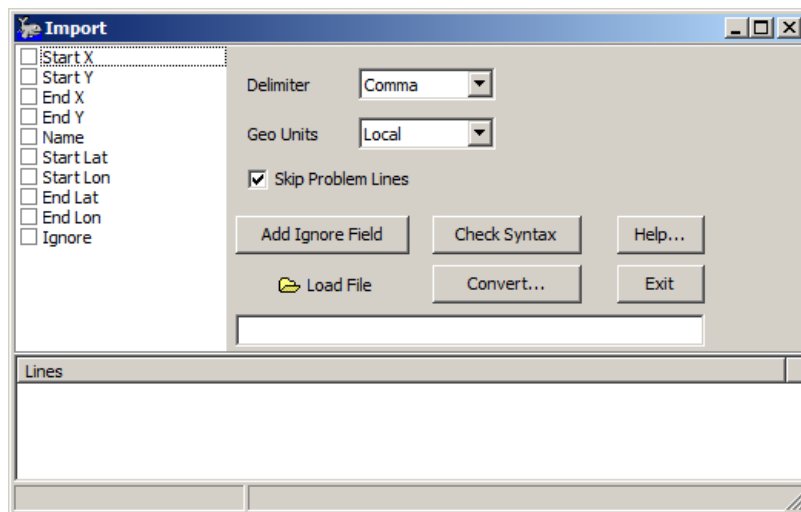
- [“Loading Background Charts to the Project”](#) on page 2-134
- [“Offset Patterns for Planned Lines”](#) on page 2-16
- [“Editing your Planned Line File in the Line Editor”](#) on page 2-29
- [“Creating 2-Dimensional Planned Lines - Spreadsheet Method”](#) on page 2-18

IMPORTING WAYPOINTS FROM A TEXT FILE TO THE LINE EDITOR

The LINE EDITOR Import dialog enables you to extract data from ASCII text files and use it to populate the fields of the LINE EDITOR to generate single-segmented planned lines.

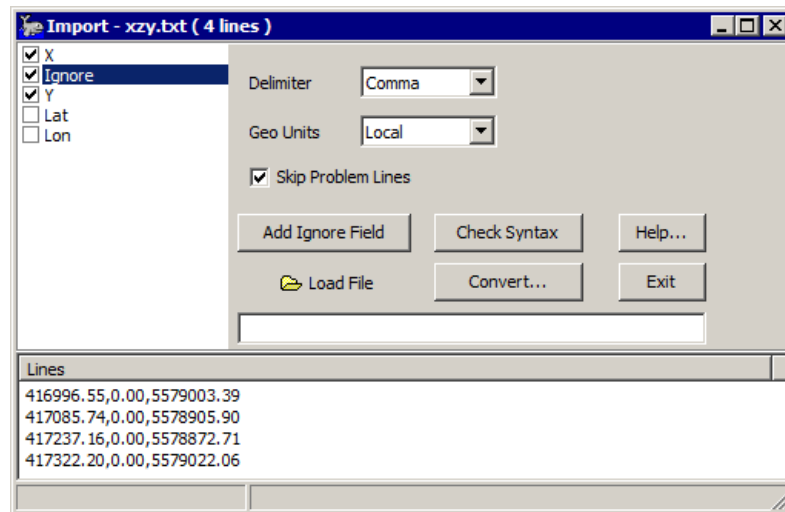
- Each line (or record) in the text file must contain the data for one line in the planned line file and present the data in the same order.
 - Each line must, at least, contain the coordinates for the start and end points of the line. If no name is imported, the LINE EDITOR automatically numbers your lines when you import the data.
1. **Open the LINE EDITOR.** Select PREPARATION-EDITORS-LINE EDITOR.
 2. **Select FILE-IMPORT.** This will give you the dialog box which you will use to set up your import of the text document.

FIGURE 33. *Line Import Dialog—Importing the Second Through Fifth Fields of Each Record: The Waypoint Positions*



3. **Select and order the fields used to create your new line file.**
 - **Place a check in the box for each field in your text file** you want to use to populate the Line file
 - **Use the cursor to drag the fields** into the order that they appear in your file.
 - **To skip a field in the string**, check 'Ignore' and drag it to the position of the field to be skipped in the list. If you need more than one Ignore field, click [Add Ignore Field] to generate as many as you need.

FIGURE 34. Ignoring Fields in the Import String—Ignoing the Second Field in an XY Import



4. **Choose the correct delimited format.** The program supports comma, tab and space delimiters.
5. **Load the text file.** Click [Load File], select your file and click [Open]. In the Lines area, you will see your waypoints as they appear in your file and you can see the syntax of the records.
6. **Check the syntax of your file against the field list.**
(Optional) This process verifies that your configuration settings are compatible with the text file you have loaded.
 - a. **Select a line** from the Lines area.
 - b. **Click [Check Syntax].** A message window will appear to tell you how many records of the total number can be converted using your current settings.
7. **Click [Convert]** A message window will appear to tell you how many records have been converted.
8. **Click [Exit].** The Import dialog will close and the LINE EDITOR will be populated with the data from the text file.
9. **Save your line file.** Select FILE-SAVE or FILE-SAVE AS and name your file. Your data will be saved, by default, with an LNW extension to your project folder.

CREATING PLANNED LINES TO FIT YOUR SURVEY AREA

You can create a border file in the BORDER EDITOR, which defines the boundary areas of your survey area. Use it to guide HYPACK® MARINE SEARCH in creating or "clipping" the survey lines to exactly fit within a coastline or unorthometric survey area.

Create one or more border files to describe your survey area. You will need one border to define the perimeter of your survey area. Additional border files may be required if there are obstructions, such as islands, in your survey area that will disrupt your line pattern.

NOTE: The last point of the border describing the perimeter should always be *inside* the border area. The last point of borders describing unsurveyable areas, such as islands, within the survey area should be outside the border area.

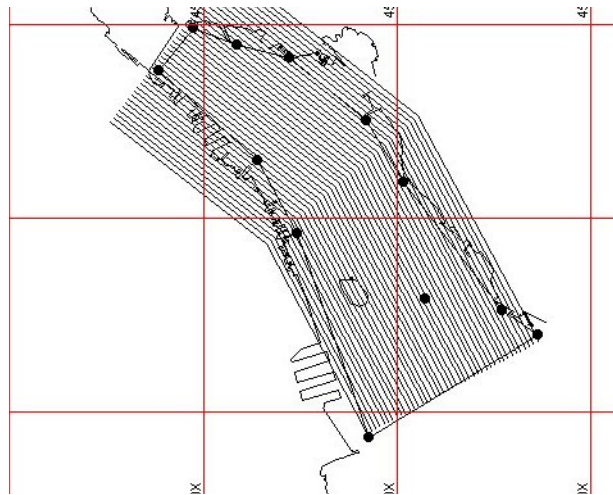
Once you have defined your survey area with border files, you can clip existing line files or generate a new line set within the border defining the perimeter.

CLIPPING PLANNED LINES TO THE SURVEY AREA

If you have a planned line file whose lines extend outside the survey area, you can use a Border file to clip the lines to fit your area.

1. **Create a border file** (or border files) defining the boundaries of your survey area.
2. **Open your planned line file** by opening the LINE EDITOR and clicking FILE-OPEN then selecting the correct line file.

FIGURE 35. *Planned Line File with Border File overlaid*



3. **Click [Clip Lines].**
4. **Select the border file that you want to clip with and click [OK].** HYPACK® MARINE SEARCH does the rest. If the border is concave and lines are broken, the segments toward the end of the line will be renamed with an “_Number” appended. For example, line 2 would become “2” and “2_1”.



NOTE: You may need to repeat this process multiple times if you have more than one border file.

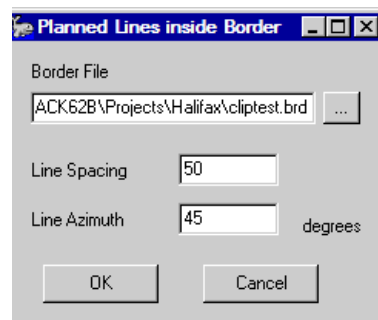
5. **Save your file.** Use FILE-SAVE if you want to overwrite your original line file. Use FILE-SAVE AS to preserve your original line file and save the clipped lines to a different name. Your data will be saved, by default, with an LNW extension to your project folder and enabled in the project files listing.

CREATING PLANNED LINES INSIDE A BORDER FILE

If you are creating a new line file the LINE EDITOR can create a set of survey lines with user-defined spacing and azimuth to fit within the border file.

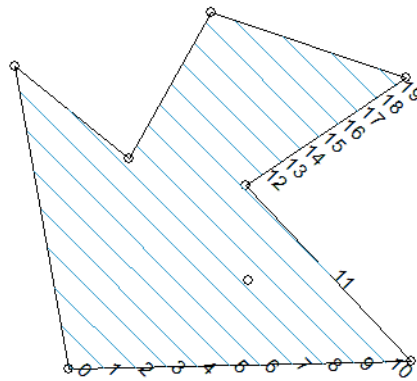
1. **Create the border file** to describe the perimeter of your area. Take care to place the last point inside the area defined.
2. **Open the LINE EDITOR.**
3. **Select LINE-GENERATE LINES IN BORDER.** A dialog will appear.

FIGURE 36. Entering the parameters to create lines inside a border file.



4. **Enter border file, line spacing and line azimuth for your file and click [OK].** The lines will be generated and drawn to the design window for preview.
5. **Save your line file.** Your data will be saved, by default, with an LNW extension to your project Folder and enabled in the project files listing.

FIGURE 37. Sample Line File within a border



GENERATING PLANNED LINES AT PREDEFINED LOCATIONS

The LINE EDITOR includes a routine that generates a set of planned lines centered over each position from a target group or XYZ file. It's a useful tool to quickly generate a search pattern or parallel offset lines over several predefined locations.

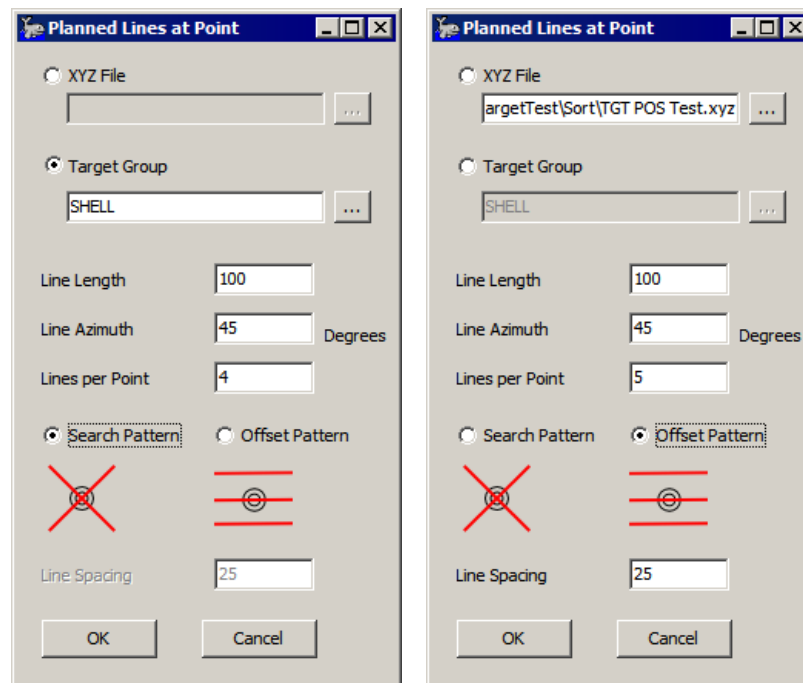
1. **Create the file to be used for positioning.** You may easily create a target group in HYPACK® MARINE SEARCH or the TARGET EDITOR or an XYZ file in the XYZ COLLECTOR.
2. **Open the LINE EDITOR and select FILE-NEW.**
3. **Select LINE-PLANNED LINES AT POINT.** The Planned Line at Point dialog appears.
4. **Enter the parameters on which the lines will be generated.**
 - **Source file:** The positioning information for each set of lines. Select the XYZ File or Target Group option, then use the corresponding ellipsis button to load the file.
 - **Line Length:** Length of each line in the file.
 - **Line Azimuth:** Angle the pattern is rotated around each position point. The program places the first line at the defined angle and generates the remaining lines relative to it.
 - **Lines Per Point:** Number of lines generated around each point in the source file.
 - **Pattern:** Choose a Search pattern or parallel offsets centered on each point.

NOTE: If you choose the Offset pattern, enter an odd number of lines per point so your lines will be evenly spaced with one line across the position and an

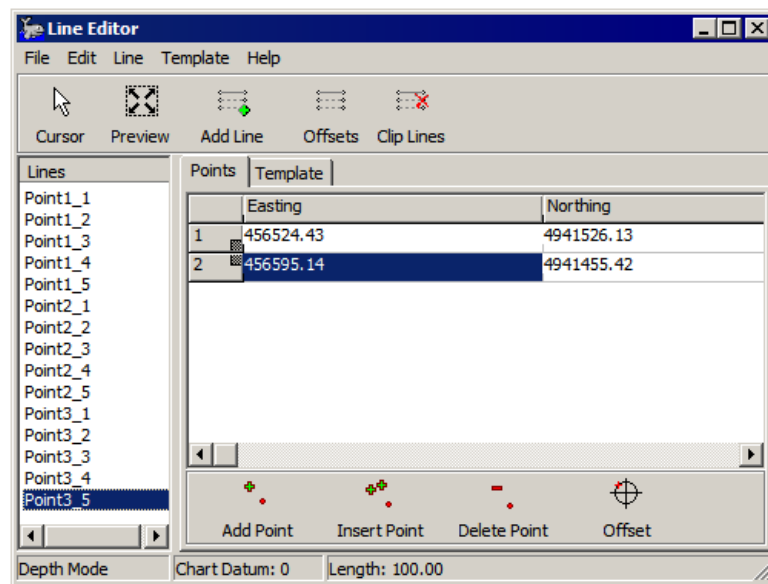
even number of lines on each side. If you enter an even number of lines per point, the program generates an equal number of lines on either side of the point leaving a gap twice the size of the line spacing in the center.

- **Line Spacing:** Distance between lines generated in an Offset pattern.

FIGURE 38. *Planned Line at Point Dialog—Search Pattern at Target Locations (left) Offsets Pattern at XYZ Positions (right)*



5. Click **[OK]**. The line sets are generated all in one planned line file with line names in the format *PointNumber_LineNumber.LNW*.

FIGURE 39. Resulting Line File in the LINE EDITOR

6. **Save your file.** Select FILE-SAVE and name your file. It is saved, by default, to your project folder.

More Information

- [“Marking Targets with your Cursor in HYPACK®”](#) on page 2-518
- [“Creating Targets in the TARGET EDITOR”](#) on page 2-528
- [“XYZ Collector”](#) on page 9-126

EDITING YOUR PLANNED LINE FILE IN THE LINE EDITOR

You may edit a planned line file that has been created in the LINE EDITOR, at any time, by opening the LINE EDITOR and selecting FILE-OPEN and selecting the LNW from the file selection dialog. The saved data will appear in the spreadsheet where you can make your changes.

Many changes can be made either in the spreadsheet or by using the cursor in the area map. The following describes the editing operations available and instructions to do them in each mode.

TABLE 2. Editing Tools and Methods in the LINE EDITOR

Task	Spreadsheet Method	Cursor Method
Add Line 	Click the Add Line icon then the Add point icon. Enter the waypoint position data. 	Add Line icon then the Cursor icon. Click on the map at waypoint positions. 
Delete Line	Right-click on the line name of the line to be removed and select 'Delete'.	
Insert a Waypoint	Select waypoint below where the new point should be inserted and click the Insert Point icon. Enter the appropriate coordinates. 	Select waypoint immediately before it on the line. (The circle will fill.) Hold the Shift key and click with the cursor at the new waypoint location.
Delete Waypoint	Select the waypoint in the spreadsheet and click Delete Point icon. 	Select the waypoint in the area map (it becomes solid filled) and push the delete key on keyboard.
Reposition a Waypoint	Type new coordinates for the point you want to move.	Select the waypoint in the area map then drag it with the cursor to the new location.
Reverse the Order of Waypoints	Right-click on the current line name and select 'Reverse Order'.	
Clip lines to survey area	(See "Clipping Planned Lines to the Survey Area".)	
Rename lines	Right-click on the current line name, select 'Rename' and enter the new line name.	

UNDO OFFSETS

If you have just used the automatic Offsets feature and are unsatisfied, and you have not yet closed the file, select LINE-UNDO OFFSETS and try again. Continue to preview and edit until your lines are satisfactory.

EXTENDING OR SHORTENING LINES

Modifying the length of the planned line (at either or both ends) enables you to expand your survey area and maintain the ability to do accurate historical comparisons with previous surveys.

1. **Open the line file** where you want to extend lines.
2. **Click the Offsets icon and select the Extend Lines tab.**

FIGURE 40. Offsets – Extend Lines Tab

The screenshot shows the 'Select Offset Method' dialog box with the 'Extend Lines' tab active. The 'Center Line' sub-tab is selected. In the 'Lines' section, the 'Specific Lines' radio button is chosen. The 'Lines' range is specified as '1' to '28'. Below this, the 'Start of line distance' and 'End of line Distance' are both set to '0'. At the bottom right, there are 'OK' and 'Cancel' buttons.

3. **Select whether you want to extend All Lines or Specific Lines.**
4. **If you choose “Specific Lines”, specify a range of lines (by line number) to be affected.** (The dialog default includes all of the lines in your file.)

NOTE: These numbers usually correspond to the line numbers. However, if the line naming scheme is other than sequential numbering beginning at one, you should count the lines in the Lines list to determine how to describe the range of lines. For example, if you are extending the offsets in a center line pattern, the center line is "1", then the section lines begin, by default, at "0+00". If you specify a range of 5-15, the lines named "3+00" to "13+00" will be extended.

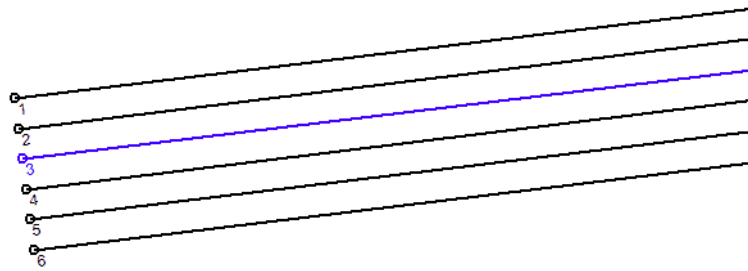
5. **Enter the distance that you want to extend the lines** at the start or end (or both) of the specified lines. (If you want to shorten your line, enter a negative distance.)
6. **Click [OK]** and the LINE EDITOR will move the start line point by the specified distance.

INSERTING EQUIDISTANT LINES WITHIN A LINE FILE

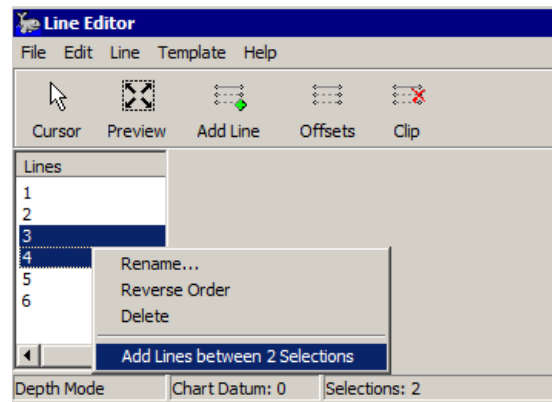
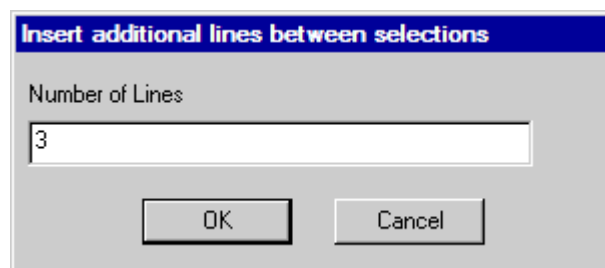
You can insert a user-defined number of survey lines between two adjacent lines in an existing planned line file. The Line Editor will calculate the required waypoint coordinates to distribute them evenly between the two existing lines using the same offset pattern. Line Editor generates unique numeric line names for the inserted lines.

To insert additional lines into an existing planned line file:

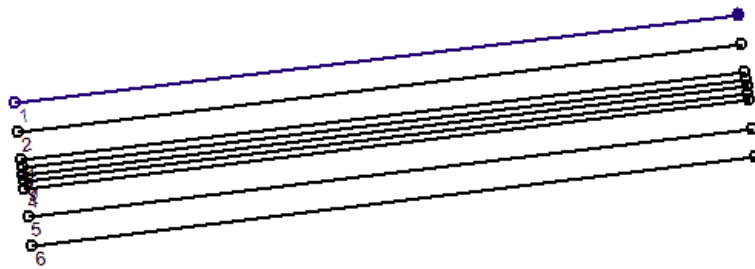
1. **Open the existing planned line file in the LINE EDITOR.**

FIGURE 41. The Original Planned Line File

2. **Hold the Ctrl key and use your cursor to select the two adjacent lines** between which you want to insert the additional lines.
3. **Right-click in the shaded space created by the selection and select “Add lines between 2 selections”**. A dialog will appear.

FIGURE 42. Inserting lines in the LINE EDITOR*FIGURE 43. Specifying the number of lines to be inserted*

4. **Enter the number of lines you want to insert and click [OK]**. The lines will be inserted into the file. In this example, we began with six lines named by number. The inserted lines are named 7, 8 and 9. You may rename them manually, if you wish.

FIGURE 44. *Three Lines Inserted to a Line File with Parallel Offsets*

5. **Save your modified file.** Select FILE-SAVE to overwrite the original line file. Select FILE-SAVE AS to write the results to a new line file. Your data will be saved, by default, with an LNW extension to your project Folder and enabled in the project files listing.

More Information

- [“Clipping Planned Lines to the Survey Area”](#) on page 2-25

CREATING 3-DIMENSIONAL PLANNED LINES IN THE LINE EDITOR

You can add channel template information to your planned line file through the options in the Template menu. This creates a 3-dimensional planned line file that can then be used to display the template during survey and dredging operations, and in the SINGLE BEAM EDITOR. It is also used to calculate volumes in the CROSS SECTIONS AND VOLUMES and the TIN MODEL programs.

You can use the Template tab as an alternative to the one provided in the CROSS SECTIONS AND VOLUMES program, then import the TPL file into the Template column of CROSS SECTIONS AND VOLUMES to describe alternate channel designs for calculations in that program.

1. **Create your channel templates.** Use the Template tab to create as many templates as you need to describe your channel. Each line can have a different template if necessary.
2. **If you are working in Elevation Mode or are using RTK positioning and have specified a Chart Datum,** apply your Chart Datum to your template by selecting TEMPLATE-ALL LINES-APPLY DATUM.
3. **Apply the template** (or templates) to the lines that it describes.
4. When you have the correct template information applied to all of your lines, **save your planned line file.** Select FILE-SAVE or FILE-SAVE AS and name your file. Your data will be saved,

CREATING A CHANNEL TEMPLATE IN THE LINE EDITOR

by default, with an LNW extension to your project folder and enabled in the project files listing.

1. **Select the line to which you want to add the template information** from the list on the left of the LINE EDITOR (click it to highlight it) and select the Template tab.
The left side of the dialog contains a 2-column spreadsheet. The area at the right draws the template as described in the spreadsheet using DBL as the horizontal axis and Depth as the vertical axis. This representation is also affected by the Elevation setting in your geodetic parameters.

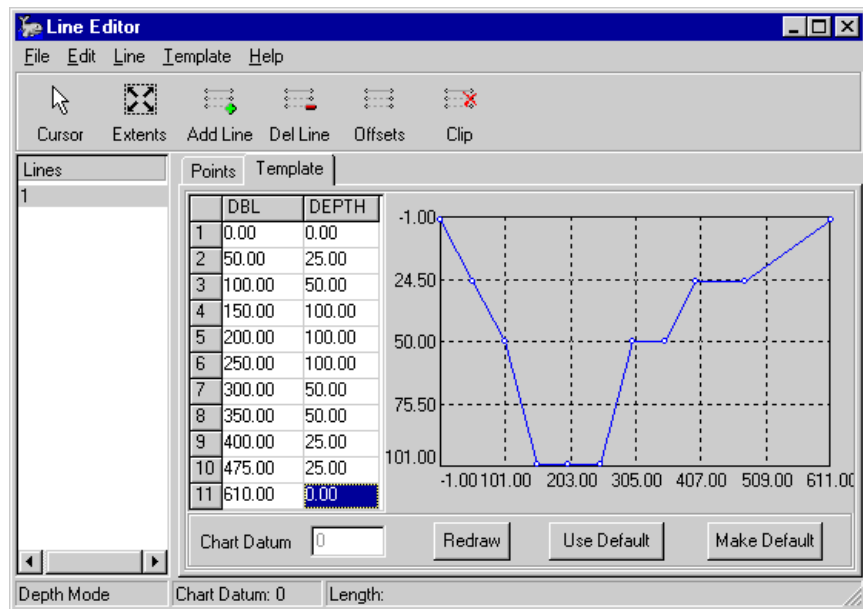
TABLE 3. *Depth vs Elevation*

Elevation Option is...	Mode	Depth Measurement
Selected	Elevation	Negative downward
Not Selected	Depth	Positive downward

The bottom of the dialog displays:

- The **Chart Datum** to show you what has been set in your geodetic parameters. You must apply your Chart Datum to your template if you are working in elevation mode or using RTK positioning.
 - The **Line Length** to show you what the template length should be for that line.
2. **Describe the channel template** by entering the Distances from the Beginning of the Line (DBL), in order, and their corresponding depths to the spreadsheet. You can enter up to 200 such points and the graph on the right will draw accordingly. If the drawing on the right is incorrect, make changes in the spreadsheet to correct it.
You can easily change the sign of your depth values by selecting TEMPLATE-ALL LINES-INVERT DEPTHS.

FIGURE 45. The Template Editor draws the Template



3. **Save the template information** (optional) by selecting TEMPLATE-SAVE CURRENT TEMPLATE and naming the template. Name it something that describes the template to help you recognize which line or series of lines it goes with. This will be saved to a template file (*.TPL) in your project Folder.

NOTE: Saving the template to a TPL file is not required, but it may save you some time in applying templates to additional lines in your file. This file is then also available to use as a template file in CROSS SECTIONS AND VOLUMES.

APPLYING AND REMOVING THE CHART DATUM TO YOUR TEMPLATE

Apply the chart datum by selecting TEMPLATE-ALL LINES-APPLY DATUM. The depths in the spreadsheet will be recalculated (depth + datum) and the vertical axis on the graph will be labeled accordingly.

Remove the chart datum from your template, select FILE- ALL LINES -REMOVE DATUM.

APPLYING THE TEMPLATE TO THE SURVEY LINES

When you create a template, the template you just created is now applied only to the line that was selected when you created the template. The next step is to apply the template to any other lines that have the same template.

The **Default Template** makes it quick and easy to apply the same template information to multiple lines. Once you have defined a

template, you can store it to temporary memory by clicking [Make Default]. You can then apply that template to one or more additional lines.

- **To apply the default template to one line:**
 - a. **Select the line** to which you want to apply the template.
 - b. **Select TEMPLATE-USE DEFAULT TEMPLATE.** The template that was last set as the default will be applied.
- **To apply the default template to all lines** select TEMPLATE-ALL LINES- USE DEFAULT TEMPLATE.
- **To apply template other than the default:**
 - a. **Type new template information** for the line into the Template tab.
 - b. **Select TEMPLATE-LOAD TEMPLATE** and select the required TPL file. (You must have previously entered the information and saved it using TEMPLATE-SAVE CURRENT TEMPLATE.)

CHANGING THE DEFAULT TEMPLATE

Unless you have a very simple channel, you will have multiple templates in your channel. As you apply template throughout your channel, from time to time, you may need change which is the default. You can:

- **Copy it from a line.** Select a line that already has the new template attached and click [Make Default] (or select TEMPLATE-MAKE TEMPLATE DEFAULT).
- **Copy it from a TPL file.** If the new template has already been defined and saved to a TPL file, select a line where you want the new default template applied, then select TEMPLATE-LOAD TEMPLATE and the template file. Click [Make Default] to set it as the new default.

REMOVING THE TEMPLATE FROM SURVEY LINES

To remove the template information from individual lines, select the line then select TEMPLATE- CLEAR TEMPLATE.

To remove the template information from all of the lines, select TEMPLATE-ALL LINES-CLEAR TEMPLATE.

APPENDING LINE FILES

You can append one existing Line File to another in the LINE EDITOR.

1. **Open or create a line file** in the LINE EDITOR.
2. **Select FILE-APPEND** and a file selection dialog will appear.
3. **Choose the second line file and click [OK].** The second file will be appended to the end of the first. When the Line Editor combines the two files, it checks for duplicate line names. If

there are duplicate line names in the appended file, the LINE EDITOR appends an “_1” to the name. If that name already exists, the LINE EDITOR appends an “_2”. LINE EDITOR will continue incrementing the number after the underscore until it creates a line name that is unique to the file.

4. **Preview the results** by clicking the Extents icon.
5. **Save your file.** FILE-SAVE will overwrite the original line file. FILE-SAVE AS will enable you to assign a new name to the combined file.

CREATING WAYPOINTS USING DISTANCE AND BEARING

You can extend the end of a survey line by adding a waypoint based on distance and bearing information instead of waypoint coordinates.

1. **Define the coordinates of at least one waypoint in a survey line.** You can enter it manually or use the cursor method.

FIGURE 46. Initial Survey Line



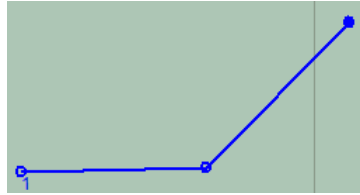
2. **Click the Offset Icon** from the lower toolbar. A dialog will appear.



FIGURE 47. Offset Point Dialog

3. **Enter the distance and bearing from the last waypoint in the line to the end point of your extension and click [OK].** The LINE EDITOR will calculate the position and automatically append the coordinates as the last waypoint in the line.

FIGURE 48. Survey Line Extended 45 Survey Units at a Bearing of 45 Degrees

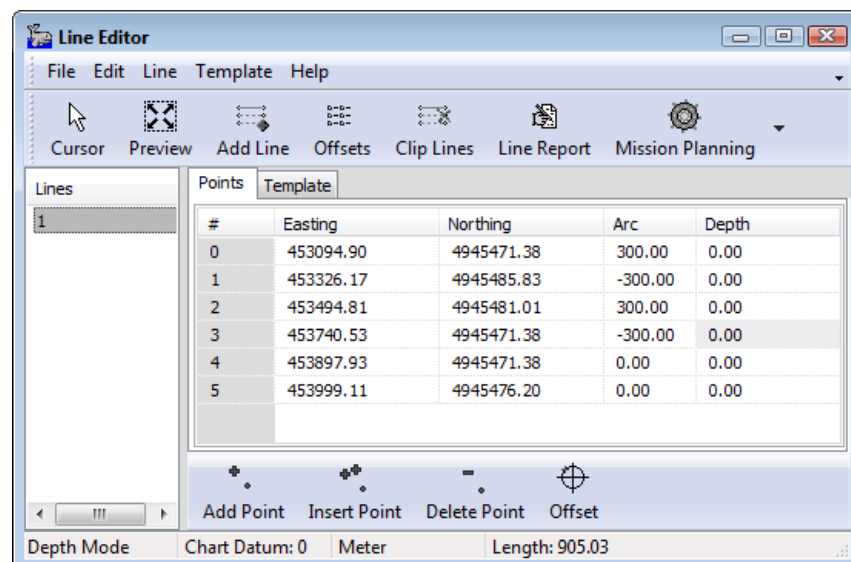


CREATING CURVED LINES WITH THE LINE EDITOR

Curved survey lines will be defined in HYPACK® MARINE SEARCH as any survey line containing one or more arched segments connecting their defining points.

1. **Create your initial line** as you would with straight lines. Typically, you define the initial line by entering a few points, using either the cursor or spreadsheet method. These points will automatically be connected by straight segments.
2. **Add curvature to any segment of the line as needed.** Enter your radius in the Arc column for the waypoint preceding the segment you want to curve. In this example, we alternated 300 and -300.

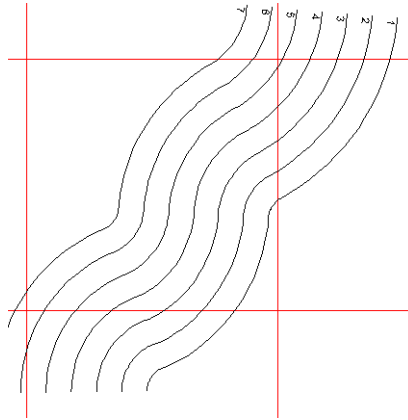
FIGURE 49. Specifying the Radius of your Arc



- Enter any radius that is, by absolute value, greater than the half-length of the segment. Otherwise, the arc can not be created.
- A positive or negative radius determines that the center point of the arc will be right or left of the segment respectively.

3. **Create your offsets as normal.** All offset patterns can be used with curved lines (some with more useful result than others).

FIGURE 50. *Curved Parallel Lines—Four Consecutive Curved Segments*



NOTE: The Clip Lines option does not support curved lines. It will clip curved segments, as if they were straight.

EXPORTING PLANNED LINES FROM THE LINE EDITOR

You can export your planned line information to additional, non-HYPACK® MARINE SEARCH formats for use in third-party software:

- L84: LNW format with WGS-84 coordinates.
- Kongsberg *.ascioplan
- CINNA format

To output an L84, ascioplan, CINNA or CSV file, select FILE-SAVE AS and set the File of Type field when you name your file.

LINE REPORTS

HYPACK® MARINE SEARCH generates line reports from a right-click menu in the HYPACK® MARINE SEARCH Project Items list and from the LINE EDITOR. Both list the distance along line for each line in the planned line (*.LNW) file. The report generated in the LINE EDITOR also attempts to estimate the time to survey the line set based on your estimates of your average speed and time to change lines.

SHOW LINES REPORT

Once you have a line file loaded to HYPACK®, you can generate a listing of the distances along each survey line and their total by

right-clicking on the Line File name in the Project File list and selecting *Show Lines Report*.

FIGURE 51. *Show Lines Report*

Line Distance Report: C:\HYPACK 2017\projects\B1b\black.lnw
Project: B1b.ini

50	326 Meters
51	326 Meters
52	326 Meters
53	326 Meters
54	326 Meters
55	326 Meters
56	326 Meters
57	326 Meters
58	326 Meters
59	326 Meters
60	326 Meters

Total Lines: 11 3585 Meters

ESTIMATING SURVEY TIME AND DISTANCE

A lines report is a listing of the distances along each survey line, and the calculated the total line distance and the approximate travel time based on user-defined travel speed and line change time. You can generate lines reports from enabled planned line files (*.LNW), or raw data files (*.RAW, *.HSX).

1. **Load the planned line file into the LINE EDITOR.**
2. **Click the Line Report icon.** The Line Report dialog appears.

FIGURE 52. *Line Report Dialog*

The image shows a 'Line Report' dialog box. It has a title bar 'Line Report'. Inside, there are two input fields: 'Survey Speed (Knots)' with the value '0.0' and 'Interline Transit Time (Minutes)' with the value '0'. At the bottom, there are two buttons: 'OK' and 'Cancel'.

3. **Enter your report calculation variables and click [OK].** The generated report appears in Windows® Notepad.
 - **Survey Speed:** Estimated average travel speed (knots).
 - **Interline Transit Time:** Estimated time between an end line and the next start line.

FIGURE 53. A Sample Line Report

Line Distance Report: C:\000 Test Projects\1mb\7101 Philadelphia\raw
 \HSX_0617.LOG
 Project: 7101 Philadelphia.ini

ROLL.HSX	564 Feet	00:01:07
ROLLA.HSX	513 Feet	00:01:01
002_1437.HSX	349 Feet	00:00:41
002_1439.HSX	309 Feet	00:00:37
003_1442.HSX	334 Feet	00:00:40
003_1444.HSX	308 Feet	00:00:37
004_1446.HSX	310 Feet	00:00:37
004_1449.HSX	289 Feet	00:00:34
001_1454.HSX	327 Feet	00:00:39
004_1456.HSX	332 Feet	00:00:39
002_1458.HSX	351 Feet	00:00:42
005_1500.HSX	280 Feet	00:00:33
003_1503.HSX	335 Feet	00:00:40
010_1505.HSX	285 Feet	00:00:34
007_1507.HSX	303 Feet	00:00:36
006_1510.HSX	332 Feet	00:00:39
008_1512.HSX	311 Feet	00:00:37
009_1515.HSX	306 Feet	00:00:36
Total Lines: 18	6138 Feet	00:12:07
Total transit time:		02:50:00
Total time:		03:02:07

4. **Save your report.** (Optional) In Notepad, select FILE-SAVE AS, set the location and name for your report and click [Save].

NOTE: FILE-SAVE defaults to the \HYPACK Marine Search\Temp folder.

EXPORTING TEMPLATE POINTS TO XYZ

If you have a planned line file that includes template information, you can export the template points to an XYZ format text file.

1. **Open the LINE EDITOR.** (Select PREPARATION-EDITORS-LINE EDITOR.)
2. **Open your 3-dimensional line file.**
3. **Select TEMPLATE-SAVE TO XYZ and name your file.**

FIGURE 54. *Exporting LNW Template Points to XYZ*

BORDER FILES

Border Files (*.BRD): A user-defined listing of XY positions that defines an area in your project area. Typically, Border files are created in the BORDER EDITOR and stored in your project folder. They have several uses, most often to clip data or limit program calculations to a user-defined area.

Use a border file to limit the area in which you generate a mosaic file of your data in the TARGETING AND MOSAICKING module.

CREATING A BORDER FILE WITH THE CURSOR METHOD

In the BORDER EDITOR, the cursor method is a quick and easy way to define your borders if you have a background file of your survey area available to you.

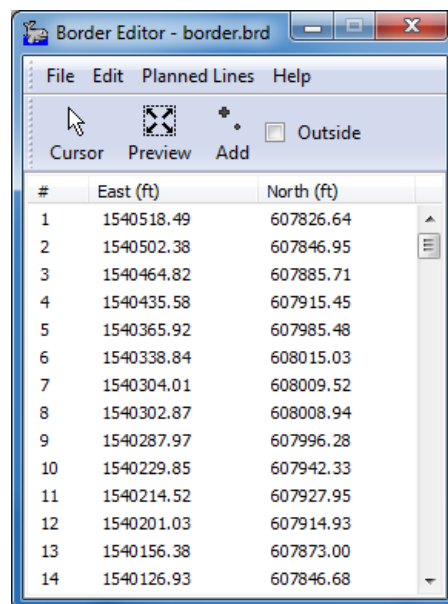
Use your cursor to define the perimeter of your area. These locations appear as open circles at the map location. The BORDER EDITOR also, automatically generates small, black “virtual waypoints” between each pair of defined waypoints. At any time, you can click and drag a waypoint or virtual waypoint to a new position. If you reposition a virtual waypoint, it becomes a waypoint and two additional virtual points appear on either side of it.

NOTE: You may need to repeat this process multiple times if more than one area must be defined.

1. **Open the background file** in your project.

2. **Open the BORDER EDITOR** by selecting PREPARATION-EDITORS-LINE EDITOR.
3. **Specify that you are creating a new file** by selecting FILE-NEW.
4. **Click [Cursor]**. The BORDER EDITOR will minimize and a BORDER EDITOR button will appear at the lower left, leaving the map visible again.
5. **Click on the map at enough locations around the perimeter of your survey area to define its shape.**
6. **Restore the BORDER EDITOR** to the screen by clicking [Border Editor]. It will display a spreadsheet of all points you have selected.

FIGURE 55. BORDER EDITOR



The screenshot shows a window titled "Border Editor - border.brd" with a menu bar (File, Edit, Planned Lines, Help) and a toolbar with icons for Cursor, Preview, Add, and an "Outside" checkbox. Below the toolbar is a spreadsheet with 14 rows of data. The columns are labeled "#", "East (ft)", and "North (ft)".

#	East (ft)	North (ft)
1	1540518.49	607826.64
2	1540502.38	607846.95
3	1540464.82	607885.71
4	1540435.58	607915.45
5	1540365.92	607985.48
6	1540338.84	608015.03
7	1540304.01	608009.52
8	1540302.87	608008.94
9	1540287.97	607996.28
10	1540229.85	607942.33
11	1540214.52	607927.95
12	1540201.03	607914.93
13	1540156.38	607873.00
14	1540126.93	607846.68

7. **Check or clear the Outside option** to indicate the area in which you want to keep your data.
8. **Edit your points** at this time if necessary using the Add icon and right-click menu.

Once a border is defined, you can select any point in the border, which will turn it red, and modify the file as follows:

- **Overtyp**e any coordinates you want to change.
- **[Add]**: Inserts a waypoint at the end of the spreadsheet mid-way between the first and last points.
- **Insert**: Adds a point mid-way between the selected point and the point *before* it.
- **Delete**: Removes the selected point.
- **Delete All**: Removes all waypoints in the current file.

- **Copy:** Copies the selected coordinate pair to the Windows® clipboard.
 - **Paste:** Overwrites the selected coordinate pair with the copied coordinate pair on the clipboard.
9. **Preview your entries** by clicking [Preview]. The BORDER EDITOR will minimize and the area map will zoom in on your points.
 10. **Save the file.** When you are satisfied, click FILE–SAVE AS. You will be asked to name the border file which will be saved, by default, with a BRD extension to the project directory and enabled (drawn to the screen) in your project.

NOTE: The BRD file stores the waypoints in XY coordinates. Alternatively, you can save the same file with WGS-84 coordinates (*.B84) for use outside of HYPACK®.

CREATING A BORDER FILE WITH THE SPREADSHEET METHOD

In this method, it is useful if you know the coordinates of your shoreline, islands and any other areas you want to exclude from your survey area that is currently covered by your planned lines.

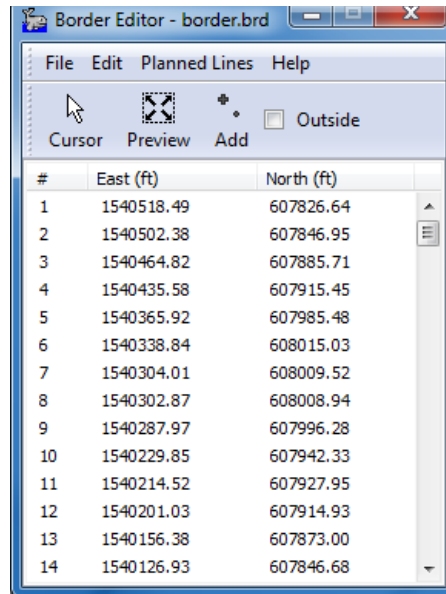
NOTE: You may need to repeat this process multiple times if more than one area must be defined.

1. **Open the BORDER EDITOR** by selecting PREPARATION-EDITORS-BORDER EDITOR. The BORDER EDITOR will appear.
2. **Click on FILE-NEW** to clear the spreadsheet.
3. **Set the format in which you want to enter your target positions.** You can enter position data in either X,Y or Lat./Lon. format. Toggle between these options using the EDIT-UNITS menu selection. Lat./Lon. displays follow the default setting found in the General Tab of the HYPACK® MARINE SEARCH Control Panel.
4. **Enter the coordinates for your boundary.** To enter your waypoints manually:
 - a. **Click the Add Point icon for each point needed** to define the area perimeter. Each point will be automatically filled with the coordinates of the upper left corner of the area map.



- b. **Edit the coordinates with the waypoint position information for your border file..** Remember that the points must form one continuous line.
5. **Check or clear the Outside option to indicate the area in which you want to keep your data.**

FIGURE 56. The **BORDER EDITOR** Window



6. **Preview your entries** by clicking [Preview]. The BORDER EDITOR will minimize and the area map will zoom in on your points.
7. **You may edit your points as necessary** by reopening the BORDER EDITOR and making any changes using the right-click menu.

Once a border is defined, you can select any point in the border, which will turn it red, and modify the file as follows:

- **Overtyping any coordinates** you want to change.
 - **[Add]:** Inserts a waypoint at the end of the spreadsheet mid-way between the first and last points.



Tip: Alternatively, HYPACK® MARINE SEARCH automatically generates a **virtual point** in the area map at the midpoint between each point defined in the BORDER EDITOR. Virtual points only become part of the border file if you click on it. At this time, two new virtual points appear before and after the new border point.

A right-click on the selected point accesses the following menu:

- **Insert:** Adds a point mid-way between the selected point and the point *before* it.
- **Delete:** Removes the selected point.

- **Delete All:** Removes all waypoints in the current file.
 - **Copy:** Copies the selected coordinate pair to the Windows® clipboard.
 - **Paste:** Overwrites the selected coordinate pair with the copied coordinate pair on the clipboard.
8. **Save your file** by clicking on FILE-SAVE, giving it a name and saving your file to your project. Your Border File will be saved with the BRD extension in your project directory and enabled (drawn to the screen) in your project.

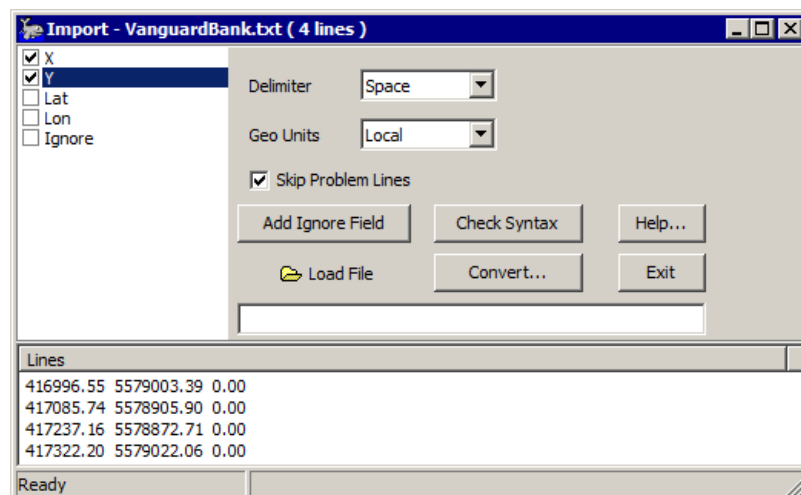
NOTE: The BRD file stores the waypoints in XY coordinates. Alternatively, you can save the same file with WGS-84 coordinates (*.B84) for use outside of HYPACK®.

IMPORTING BORDER POINTS TO THE BORDER EDITOR

The Border Import dialog enables you to extract data from ASCII text files and use it to populate the fields of the BORDER EDITOR. Each line (or record) in the text file must contain the data for one point in the border and present the data in the same order.

1. **Open the BORDER EDITOR** from the Editors menu in the HYPACK® MARINE SEARCH shell.
2. **Select FILE-IMPORT.** This will give you the dialog box which you will use to set up your import of the text document.

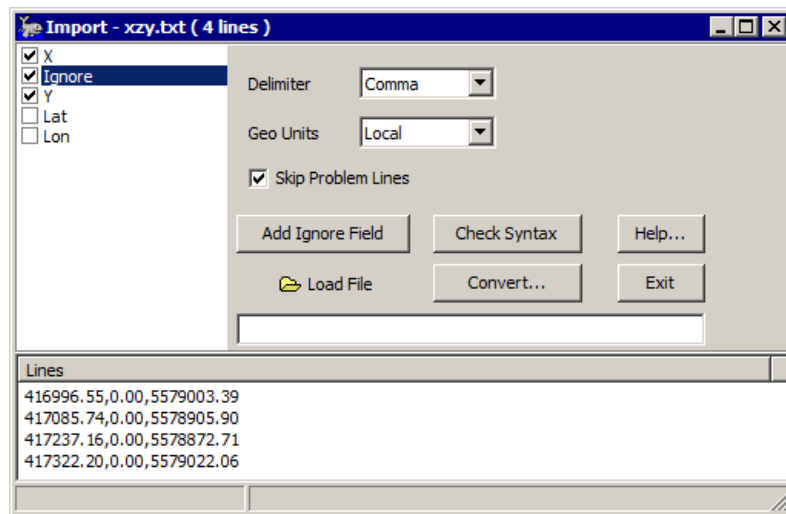
FIGURE 57. Border Import Dialog--importing the first two fields of each record: the XY positions



3. **Select and order the fields used to create your new border file.**

- a. **Place a check in the box for each field** in your text file you want to use to populate the border file
- b. **Use the cursor to drag the fields** into the order that they appear in your file.
- **To skip a field in the string**, check 'Ignore' and drag it to the position of the field to be skipped in the list. If you need more than one Ignore field, click [Add Ignore Field] to generate as many as you need.

FIGURE 58. Ignoring Fields in the Import String--Ignoring the Second Field in an XY Import



4. **Choose the correct delimited format.** The program supports comma, tab and space delimiters.
5. **Load the text file.** Click [Load File], select your file and click [Open]. In the Lines area, you will see your border points as they appear in your file and you can see the syntax of the records.
6. **Check the syntax of your file against the field list.**
(Optional) This process verifies that your configuration settings are compatible with the text file you have loaded.
 - a. **Select a line** from the Lines area.
 - b. **Click [Check Syntax].** A message window will appear to tell you how many records of the total number can be converted using your current settings.
7. **Click [Convert]** A message window will appear to tell you how many records have been converted.
8. **Click [Exit].** The Import dialog will close and the BORDER EDITOR will be populated with the data from the text file.
9. **Save your border file** by selecting FILE-SAVE and naming your file. Your file will be saved, by default, to your project folder.

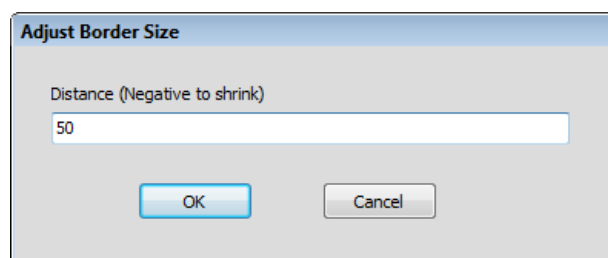
ADJUSTING BORDER SIZE

If you find an existing border file is incorrectly sized, you can quickly expand or contract the border by a user-defined amount.

If the value is mathematically impossible to implement based on the original border measurements, the editor displays a message and aborts the adjustment.

1. **Open the BORDER EDITOR** from the Editors menu in the HYPACK® MARINE SEARCH shell.
2. **Open the border file you want to resize.** Select FILE-OPEN, select your file, and click [Open].
3. **Select EDIT-OFFSET BORDER.** The Adjust Border Size dialog appears.

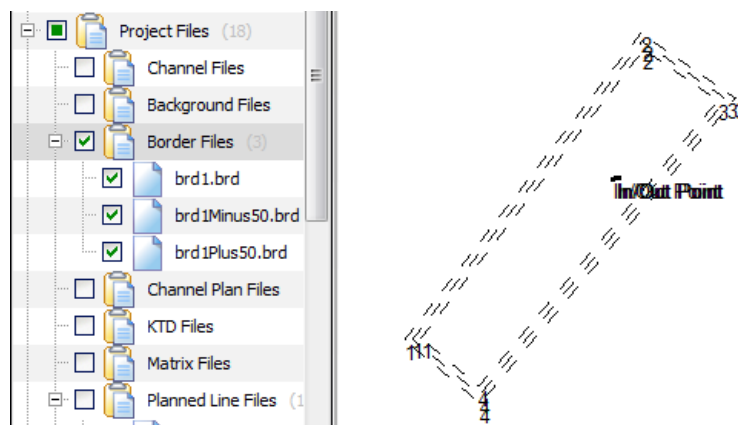
FIGURE 59. Border File Adjust Dialog



4. **Enter the distance, in survey units, by which you want to shift the border waypoints and click [OK].** A positive value expands the border area, and a negative value decreases the border area.

The adjusted waypoints replace the original waypoints in the BORDER EDITOR spreadsheet, and a preview of the adjusted border appears in the HYPACK® MARINE SEARCH Map display.

FIGURE 60. Three Border Files—The Original BRD, a BRD Increased by 50 and a BRD Decreased by 50



5. **Save your border file.**
 - **To overwrite the original border file**, select FILE-SAVE.
 - **To generate a new border file**, select FILE-SAVE AS and name your file. Your file will be saved, by default, to your project folder.

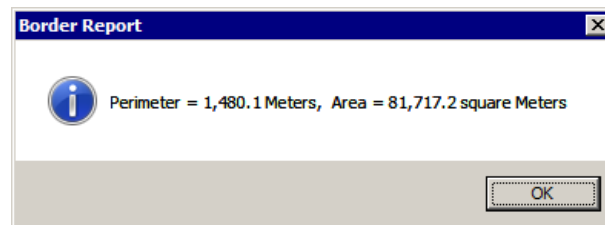
BORDER REPORTS

A border report displays the perimeter distance and area of a border file.

To display a border report:

1. **In the Project Files list, right-click on the border file** for which you would like to generate the statistics.
2. **Select 'Border Report'.**

FIGURE 61. Sample Border Report



TARGETS

Targets mark points of interest in your project area. To that end, each target must at least include a name and the XY position, but it can also include a lot of other metadata according to the project and the technology used and the program in which you mark your target. Targets marked in TARGETING AND MOSAICKING may record the height, length, width, and a capture file of a submerged feature.

You can create targets in the HYPACK® MARINE SEARCH interface or in the TARGET EDITOR then display them in the SURVEY program. This enables you to navigate *to* predetermined locations or *away* from areas dangerous for navigation. You can also mark targets at points of interest in SURVEY and in post-processing and save them to the project target list.

The TARGET EDITOR displays all information about each target in one window and enables you to modify target properties and attributes where appropriate.

FIGURE 62. Sample TARGET EDITOR Display

Target Editor

File Spreadsheet Help

Add Delete Offset Fill Selection

Details Spreadsheet

By Group

- HYSCAN
 - 10:35:19
 - 10:35:19
 - 10:34:57
 - 13:33:34
 - 13:33:34
 - 09:39:33
 - 13:33:21
- Default

Name 13:33:21

Date Acquired 2016-10-03 13:33:21

Date Modified 2017-07-10 12:35:47

WGS84 Latitude 49 23.146499 N

WGS84 Longitude 000 53.017566 W

X 653592.6

Y 5472495.8

Depth 0.00

Event 0

Survey File 000_1332

Source HYSCAN

Attributes

Attribute	Value
Length	9.90
Width	18.00
Range	54.90
Tow Fish Altitude	13.80

Symbol

Rotation

Clear

Notes

Length: 9.9 Width: 18.0

A target group is a list of individual targets, which allows you to enable and disable all targets in the group in one operation (in much the same way catalogs facilitate data files).

HYPACK® MARINE SEARCH automatically creates several default groups in the Project Items list named according to the program in which the member targets were created. You can also create target groups to suit your needs. Targets can be members of more than one group.

Each project maintains a **target database** (targets.db) in the project folder. The HYPACK® MARINE SEARCH shell, HYPACK® SURVEY, SIDE SCAN SURVEY AND TARGETING AND MOSAICKING all read and write target information to this database. The database model currently supports a lengthy list of target properties and attributes. Each program reads and writes only the properties and attributes they need.

MARKING TARGETS WITH YOUR CURSOR IN HYPACK® MARINE SEARCH

You can use the cursor, in Target Editor mode, to mark targets in the Map window. For each click, HYPACK® MARINE SEARCH marks a target in the map and saves it in the Shell target group in the Project Items list. HYPACK® MARINE SEARCH automatically names targets using consecutive numbers, but you can rename them in the TARGET EDITOR.

1. **If you have files that define your survey area (ex. background files or planned line files), load them.**
2. **In the Map View tools, click the Add Target icon.**
The cursor changes to a triangle beside crosshairs.
3. **Click in the Map window (with the cross hairs part of the cursor) at each target location.** For each click, HYPACK® MARINE SEARCH marks a target in the map and saves it to the Shell group.



TARGET DISPLAY OPTIONS

The Targets tab in the HYPACK® MARINE SEARCH Control Panel affects the display in the HYPACK® MARINE SEARCH area map. The Target Parameters in SURVEY provide the default target display options in SURVEY. These settings are applied universally to all targets enabled in your map windows.

For options that affect only select targets, use the right-click menu or TARGET EDITOR to modify the target properties.

ZOOM EXTENTS ON TARGETS IN HYPACK® MARINE SEARCH

You can use the right-click menu to zoom in on an individual target, on the enabled targets in a select group or on all of the project targets:

1. **In the Project Items list, right-click on the target item on which you want to zoom.**

Targets to Zoom	Right-click Location
Individual target	Target

Targets to Zoom	Right-click Location
Target group	Target group
All project targets	Target folder

2. **Select Zoom Extents.**

TARGET EDITOR

The TARGET EDITOR is the interface where you can create, view and edit your target information.

To open the TARGET EDITOR, use any of the following methods:

- Select PREPARATION-EDITORS-TARGET EDITOR.
- Right-click on the Targets folder in the Project Items list and select Open Target Editor.
- Right-click on a target in the Project Items list and select Edit Target.
- Double-click on a target in the Project Items list.

It presents your target properties and attributes in two tabs: Details and Spreadsheet.

DETAILS TAB

The **Details** tab lists all of the targets in your project. Most viewing and editing can be done in this tab.

- **Choose a sort method:** date, survey line, name or group. Click on the link above the tree listing until you reach your preferred sort option.
- **Enable and disable targets or target groups** using the check boxes. You may also use these selections to display only selected targets from the spreadsheet menu. The Export Checked options in the File menu limit target reports and target exports.
- **View and edit target properties.** When you select a target in the tree, its properties appear in the tab. This view includes the corresponding screen capture file and any additional comments from TARGETING AND MOSAICKING, if they exist. Only select fields can be modified in Edit Target Mode.

FIGURE 63. Sample Details Tab

Target Editor

File Spreadsheet Help

Add Delete Offset Fill Selection

Details Spreadsheet

By Group

- ☒ HYSCAN
 - ☒ 10:35:19
 - ☐ 10:35:19
 - ☐ 10:34:57
 - ☐ 13:33:34
 - ☐ 13:33:34
 - ☒ 09:39:33
 - ☒ 13:33:21
 - ☐ Default

Name 13:33:21

Date Acquired 2016-10-03 13:33:21

Date Modified 2017-07-10 12:35:47

WGS84 Latitude 49 23.146499 N

WGS84 Longitude 000 53.017566 W

X 653592.6

Y 5472495.8

Depth 0.00

Event 0

Survey File 000_1332

Source HYSCAN

Attributes

Attribute	Value
Length	9.90
Width	18.00
Range	54.90
Tow Fish Altitude	13.80
Tow Fish Altitude	13.80

Symbol

Rotation

Clear

Notes

Length: 9.9 Width: 18.0

SPREADSHEET TAB

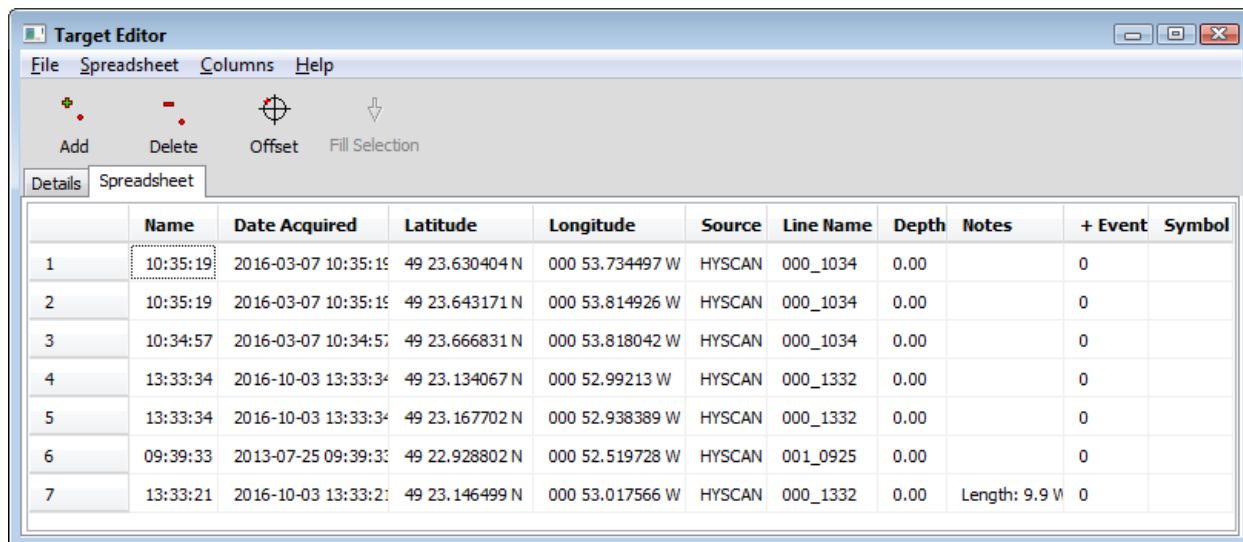
The **Spreadsheet** tab enables you to see each of your targets and their properties in one row of a table. In this view, you can see the properties of multiple targets at once.

You can configure the TARGET EDITOR Spreadsheet using common Windows® spreadsheet operations:

- **Sort the spreadsheet** based on any attribute in ascending or descending order by clicking on the column heading.
- **Resize the columns.** Click and drag the right-hand edge of each column heading.
- **Reorder the columns.** Click and drag the column heading.
- **Enable and disable targets.** Click the target number.
- **Display only enabled targets** (SPREADSHEET-SHOW CHECKED) or all project targets (SPREADSHEET-SHOW ALL).

- **Choose the displayed properties** by selecting and deselecting them in the Columns menu.

FIGURE 64. Sample Spreadsheet View



	Name	Date Acquired	Latitude	Longitude	Source	Line Name	Depth	Notes	+ Event	Symbol
1	10:35:19	2016-03-07 10:35:19	49 23.630404 N	000 53.734497 W	HYSCAN	000_1034	0.00		0	
2	10:35:19	2016-03-07 10:35:19	49 23.643171 N	000 53.814926 W	HYSCAN	000_1034	0.00		0	
3	10:34:57	2016-03-07 10:34:57	49 23.666831 N	000 53.818042 W	HYSCAN	000_1034	0.00		0	
4	13:33:34	2016-10-03 13:33:34	49 23.134067 N	000 52.99213 W	HYSCAN	000_1332	0.00		0	
5	13:33:34	2016-10-03 13:33:34	49 23.167702 N	000 52.938389 W	HYSCAN	000_1332	0.00		0	
6	09:39:33	2013-07-25 09:39:33	49 22.928802 N	000 52.519728 W	HYSCAN	001_0925	0.00		0	
7	13:33:21	2016-10-03 13:33:21	49 23.146499 N	000 53.017566 W	HYSCAN	000_1332	0.00	Length: 9.9 W	0	

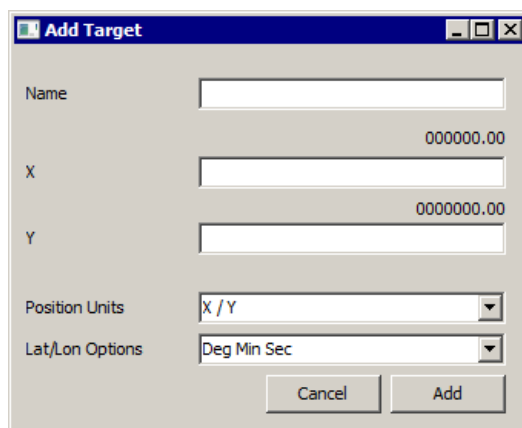
CREATING TARGETS IN THE TARGET EDITOR

When you know the coordinates of your target positions, you can create targets by entering target names and positions in the TARGET EDITOR:

1. **Open the TARGET EDITOR.** Select PREPARATION-EDITORS-TARGET EDITOR.
2. **Select FILE-ADD TARGET** (or click the Add icon). The Add Target dialog appears.



FIGURE 65. Add Target Dialog



Add Target

Name:

X: 000000.00

Y: 000000.00

Position Units:

Lat/Lon Options:

3. **Select your preferred units with which to enter the position:** X/Y, Local Latitude/Longitude, or WGS-84 Latitude/Longitude.
4. **If you have chosen one of the Latitude/Longitude options, set your preferred input format.**
5. **Enter your target name and position coordinates.**
6. **Click [Add].** The TARGET EDITOR saves the target to the Default group.

More Information

- [“Targets Database”](#) on page 11-49

TARGET PROPERTIES

Properties

Target Properties can apply to all targets, regardless of where or how you generate them.

TABLE 4. *Target Properties*

Property	Definition	Editable?
Name	Target Name	Yes
Date Acquired	Date and time the target was originally generated.	No
Date Modified	Date and time the target was last edited.	No
WGS-84 Latitude and Longitude	Current target position. Automatically updates if you change X,Y.	Yes
X, Y	Current target position. Automatically updates if you change Lat/Lon.	Yes
Depth	Water depth at target location.	Yes
Event	If the target is marked during SURVEY, this is the latest event number. Otherwise, this value will be 0.	Yes
Survey File/Line Name	Survey line file on which the target is marked during SURVEY.	Yes
Source	Program in which you mark the target or “imported”.	No
Notes	User-defined memo regarding target position. User notes entered in the Target Properties dialog in SURVEY or DREDGEPACK®, in TARGETING AND MOSAICKING during targeting.	Yes

Property	Definition	Editable?
Symbol	S57 chart display symbol that can be displayed at target locations. The symbols are set in the TARGET EDITOR or through the right-click menu from the Project Items list. Overridden by Display Method = 1 (Alarm)	Yes
Rotation	Clockwise symbol rotation.	Yes

Attributes

Target attributes are generally only pertinent to the source program. For example, circles, alarm, transparency is only supported in HYPACK® SURVEY, but not in main HYPACK® MARINE SEARCH Map window.

TABLE 5. *Target Attributes*

Attribute	Definition	Editable?
Distance	Distance from the current target position. SURVEY or DREDGEPAK® displays the target at the position calculated using Distance and Bearing properties, with a dotted line back to the original location. You can relocate all targets based on these attributes in the TARGET EDITOR.	Yes
Bearing	Direction the target is offset by the Distance property value.	Yes.
Orientation	The angle of the alarm flag from the target when displaying it in SURVEY. Applicable only when Display Method = 1 (Alarm)	Yes
Circle Radius	Radius of the first circle around the target (and distance from there to any subsequent circles) when you select the Circle Target Display option in the HYPACK® MARINE SEARCH Control Panel Applicable only when Display Method = 0 (Circle)	Yes
Number of Circles	Number of concentric circles around the target when you select the Circle Target Display Method in the HYPACK® MARINE SEARCH Control Panel. Applicable only when Display Method = 0 (Circle)	Yes
Height	Height of targeted object from the bottom. Typically originates in TARGETING AND MOSAICKING.	Yes
Length	Measured Length of targeted object. Typically originates in TARGETING AND MOSAICKING.	Yes

Attribute	Definition	Editable?
Width	Measured width of targeted object. Typically originates in TARGETING AND MOSAICKING.	Yes
Range	Distance (measured diagonally) from the sonar head to the object.	Yes
Towfish Altitude	Towfish Height above the bottom when the target was marked.	Yes
Towfish Heading	Towfish Heading when the target was marked.	Yes
Capture File	Screen capture of targeted object originating in TARGETING AND MOSAICKING.	No
Display Method	In the HYPACK® SURVEY Map window. 0 = Circle or 1 = Alarm.	Yes
Transparency	Percent opaqueness. (0 = transparent, 100 fully opaque)	Yes

EDITING TARGET PROPERTIES

In the TARGET EDITOR, *when you are in Edit Mode*, you can edit or add target properties and attributes in either the Tree or Spreadsheet tab. The program automatically saves your changes when you close the dialog.

Set Edit Mode in the Spreadsheet menu. The Edit Mode item toggles the mode on and off.

Target attributes are generally only pertinent to the source program. For example, circles, alarm, transparency is only supported in HYPACK® SURVEY, but not in the main HYPACK® MARINE SEARCH Map window.

A right-click menu from the Project Items list also accesses a routine specifically for assigning S57 symbols to a select target.

EDITING TARGET PROPERTIES IN THE DETAILS TAB

1. **Right-click on a target in the Project Items list and select Edit Target.** The TARGET EDITOR appears with the target information displayed.
2. **Select SPREADSHEET and be sure the Edit Mode is checked.**
3. **Return to the Details tab.**
4. **Select (highlight) the target you want to edit.** The properties for the selected target are displayed on the right side of the TARGET EDITOR.
5. **Modify the target properties as needed.**
6. **Add any other applicable attributes as needed:**

- a. **Click [+] and select the required attribute.** The selected attribute appears in the Other Attributes list.
 - b. **Enter the attribute value.**
7. **Close the dialog.**

EDITING TARGET PROPERTIES IN THE SPREADSHEET TAB

In the Spreadsheet tab, you can edit properties for individual targets, as you can in the Details tab. (Just find the row for the target and change the property value in the appropriate column.) You can also apply the same property to multiple targets at once:

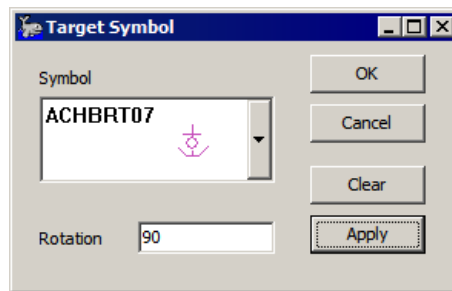
1. **Open the Target Editor.** Select EDITORS-TARGET EDITOR.
2. **Select SPREADSHEET and be sure the Edit Mode is checked.**
3. **Limit your Spreadsheet display to the targets you want to modify:**
 - a. **In the Details tab, check all targets to which you want to enter the same property.**
 - b. **In the Spreadsheet tab, select SPREADSHEET-SHOW CHECKED.**
4. **Enter the new property at the top of the column** (eg. the target symbol).
5. **Multiselect the column and click the Fill Selection icon.** The property value of the first selected cell gets copied to the remaining selected cells. *It is not applied to targets that are not displayed.*
6. **Close the dialog.**



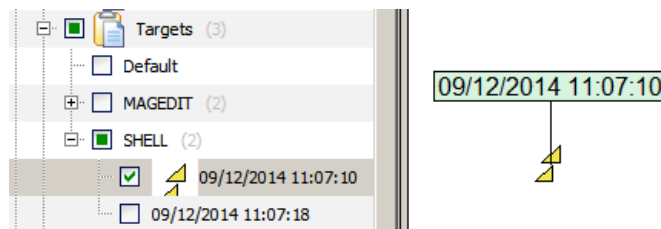
ASSIGNING S57 DISPLAY SYMBOLS FROM THE PROJECT ITEMS LIST

You can assign an S57 display symbol to any target in HYPACK® MARINE SEARCH, in the TARGET EDITOR or from Project Items list. The symbol appears at the target location together with the circles or alarm flags designated in the Control Panel settings.

1. **Access the Target Symbol dialog.**
 - **In the Project Items list,** right-click on the target to which you want to assign the symbol and select Assign Display Symbol.
 - **In the Spreadsheet tab of the TARGET EDITOR,** right-click on the target name in the spreadsheet and select Edit Symbol.

FIGURE 66. Target Symbol Dialog

2. **Use the Symbol drop-down to select your S57 symbol.**
3. **Enter the rotation.** (Optional) The number of degrees to rotate the symbol clock-wise.
4. **Preview the results,** (Optional) Click [Apply].

FIGURE 67. Sample S57 Target Symbols

5. **Click [OK].**

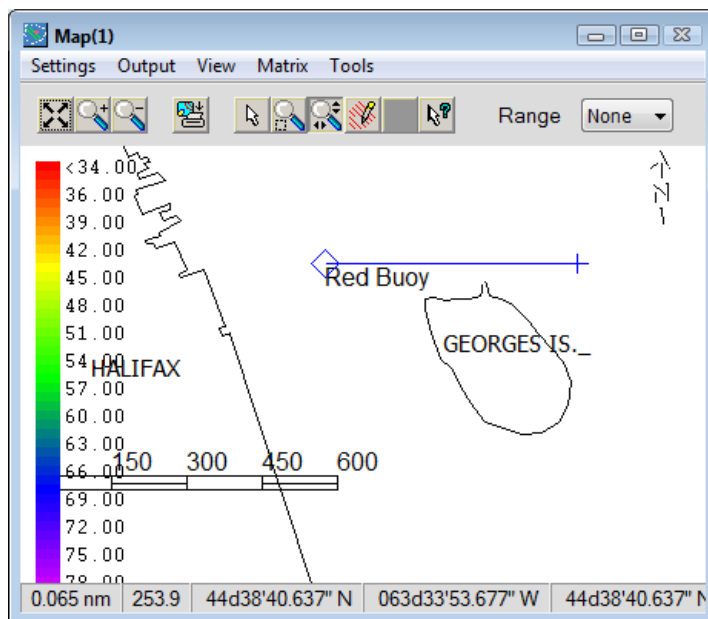
To remove the S57 Symbol, do the following:

1. **Right-click in the Project Items list on the target to which you want to assign the symbol and select Assign Display Symbol.** The Target Symbol dialog appears.
2. **Click [Clear].** The symbol disappears in the dialog.
3. **Preview the results.** (Optional) Click [Apply].
4. **Click [OK].** The HYPACK® MARINE SEARCH displays remove the symbol and the map window restores the default target symbol.

More Information

- [“Target Properties”](#) on page 2-55
- [“Target Display Settings in HYPACK®”](#) on page 1-48
- [“Targets in the MAGNETOMETER EDITOR”](#) on page 7-49
- [“Marking Targets in the SUB-BOTTOM PROCESSOR”](#) on page 7-99

FIGURE 68. Target Translated 500m at 90 Degree Bearing in HYPACK® SURVEY



OFFSETTING TARGETS IN THE TARGET EDITOR

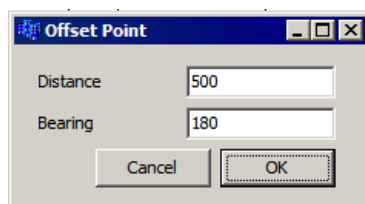
In the TARGET EDITOR, you can create additional targets at user-defined positions *relative to existing targets*.

1. In the TARGET EDITOR, select one or more targets in the tree view.

Tip: To multiselect files, hold the Ctrl key and select multiple individual records or hold the Shift key and click on the first and last records in a range of consecutive records.

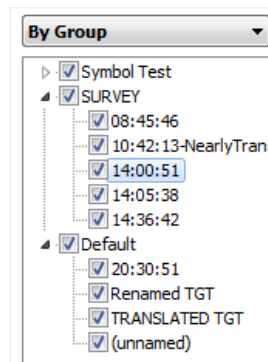
2. Right-click and select **Offset Selected Targets**. The Offset Point Dialog appears.

FIGURE 69. Offsets Point Dialog



3. Enter the distance and bearing, at which you want the new targets generated relative to the selected targets and click [OK].

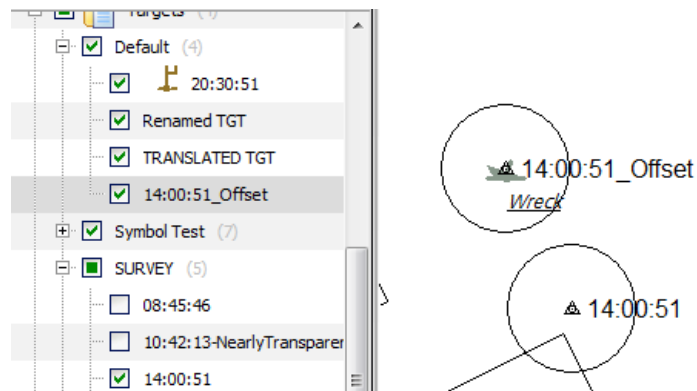
FIGURE 70. The Resulting Targets in the TARGET EDITOR



4. **Name your new targets.** Enter a Name attribute in the TARGET EDITOR.

HYPACK® MARINE SEARCH assigns the new targets to the Default target group

FIGURE 71. Resulting Targets in HYPACK® MARINE SEARCH



DELETING TARGETS IN THE TARGET EDITOR

IMPORTANT!

There is a critical difference between *removing* and *deleting* targets:

Removing a target omits it from the current group listing, but the target remains in the project. If it has no assigned group, HYPACK® MARINE SEARCH automatically assigns it to the Default group.

Deleting a target removes it from your project and from your hard drive. *It no longer exists.*

- **From the HYPACK® MARINE SEARCH Interface**, right-click in the Project Items list on the target you want to delete and select Delete Target.
- **From the TARGET EDITOR**, select the target you want to delete in the Details tab and click the Delete icon.



IMPORTING AND EXPORTING TARGET DATA TO THE TARGET EDITOR

When you open a project with legacy TGT format target files from earlier HYPACK® MARINE SEARCH versions, HYPACK® MARINE SEARCH automatically converts each TGT file to a target group.

In addition, you can import or export target information in the Project Items list using either a simple text (*.TXT) file or the HYPACK® MARINE SEARCH target file (*.TGT) format, respectively.

NOTE: This procedure was designed to import HYPACK® MARINE SEARCH TGT files from earlier projects. For this reason, it only supports select target properties (not target attributes).

EXPORTING TEXT FILES FROM THE TARGET EDITOR

You can generate a user-configured text file which may then be imported to a text editor or spreadsheet programs. You can export all targets in the project or only selected targets. The output file is stored, by default to the project folder.

1. **Configure your Spreadsheet tab with the data** you want to export.
 - a. **Select the data** using the Columns menu or dialog.
 - b. **Order the columns.** Drag the spreadsheet headings.
 - c. **Select the targets you want to export:**
 - i. **Select SPREADSHEET-SHOW ALL.**
 - ii. **Click the target number to select or deselect targets until only the targets for export are checked.**
 - iii. **Select SPREADSHEET-SHOW CHECKED.**
2. **Select FILE-SPREADSHEET EXPORT.** A File Save dialog appears.
3. **Choose a location, name your file and click [Save].** The exported file is saved, by default, to the project folder with a CSV extension.

FIGURE 72. Sample Output File:

```
455473.70,4942631.39,0.00,"Man Overboard"
455216.00,4943428.67,0.00,"Red Buoy"
454113.00,4945510.67,0.00,"Green Buoy"
```

IMPORTING LEGACY TARGET FILES TO THE PROJECT

You can import the targets from an existing target file (*.TGT) to your current project. HYPACK® MARINE SEARCH imports target files (*.TGT), creating a target group named according to the TGT file name. With this feature, you can import a target file from someone using earlier versions of HYPACK® MARINE SEARCH to your current project (targets.db).

You can import target files through the Project Items list or in the TARGET EDITOR.

IMPORTING TARGET FILES THROUGH THE PROJECT FILES LIST

1. **Right-click on the Targets item in the Project Files list and select Import Targets: *.TGT File.** A File Open dialog appears.
2. **Select the target file you want to import and click [Open].**

IMPORTING TARGET FILES THROUGH THE TARGET EDITOR

1. **Select FILE-IMPORT TARGET FILE.** A File Open dialog appears.
2. **Select the target file (*.TGT) you want to include in your project and click [Open].**

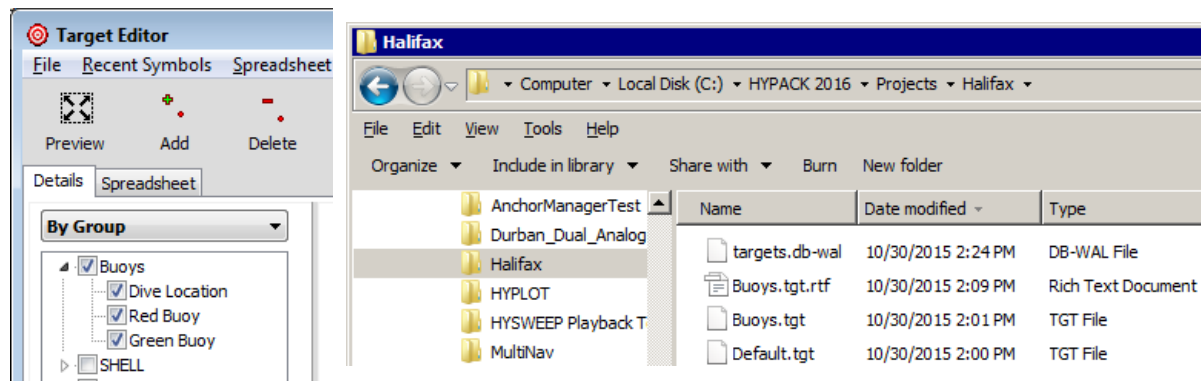
EXPORTING TO THE TARGET FILE FORMAT FROM THE TARGET EDITOR

You can export one or more targets to the legacy target file (*.TGT) format. This can be helpful if you are working with another HYPACK® MARINE SEARCH user who has an earlier version of HYPACK® MARINE SEARCH that cannot read the targets database.

You can export all targets in the project or only selected targets. The output file is stored, by default to the project folder.

1. **Choose your targets to export:**
 - **To export select targets,** check the targets or groups you want to export and select FILE-EXPORT CHECKED TO TGT.
 - **To export all targets,** select FILE-EXPORT ALL TO TGT.
2. **Choose a location, name your file and click [Save].**

FIGURE 73. Exporting Targets—Target Editor Selections (left), Export Results (right)



TARGET REPORTS

The TARGET EDITOR and TARGETING AND MOSAICKING generate a report in rich text format (*.RTF) that presents the data about each target in an easy-to-read form, one page per target. The output file is stored, by default, to the project folder.

GENERATING A TARGET REPORT IN THE TARGET EDITOR

1. **Choose your targets to export:**
 - **To export select targets**, check the targets or groups you want to export and select FILE-EXPORT CHECKED TO RTF.
 - **To export all targets**, select FILE-EXPORT ALL TO RTF.
2. **Name your file and click [Save].** The report is saved, by default, to your project folder.

FIGURE 74. Sample Target Report

Name	Date	11/08/2004
09:06:51	Time	09:06:51
Survey File	Event	2388
001_0904.HSX	X	2381019.4
Capture File	Y	320845.5
09-06-51.JPG	WGS84 Latitude	32.70885673 N
	WGS84 Longitude	79.76123512 W
	Heading	166
	Fish Altitude	98.6
	Range to Target	98.6
	Height Above Bottom	0
	Length	0
	Width	0
Notes	Height: U.U	



GENERATING A TARGET REPORT IN TARGETING AND MOSAICKING

1. **Open the TARGET VIEWER.** From the TARGETING AND MOSAICKING program in either Scan View or Mosaic mode, select TOOLS-TARGET VIEWER. The program automatically loads the targets associated with the currently loaded data.
2. **Click the 'Save Target Book to RTF' icon.** A File Save dialog appears.
3. **Name your file and click [Save].** The report is saved, by default, to your project folder.



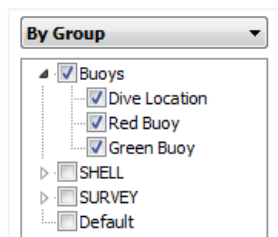
MANAGING TARGETS AND TARGET GROUPS

A target group is a list of individual targets, which allows you to enable and disable all targets in the group in one operation (in much the same way catalogs facilitate data files).

HYPACK® MARINE SEARCH automatically creates several default groups in the Project Items list named according to the program in which the member targets were created. You can also create target groups to suit your needs. Targets can be members of more than one group.

NOTE: The Project Items list displays empty groups, but the TARGET EDITOR displays only populated groups.

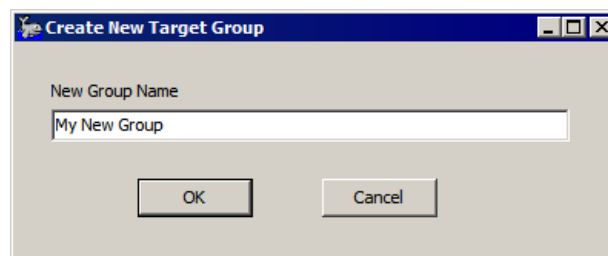
FIGURE 75. Sample Target Groups



ADDING TARGET GROUPS

1. **Open the Create New Target Group dialog.**
 - **From the HYPACK® MARINE SEARCH Interface**, right-click on Targets in the Project Items list and select Add Group.
 - **From the Target Editor**, select FILE-ADD GROUP.

FIGURE 76. Create New Target Group



2. **Enter the name for your new group and click [OK].** Your new target group appears under Targets in the Project Items list when you close the TARGET EDITOR. It appears in the Details

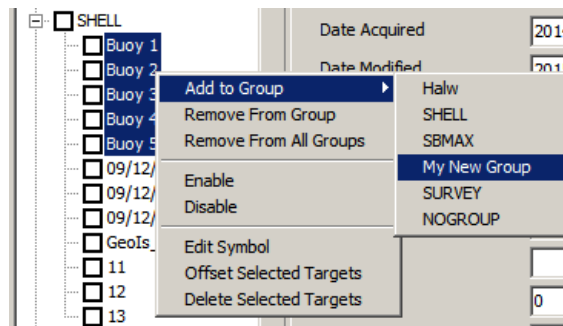
tab of the TARGET EDITOR only when you add a target to the group.

ADDING TARGETS TO TARGET GROUPS

When you first mark a target, HYPACK® MARINE SEARCH stores it in the default group according to the program in which you marked it. However, targets can be members of multiple groups, if you wish. You can copy one or more targets from their current group to another as follows:

1. **Select one or more targets in the Details tab.**
2. **Right-click on the selection and select Add to Group then the name of the group to which you want to copy the selected targets.**

FIGURE 77. Adding Selected Targets to a Target Group



REMOVING TARGET GROUPS

When you remove a target group, the targets in the selected group remain and become part of the Default target group.

- **From the HYPACK® MARINE SEARCH Interface**, right-click in the Project Items list on the target group you want to remove and select Remove Target Group.
- **From the TARGET EDITOR**, select one or more groups to remove in the Details tab and select FILE-REMOVE GROUP.

REMOVING TARGETS FROM TARGET GROUPS

In the TARGET EDITOR, you can remove select targets from one or more groups:

IMPORTANT!

There is a critical difference between *removing* and *deleting* targets:

Removing a target omits it from the current group listing, but the

target remains in the project. If it has no assigned group, HYPACK® MARINE SEARCH automatically assigns it to the Default group.

Deleting a target removes it from your project and from your hard drive. *It no longer exists.*

1. **Select one or more targets in the Details tab.**
2. **Right-click on your selection and select the appropriate Remove option:**
 - **Remove from Group** omits the selected target from the group in which you have selected it. If it resides in another group, it remains there.
 - **Remove from All Groups** omits the selected target from all groups and moves it to the Default group.

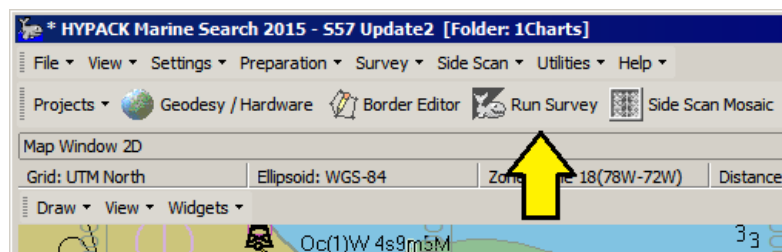
RENAMING TARGET GROUPS

1. **From the TARGET EDITOR**, select the group you want to remove in the Details tab.
2. **Select FILE-RENAME GROUP.** A dialog appears with the current group name.
3. **Enter the new name and click [OK].**

SURVEYING

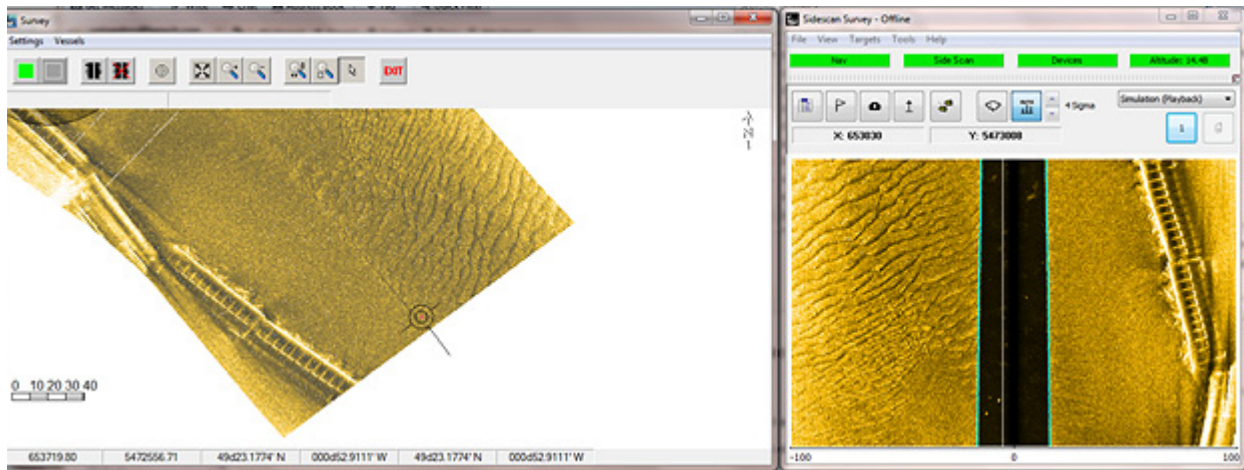
After you have run the Geodesy/Hardware program, you can start the SURVEY program: click [Run Survey].

FIGURE 78. Starting the SURVEY Program



The SURVEY program establishes communication with your GPS and side scan, then opens the Area Map and SIDE SCAN SURVEY windows. If you have created a search pattern of planned lines, a Left-Right Indicator window also appears.

FIGURE 79. HYPACK® MARINE SEARCH SURVEY Program.



WINDOWS IN SURVEY

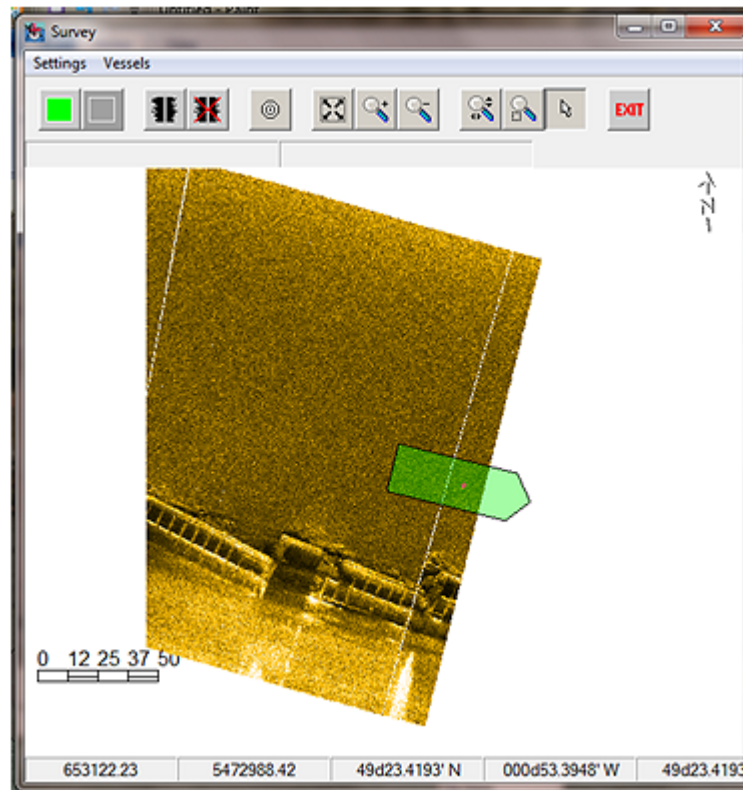
The SURVEY display is comprised of the 'shell', with a menu bar and toolbars, as well as your choice of several independently-displayed and configured windows:

- **Area Map:** This is a plan view of your project area. It displays any enabled project files along with the position of the vessels and their track lines.
- **Left-Right Indicator:** Shows the position of the boat relative to the current planned line segment.
- **Data Display:** Shows real-time, textual information regarding your survey.

SURVEY WINDOW

The Survey window shows the position of the GPS antenna and the side scan real-time mosaic. It can also display background files in a variety of formats.

FIGURE 80. Survey Window



The SURVEY window also contains the primary menu items, along with icons that allow you to quickly Start Logging, End Logging and access the Side Scan real-time mosaic parameters.

FIGURE 81. SURVEY Shell Toolbar



Start Logging tells SURVEY to save the position and side scan data to a file. Saving your data allows you to do targeting and mosaicking in post-processing.

End Logging tells SURVEY to stop logging and closes the current data file.

Real-time Mosaic Parameters: This icon opens up the Side Scan Settings window where you can set the parameters for the real-time mosaic. You can also access the Side Scan Settings window from the CHART – SIDE SCAN menu item.



Clear Side Scan erases all of the real time mosaics. Be careful with this one!

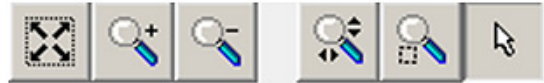


Quick Target marks a target when you click on the screen. (You can also mark a target, at any time, with the normal cursor by double-clicking on the screen.)



Zoom Icons: Zoom

Extents, Zoom In, Zoom Out, Pan (select the tool then click and drag), Zoom Window and the Normal Cursor.



Exit closes the SURVEY program and returns you to the HYPACK® MARINE SEARCH shell.



LEFT-RIGHT INDICATOR

The Left-Right Indicator window only appears when you have planned lines loaded into the SURVEY program. It shows the position of the main vessel relative to the planned survey line, as well as certain information of particular interest to the helmsman:

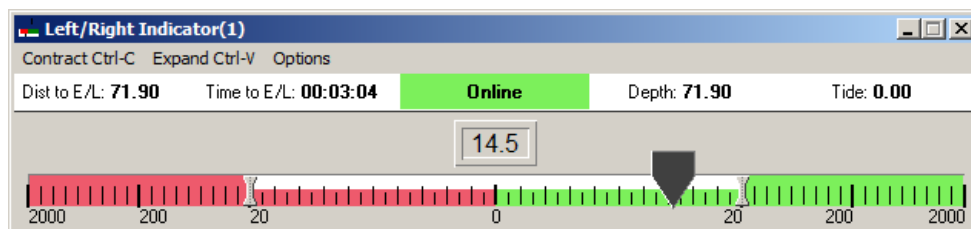
TABLE 6. *Left-Right Indicator Statistics*

Logging Status	Display
Logging	Distance and Time ^a to the end of the current survey line.
Not Logging	Distance and Time* to the start of the next survey line.
Always	Logging status, uncorrected depth and tide

a. Times are calculated based on distance and current speed.

Additional, displays can be loaded by selecting WINDOW-NEW-LR INDICATOR.

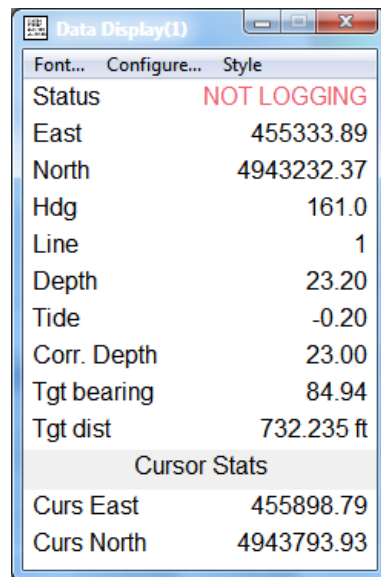
FIGURE 82. *The Left-Right Indicator*



DATA DISPLAY WINDOW IN SURVEY

The Data Display window shows textual information about the survey.

FIGURE 83. *The Data Display Window*



The screenshot shows a window titled "Data Display(1)" with a menu bar containing "Font...", "Configure...", and "Style". The main area displays a list of survey parameters and their values. The "Status" is "NOT LOGGING" in red. Below are various coordinates and measurements. At the bottom, a section titled "Cursor Stats" shows the current cursor's East and North coordinates.

Status	NOT LOGGING
East	455333.89
North	4943232.37
Hdg	161.0
Line	1
Depth	23.20
Tide	-0.20
Corr. Depth	23.00
Tgt bearing	84.94
Tgt dist	732.235 ft
Cursor Stats	
Curs East	455898.79
Curs North	4943793.93

When you first start the SURVEY program, the display does not contain any items. Use the menu in the Data Display window to configure the Data Display. You can select the items to display, the font of the displayed items, or change the style of the display.

Once the Data Display has been configured, the program will restore the items and font in the same way, when the program is re-started.

STYLE-STAY ON TOP assures the Data Display window remains visible even when it overlaps with another window.

SIDE SCAN SURVEY WINDOW

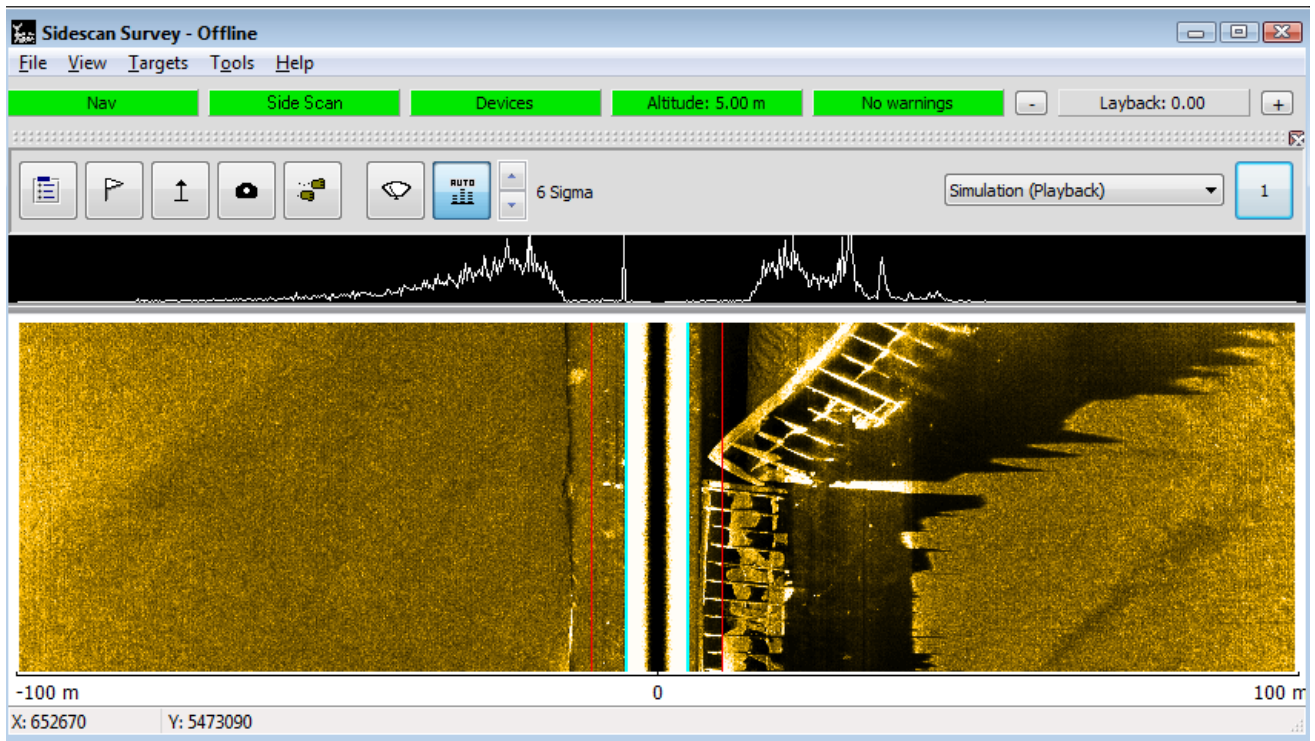
HYPACK® SEARCH includes the Side Scan Survey window with a waterfall display, and alarm status indicators.

The View menu provides access to existing windows, and options to generate (VIEW-NEW-*WindowName*) and remove (VIEW-REMOVE-*WindowName*) windows in your display. In this way, HYPACK® SEARCH can show multiple windows of the same type, but you can configure them to display data from different devices (selected in the toolbar for each window) or the same data with different display options.

The Side Scan Survey window is the traditional side scan display (forward looking and without slant range corrections). It updates at 1Hz, regardless of how quickly your GPS or side scan is updating.

You can include the side scan signal and a bottom tracking tool in the display options, and adjust the reflection brightness and contrast through the side scan controls. The status bar shows the cursor position in either X/Y or lat./lon. in the status bar.

FIGURE 84. Side Scan Survey Window

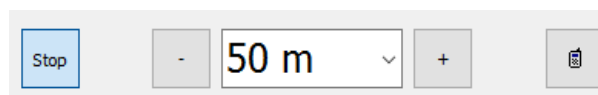


If you have dual frequency side scan, use the frequency icon toggle between frequency displays. A second Side Scan Waterfall window is available through the View menu to support dual frequency units.

You can **control your sonar settings** from SIDE SCAN SURVEY. Device controls in the interface directly control sonar pinging, and can change the sonar range. For more complex setting changes, the controller icon accesses the full device controller window. (These tools are unavailable in playback mode.)



FIGURE 85. Ping Range Tools (from right to left) —Start/Stop Pinging, Range Controls, Device Controller Access



SIDE SCAN SURVEY is configured to continuously check for and notify you of data errors or loss of data input. The alarm indicators show green (OK), yellow (careful) or red (no good) depending on status. Click the indicator to show status history.

To access additional features, right-click on the waterfall or click an icon in the tool bar.

SIDE SCAN ALTITUDE WINDOW

Many of our users tow the side scan device on a towfish with an altitude sensor and it is handy, if not required, to know the towfish altitude during data collection. If your device outputs bottom tracking you can display the current towfish altitude in the Altitude window.

You may configure this window to display a red background if the altitude returned by the sensor falls below a user-defined limit.

To configure this window, select VIEW OPTIONS(F9). In the Altitude Tab, set the alarm limit to display a red background if the altitude returned by the sensor falls below this limit.

In the following example, the alarm limit was set to 36 survey units. At 37, the background is green but red at altitudes less than 36.

FIGURE 86. *Side Scan Altitude Window*

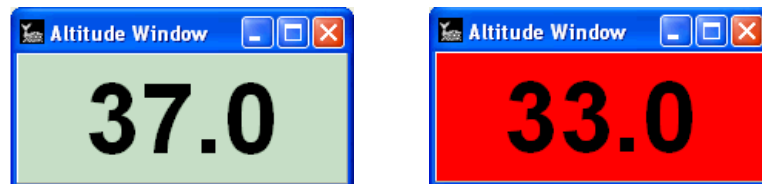
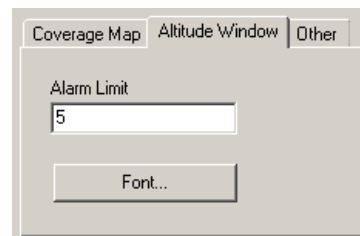
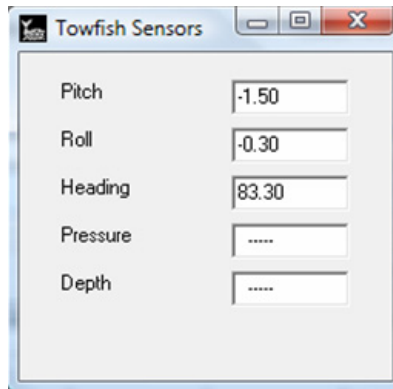


FIGURE 87. *Setting the Side Scan Altitude Window Alarm Limit*



TOWFISH SENSORS WINDOW IN SIDE SCAN SURVEY

The Towfish Sensors window displays the pitch, roll, heading, pressure and depth of your side scan sonar.

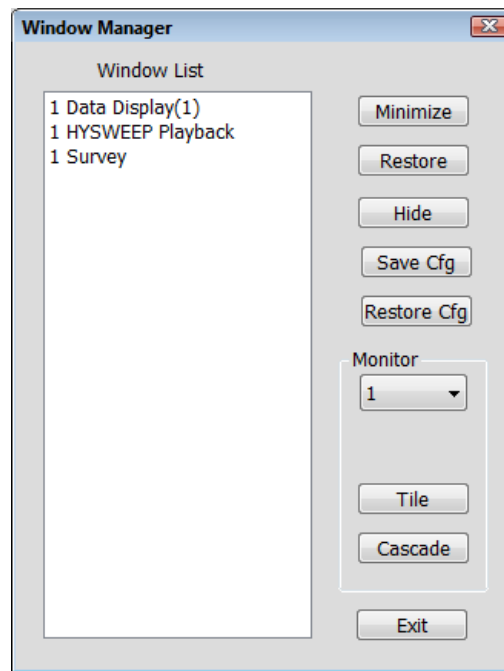
FIGURE 88. *Towfish Sensors Window*

CONFIGURING YOUR WINDOWS DISPLAY IN THE WINDOWS MANAGER

The Window Manager may be used to arrange your survey windows in one or more monitors.

1. **Access the Window Manager** by selecting SETTINGS-WINDOW MANAGER in the SURVEY shell.

The Window Manager will appear with a list of your current Survey windows. Multiple windows of the same type are distinguished by numbers, both on their title bars and in the Window Manager.

FIGURE 89. *Window Manager*

2. **Choose the windows to view.**
 - a. **Select one or more windows in the list.**
 - b. **Click [Minimize], [Hide] or [Restore].**
 - [Minimize] closes the selected window and positions a restore button at the bottom of the screen.
 - [Hide] closes the selected window. It can only be restored through the Window Manager.
 - [Restore] reopens the selected window in your display.
3. **If you have multiple monitors, assign windows to each monitor.** (Optional) The monitor numbers designated in the Windows® display settings populate the Monitor drop-down list.
 - a. **Select the monitor window to configure.**
 - b. **Select the windows for the selected monitor.**
4. **Position the windows in the monitor.**
 - a. **Select the windows for the selected monitor.**
 - b. **Click [Tile] or [Cascade].**
 - [Tile]: SURVEY attempts to arrange the selected windows optimally on the screen.
 - [Cascade] arranges all of the windows, diagonally offset from each other, in the upper-left corner of your screen.
5. **Save your configuration.** (Optional) Click [Save Cfg] and name your window configuration. At any time, you can return to this layout by clicking [Restore Cfg] and selecting the file. This is handy to quickly switch between multiple configurations or to return to a “user-defined default” after you have rearranged the windows.
6. **Click [Exit]** and manually make any final adjustments to window size and positioning.

CONFIGURING YOUR AREA MAP DISPLAY IN SURVEY

The SURVEY program loads the information from the current project. It gets geodetic information and hardware information by reading the project's initialization files. It loads the most recently used planned survey line file (*.LNW) from the current project, as well as any other enabled project files (eg. charts).

The HYPACK® SURVEY interface also enables you to load additional files and set other display options. If you have more than one area map display, you can configure each display independently.

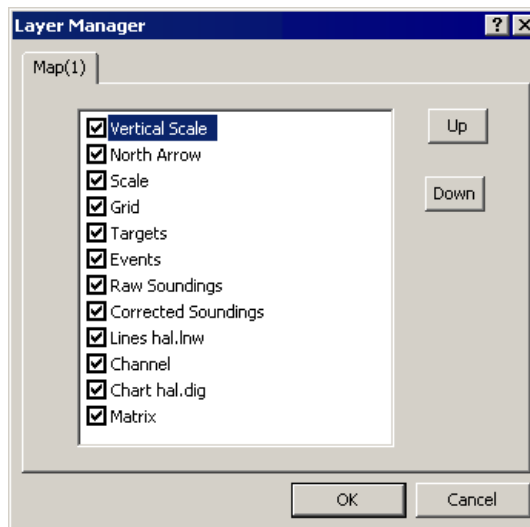
AREA MAP LAYER MANAGER

In addition to your project files, you may also include chart features, such as a legend, scale, north arrow, and projection and lat./lon. grids, in your area map display.

To set the files displayed and their draw order:

1. **Access the Layer Manger** by selecting SETTINGS-LAYER MANAGER.
2. **Check the files and features you want to display.**
3. **Set the draw order.** You can click and drag the files in the list or select one and reposition it with the Up and Down buttons. Items at the end of the list are drawn first and will be overlaid by any in the list above them that are selected.
4. **Click [OK].**

FIGURE 90. A Sample Area Map

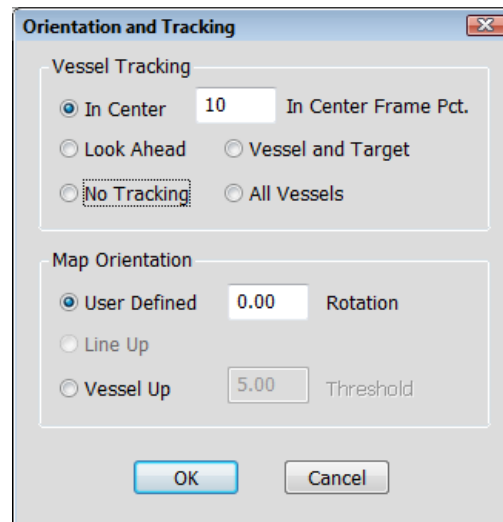


AREA MAP TRACKING AND ORIENTATION OPTIONS

Tracking and Orientation options automatically re-adjust the screen when the boat leaves the display area and to rotate your map to your preferred orientation.

Vessel track points are limited to one per second.

FIGURE 91. Tracking and Orientation Dialog



Select SETTINGS-TRACKING/ORIENTATION from the menu and the Orientation and Tracking dialog appears.

Vessel Tracking:

- **In Center** returns the boat to the center of the screen as it nears the edge. The **Edge Dist to Win Size Pct** option determines when the centering will occur based on the distance between the vessel and the edge of the area map (expressed in percentage of the Area Map window size with an allowable range of 5-25%).

NOTE: If you enter a value outside the 5-25 range, the program will reset the value to 5, if you have entered a value less than 5, or 25 if you have entered a value greater than 25.

- **Look Ahead** moves the boat further back from the center to maximize the amount of space displayed ahead of the vessel.
- **Vessel and Target** keeps the boat and the current active target in view. The map automatically zooms to fit as you approach.
- **All Vessels:** The map automatically zooms to fit to keep all mobiles in view.
- **No Tracking** allows you to move the screen anywhere you want without having it zoom back to keep the boat in view. (Press the Home key to center the vessel on your screen.)

If you set your preferred method of tracking, you can quickly toggle between this setting and “No Tracking” by selecting SETTINGS-TOGGLE TRACKING (Ctrl+T).

Map Orientation:

- **Vessel Up** aligns the Area Map with the current vessel heading. Define a threshold (in degrees) to determine how

much the vessel heading must change to cause the map orientation to adjust. This prevents constant (annoying) updates of the map orientation with only small changes in vessel heading.

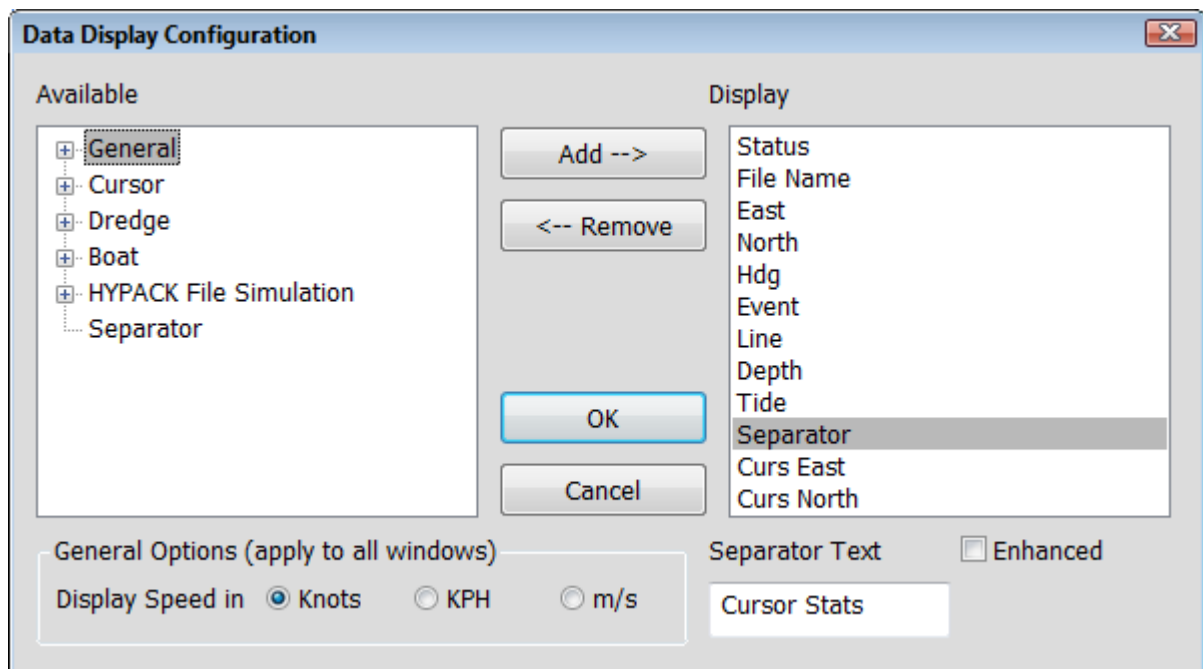
- **Line Up** draws the screen so the current line segment is directly “up” the screen. If you are in the “Line Up” orientation, the boat should be progressing up the screen. If your boat is going “down” the screen, you need to “whip” the line ends (change the start-line and end-line points) by using the Ctrl-W key command or the LINE–SWAP menu item.
- **User-Defined Rotation** draws the Area Map according to the specified degrees. Zero degrees will orient the map with North up.

CONFIGURING THE DATA DISPLAY

You can select the items displayed and the order in which they are displayed using the Data Display Configuration dialog.

1. **Select CONFIGURE on the menu bar** and the Data Display Configuration window appears.

FIGURE 92. Configuring the Display



2. **Select the items to be displayed.**

There are two lists: ‘Available’ and ‘Display’. The items in the ‘Display’ list appear in the Data Display.

To move any item from one list to the other, do either of the following:

- Double-click on the item
- Select the item in the list, then click [Add=>] or [=<Remove].

Items appear in the Data Display in the order they have been added to the Display list. To re-configure the entire order, just drag the items up or down the Display list.

If your configuration includes multiple vessels, each vessel has a list of items which is preceded by the vessel name in your Data Display window. For example, if you have main vessel and a towfish named “ROV”, you will find items named “ROV–East”, “ROV–North”, etc.

The Data Display uses black for all items that are not associated with a specific vessel. It uses the outline color designated for each vessel to display vessel-specific information. This is an easy way to distinguish between the different vessels in the Data Display.

NOTE: **NOTE** If you are surveying with only a multibeam system, the depth reading in the Data Display is the nadir depth. (The hysweep.dll must be installed to report this data.)

CONFIGURING YOUR LEFT-RIGHT INDICATOR

Configuring the Scale

You can display the cross track error using either of two scales, and expand and contract the either scale to suit your purposes.

To choose the type of scale, select or deselect the Logarithmic Scale option in the Options menu.

To contract the scale:

- Click ‘Contract’ on the menu bar.
- Use Ctrl-C (Contract) from the keyboard.

To expand the scale:

- Click ‘Expand’ on the menu bar.
- Use Ctrl-V (Expand) from the keyboard.

NOTE: **NOTE** These keyboard commands only work with the focus on the Left-Right Indicator window.

Configuring the XTE Label

The cross track error label is a real-time display of the distance off line. The font and float properties can be configured to meet the needs of different operators.

To modify the font, select OPTIONS-FONT in the indicator menu. The Windows® Font Dialog appears for you to make your adjustments. *Only the font, style and size apply*. These settings override the current scheme until you exit SURVEY.

The label can float above the pointer in the indicator or remain centered over the graphical display.

To toggle the float setting, select and deselect the OPTIONS-FLOATING TEXT menu option.

Setting the XTE Alarm Distance

SURVEY alerts you that your vessel is too far off the currently selected survey line. You can decide the distance at which you will be alerted.

To set a “Cross Track Error Alarm” distance:

- **Drag the tab indexes in the left–right indicator window.** The tab indexes are small gray bars, equidistant from center on the indicator scale.
- **Set the XTE limit in the Navigation Parameters dialog** (in the Options menu).

When this setting is changed, all other Cross Track Error displays update accordingly.

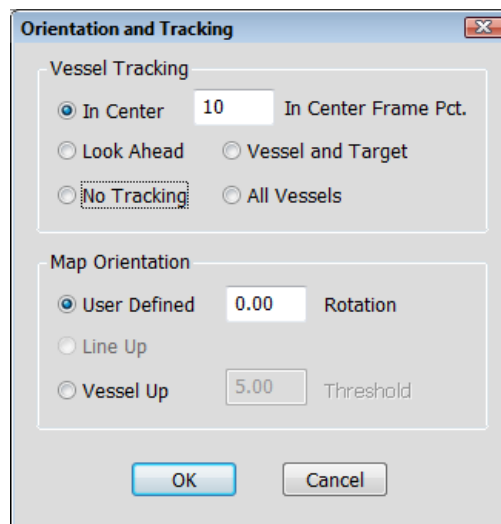
When the boat travels outside this range, the frame around the cross track label turns either red (planned line is to starboard) or green (planned line is to port), and the ‘XTE’ alarm appears in the shell. *This has no effect on the data logging*; it is only a visual alarm to the helm to steer toward the survey line.

TRACKING AND ORIENTATION

Tracking and Orientation options automatically re-adjust the screen when the boat leaves the display area and to rotate your map to your preferred orientation.

Vessel track points are limited to one per second.

FIGURE 93. Tracking and Orientation Dialog



Select SETTINGS-TRACKING/ORIENTATION from the menu and the Orientation and Tracking dialog appears.

Vessel Tracking:

- **In Center** returns the boat to the center of the screen as it nears the edge. The **Edge Dist to Win Size Pct** option determines when the centering will occur based on the distance between the vessel and the edge of the area map (expressed in percentage of the Area Map window size with an allowable range of 5-25%).

NOTE: If you enter a value outside the 5-25 range, the program will reset the value to 5, if you have entered a value less than 5, or 25 if you have entered a value greater than 25.

- **Look Ahead** moves the boat further back from the center to maximize the amount of space displayed ahead of the vessel.
- **Vessel and Target** keeps the boat and the current active target in view. The map automatically zooms to fit as you approach.
- **All Vessels:** The map automatically zooms to fit to keep all mobiles in view.
- **No Tracking** allows you to move the screen anywhere you want without having it zoom back to keep the boat in view. (Press the Home key to center the vessel on your screen.)

If you set your preferred method of tracking, you can quickly toggle between this setting and “No Tracking” by selecting SETTINGS-TOGGLE TRACKING (Ctrl+T).

Map Orientation:

- **Vessel Up** aligns the Area Map with the current vessel heading. Define a threshold (in degrees) to determine how

much the vessel heading must change to cause the map orientation to adjust. This prevents constant (annoying) updates of the map orientation with only small changes in vessel heading.

- **Line Up** draws the screen so the current line segment is directly “up” the screen. If you are in the “Line Up” orientation, the boat should be progressing up the screen. If your boat is going “down” the screen, you need to “whip” the line ends (change the start-line and end-line points) by using the Ctrl-W key command or the LINE–SWAP menu item.
- **User-Defined Rotation** draws the Area Map according to the specified degrees. Zero degrees will orient the map with North up.

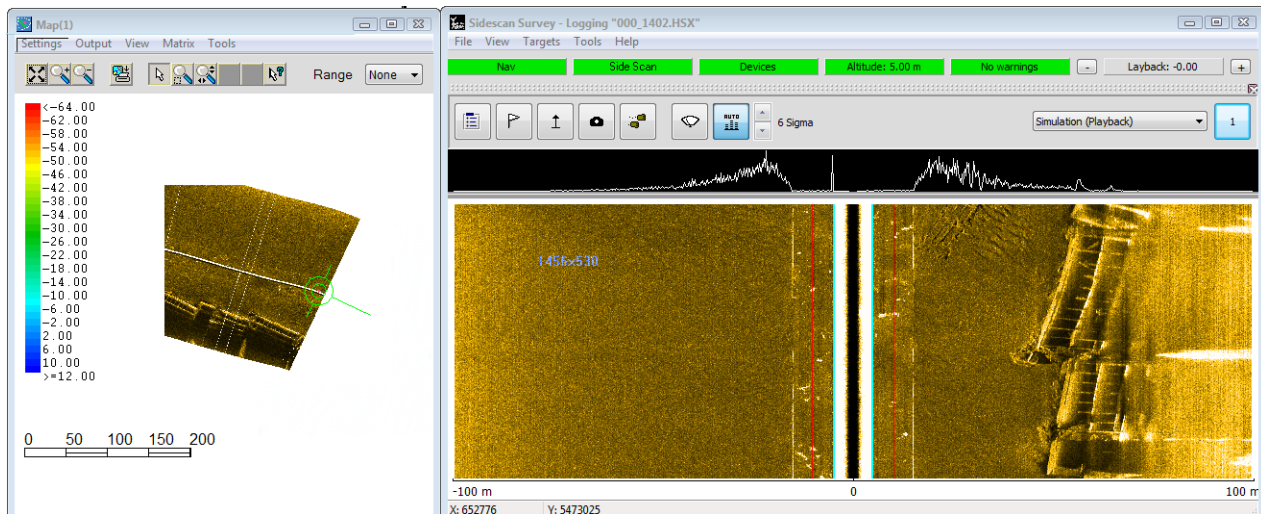
REAL-TIME MOSAIC IN HYPACK® SURVEY

Real-time mosaic is a series of georeferenced TIF (Geo-TIF) images (tiles) of your side scan data, generated by SURVEY based on your real-time mosaic options.

When you enable the Side Scan Matrix (CHARTS-SIDE SCAN MATRIX), HYPACK® SURVEY paints a preview of the real-time mosaic tiles at the vessel location. As the vessel moves through the project area, the program continuously loads and unloads the individual tiles according to the vessel location and logs the data to a binary file in the project \Autoscan folder.

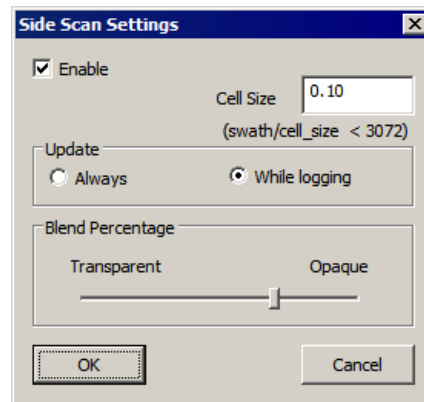
When you close the SURVEY program, HYPACK® generates a series of Geo-TIF files from the binary data, stores them to your project \Real Time Mosaic folder and enables them as background charts in your project.

FIGURE 94. Real-time Mosaic in the HYPACK® SURVEY Map Window (left) and Side Scan Waterfall (right)



1. **Open the real-time mosaic settings dialog select CHART-SIDESCAN MATRIX.**

FIGURE 95. Real-Time Mosaic Settings



2. **Select the Enable option and configure the options and click [OK].**
 - **Enable:** Check this option to start drawing the real-time side scan mosaic.
 - **Cell Size:** The distance per pixel in the real-time mosaic. It defaults to 0.15m per pixel for metric grids and 0.50 ft per pixel for foot grids.

IMPORTANT!

Changing cell size erases all previously logged real-time mosaic data. If you want to change the cell size and you have already logged real-time mosaic data, exit HYPACK® SURVEY to generate the Geo-TIF files for your logged data, then return to

HYPACK® SURVEY, change the cell size and resume your survey.

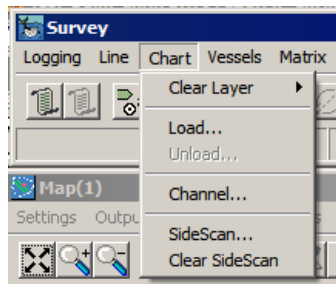
- **Update** determines when the SURVEY program updates the real-time mosaic.
- **Always** updates the mosaic regardless of your logging status.
- **While Logging:** SURVEY only updates the mosaic when you are logging survey data—from when you click the “Start Logging” icon until you click the “Stop Logging” icon.
- **Transparency:** When set to **Opaque**, you won’t be able to see anything underneath the mosaic as it draws. As you move the slider to the left, the new mosaic lines will become more transparent.

NOTE: This does not affect the resulting Geo-TIF files.

The binary files with the data for the real-time mosaic remain in your project, even after the Geo-TIF files have been created.

If you want to resurvey your area, CHART-CLEAR SIDE SCAN MATRIX deletes the real-time mosaic (BIN) data. If you logged data using start/end logging, you still have a permanent copy of that data for post-processing, but *SURVEY will not generate Geo-TIF charts of the cleared data.*

FIGURE 96. Chart Menu List./



More Information

- [“Creating Georeferenced TIF or PDF Files in Mosaic Mode”](#) on page 2-139

SETTING THE SIDE SCAN LAYBACK

HYPACK® Marine Search displays your towfish at a user-defined distance directly behind the survey boat origin. Initially, the survey

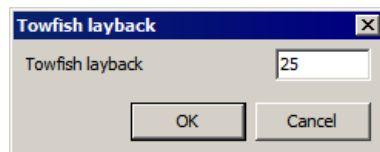
programs use the forward horizontal offset of the sonar set in the hardware configuration; however, you can change the layback from the Side Scan Survey window. The sonar forward offset and the layback setting in SIDE SCAN SURVEY are synchronized; each updates the other.

NOTE: HYPACK® MARINE SEARCH does not attempt to model where the fish actually is, especially during turns or during deep tows. The towfish is always straight behind the boat.

In HYPACK® MARINE SEARCH, set your layback distance in the Towfish Layback dialog:

1. Click **[Layback]** in the Side Scan Survey window to access the Towfish Layback dialog.

FIGURE 97. Towfish Layback Dialog



2. Enter your layback distance in survey units and click **[OK]**.

SURVEY stores the current layback in CAB records: one at the beginning of each line and one for each layback change during logging.

IMPORTANT!

If you are on a State Plane grid, enter your offsets in feet.

If you are on a UTM grid, enter your offsets in meters.

Tip: Use the buttons on either side of the Layback button to increase or decrease the layback by one survey unit.

More Information

- [“Side Scan Configuration”](#) on page 2-9

SIDE SCAN CONTROLS

The Side Scan Controls enable you to adjust the display settings for the Side Scan Survey window. Additional tools appear in the toolbar.

To access the side scan controls:

- Right-click on the side scan waterfall and select Side Scan Controls.

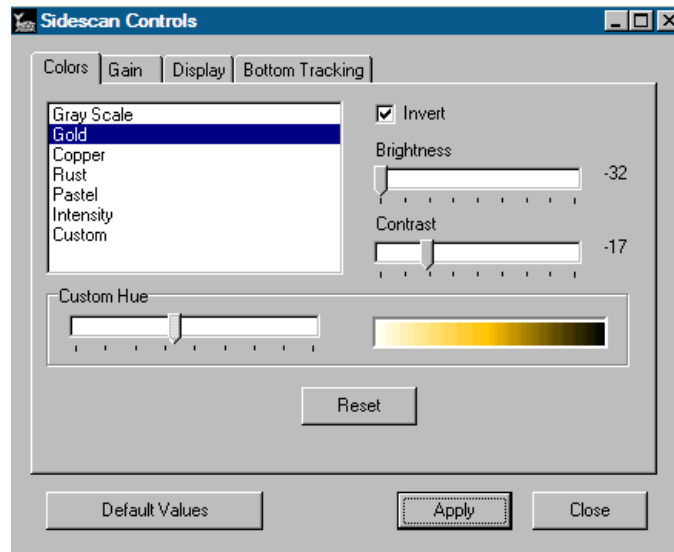
- Click the icon .
- Shift + F9



SIDE SCAN CONTROLS—COLOR TAB

The side scan data is colored based on the intensity of the acoustic signal. The Color tab allows you to adjust all of the color properties of the scrolling data in the display

FIGURE 98. Side Scan Controls Dialog—Colors Tab



There are several preset color options for which you can adjust the brightness and contrast using the corresponding sliders. In each case, low amplitude is light and high amplitude is dark (the traditional display method), but you can also reverse amplitudes represented by the dark and light color by checking the **Invert** checkbox. This is a more natural display because it emulates light and shadows.

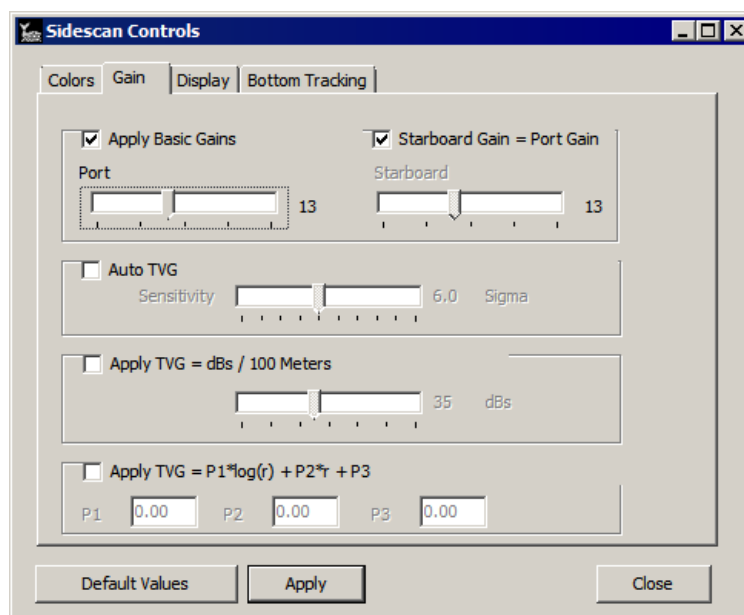
[Default] returns the setting to the Gold setting with 50% brightness and contrast.

[Reset] resets the average amplitude value. The color schemes are all based on this value so, if your display looks light or dark and the Brightness control doesn't help, try this button to correct it.

SIDE SCAN CONTROLS – GAIN

The basic gain controls are available separately for port and starboard transducers. Check 'Apply Basic Gains' and use the sliders to optimize your displays.

FIGURE 99. Side Scan Controls Dialog



The **basic gain** can be used to shift the intensities of an entire channel (port or starboard or both) up or down.

TVG (Time Varied Gain) balances the intensities across a channel.

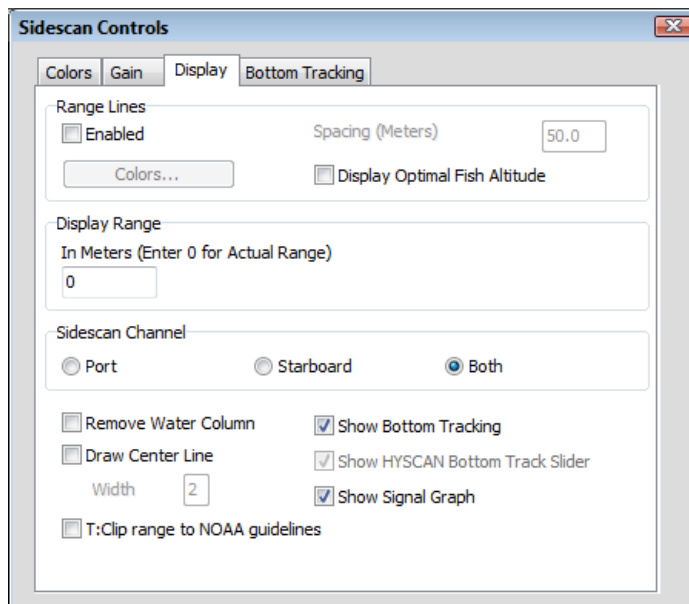
Tip: For beginners, we would recommend the AutoTVG with a Sensitivity = 7.



SIDE SCAN CONTROLS – DISPLAY TAB

The Display Tab contains options which determine the method to calculate the data to be displayed.

FIGURE 100. Side Scan Controls Dialog—Display Tab



Remove Water Column shows the side scan data corrected for slant ranges.

Beware!

BEWARE! *During acquisition this is dangerous, as you lose the indication of how high the towfish is above the bottom. It is not recommended for normal operations. In post-processing, the same option is used to omit the water column from your output mosaic. Failure to remove the water column will result in a dark strip down the TIF which will affect the accuracy of the georeferencing.*

NOTE: For this option to work well, your towfish altitude must be accurately measured.

Draw Center Line draws a line vertically between the port and starboard channels in the waterfall display.

Show Signal Graph displays the side scan signal below the toolbar.

Show Bottom Tracking (recommended) superimposes a blue line that represents the bottom tracking in the Survey window.

Show HYSCAN Bottom Track Slider displays a bar above the waterfall display with a blue bar for the bottom track and a red bar on each side to define the amount the bottom track can change vertically per second before adjusting the bottom tracking. This helps filter bad soundings.

Range Lines draws reference range lines at the user-defined Spacing Interval and color from the water column outward.

Display Optimal Fish Altitude draws a red line at 10% of the sonar ping range—typically the height at which you can record the best quality data.

Display Range can be used to limit the data *for display purposes only*. For example, the side scan might be set to scan 100m, but you only wish to view 50m. The SURVEY program still logs all of the side scan data for post-processing. Set this value to 0 and the window automatically scales according to the full extent of the data.

Smoothing eliminates minute depth changes.

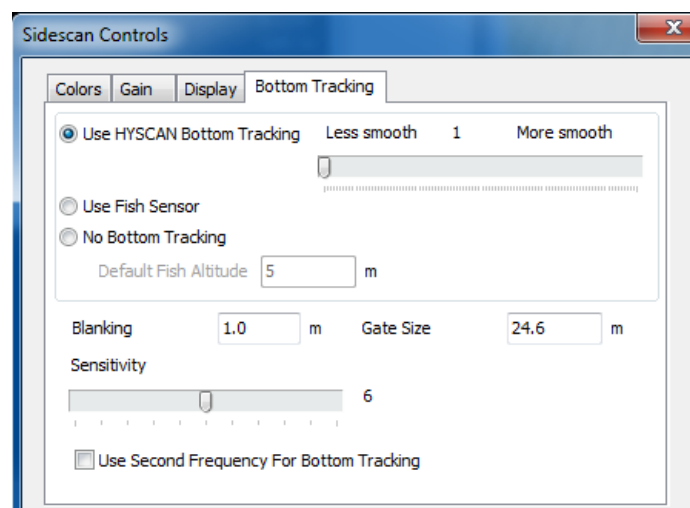
The **Side Scan Channel options** enable you to view both channels (recommended) or the Port or Starboard channel alone.

Clip Range to NOAA Guidelines reduces the range of the mosaic produced when the towfish gets too close to the bottom. When it is less than the 8% of the device range scale from the bottom, the range of the mosaic created is 12.5 times the towfish altitude. For example, at a 100 meter range scale with the towfish at 5 meter altitude, the mosaic will extend only to 62 meters (5×12.5).

SIDE SCAN CONTROLS – BOTTOM TRACK

The Bottom Tracking options draw a blue line in your side scan display at the position where SURVEY recognizes the bottom. This position is also recorded to your file and used as the assumed bottom by TARGETING AND MOSAICKING in post-processing, but you can override this setting at that time if you wish.

FIGURE 101. Side Scan Controls Dialog—Bottom Tracking



Choose the source from which you want to read the depth or select "No Bottom Tracking" and set a constant value that approximates the depth.

- **If your side scan sonar has a function to determine the bottom track**, select "Use Fish Sensor".
- **If you want SURVEY to detect the bottom**, select "Use HYSCAN Bottom Tracking", then adjust the Blanking, Gate Size, Sensitivity and Smoothing settings to lock onto the bottom.

NOTE: You must also select the Show Bottom Tracking option and clear the Remove Water Column option in the Display tab.

- **Blanking** tells the program to ignore all signal down to this depth.
- **Gate Size** tells SIDE SCAN SURVEY the amount the bottom track can change vertically per second before adjusting the bottom tracking. This helps to filter bad soundings from the bottom tracking records. Leave it set to 1.0 except in extreme cases
- **Sensitivity** sets the level of intensity at which the bottom is classified. Try it with a couple of different settings.

Click the 'Bottom Tracking' icon, then click on the waterfall display at the approximate level where you think the bottom should be. SIDE SCAN SURVEY then begins searching for the bottom at that level, and continues to search based on the other settings in the Bottom Tracking tab until it detects the actual bottom.



- **If you want to fix the bottom track at a defined depth**, select "No Bottom Tracking" and enter the Default Fish Altitude.

LOGGING DATA

The Navigation Parameters dialog in SURVEY provides options to help automate the planned line navigation and data logging. This allows the helmsman to focus on driving while the program handles the data.

To access the Navigation Parameters, select SETTINGS-NAVIGATION PARAMETERS.

FIGURE 102. Navigation Parameters Dialog

Start line gate	0.00	Meter	Offset	0.00	Meter
XTE Alarm limit	0.00	Meter			
Next Line	1				
Line increment	1				
LOG Backup Time	0	Minutes			

OK Cancel

Typically, when you set up a survey project, you create a set of planned survey lines to guide your navigation as you collect data. They help insure that you achieve the proper coverage of your survey area. Most surveyors begin on the first line of the line file and navigate up one line and down the next, logging data for each line, until they reach the end.

When you begin logging data at the beginning of each planned line (start line), the SURVEY program opens a data file and begins to record data. The status in the Data Display window will change to 'Logging'. This is your indication that you have started line and the SURVEY program is logging data.

To Start Logging:

You can start line manually or automatically.

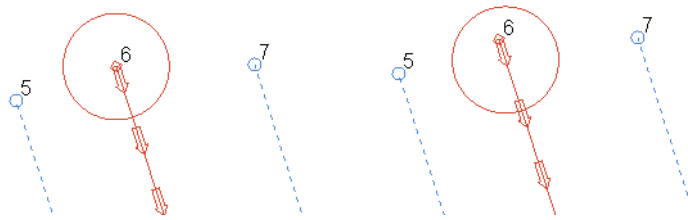
- **Manually** by selecting LOGGING-START LOGGING (Ctrl+S)
- **Automatically** using the automatic Start Line Gate feature.

The automated Start Line Gate feature begins logging automatically if the vessel tracking point passes within the specified distance of the start line point.

The **Start Line Gate** is specified in the Navigation Parameters window. Select OPTIONS–NAVIGATION PARAMETERS.

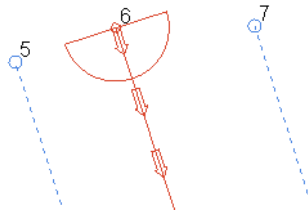
- **Start Line Gate = "0.0"**, the feature is disabled and the SURVEY program only starts and ends logging if you manually intervene.
- **If the Start Line Gate > 0**, the program starts logging automatically when the distance from the tracking point to the starting point of the planned line is less than the absolute value of the Start Line Gate. This "trigger area" is shown as a circle at the beginning of the planned line. A positive **Offset** shifts the circle down line by the specified amount, while a negative offset shifts it backward along the line.

FIGURE 103. Start Line Gate = 25 (left), with Offset=10 (right)



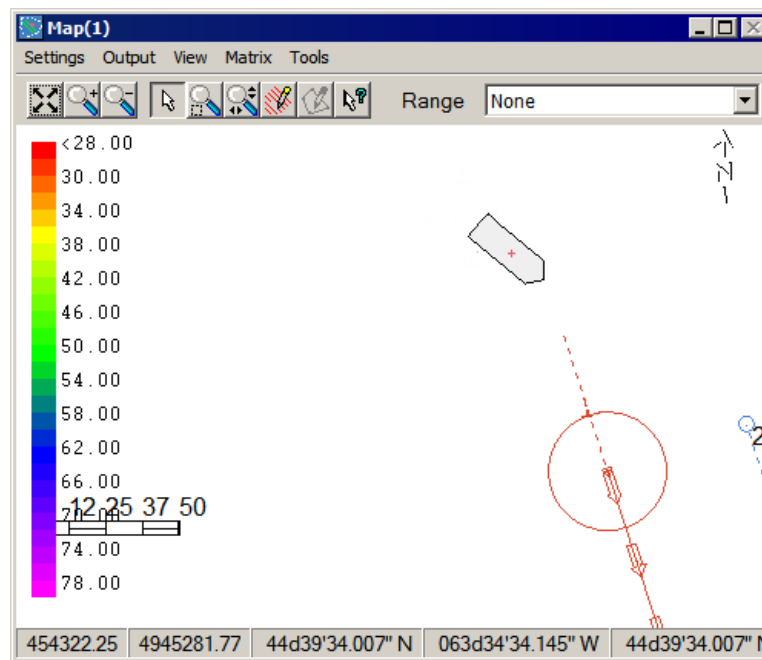
- **Start Line Gate < 0**, the SURVEY program only starts logging when the tracking point breaks the perpendicular projection of the start line point and the distance from the tracking point to the starting point of the planned line is less than the absolute value of the Start Line Gate.

FIGURE 104. Negative Start Line Gate



Tip: The **Approach Line Distance** option in the Navigation Parameters draws a dotted extension from the planned line for a user-defined distance. The approach line is a visual guide for your helmsman align your vessel with the line before you reach the start line.

FIGURE 105. Approach Line Extends 50 Meters from the Start Line



To Suspend Logging:

At any time while logging, select LOGGING-SUSPEND LOGGING (Ctrl+U). The status in the Data Display window will display the word "Suspended". A target with the name "Paused" will be placed on the screen at the tracking point position. You will still receive screen updates and position information, but the program will not write information to disk. This is useful if the survey boat needs to pause for traffic.

To Resume Logging:

Select LOGGING-RESUME LOGGING (Ctrl+R).

To Abort Logging:

At any time while "On-Line", select LOGGING-ABORT LOGGING (Ctrl+A). SURVEY stops logging data and saves the data logged to that point with an *.XXA extension. (If this would cause a duplicate file name, the extension becomes *.XXB, *.XXC...). The aborted file is *not included in the current catalog file*.

To End Logging:

Once logging has been started, it can be ended (end line) as follows:

- **Manually** by selecting the LOGGING-END LOGGING (Ctrl+E).
- **Automatically** if you are using the Start Line Gate. The line will be ended automatically when the tracking point breaks the a line projected perpendicular from the end segment point of the planned line.

To disable the automatic end line, select the Disable End Line Gate option in the Navigation Parameters dialog. In this

case, you must stop logging manually, though a start line gate automatically starts logging.

When the SURVEY program executes an “End Line” event, it closes and saves the data file and then selects the next line in the line queue. It determines the start line point based on the Line Mode in the Navigation Parameters dialog. A small red circle is drawn about the start line point and arrows indicate the direction of travel.

Beware!

BEWARE! Logging data to a network location has not been done successfully. All data should be logged on the survey computer.

KEYBOARD LOGGING COMMANDS

TABLE 7. Keyboard Logging Methods

FILE-HYPACK® MARINE SEARCH Commands	Keyboard Shortcuts
Start Logging	Ctrl + S
End Logging	Ctrl + E
Suspend Logging	Ctrl + U
Resume Logging	Ctrl + R
Increment Line	Ctrl + I
Decrement Line	Ctrl + D
Swap Line	Ctrl + W
Mark Event	Ctrl + N

Raw data is logged, by default, to the project’s Raw folder.

RAW DATA FILES

When you create a new project, HYPACK® MARINE SEARCH creates a sub-directory under the \HYPACK Marine Search\Project directory with the name of your project. It then creates a sub-directory named ‘Raw’. For example, if your new project was named “Richmond 1998”, your raw data files from the SURVEY program would be stored in the “\HYPACK Marine Search\Projects\Richmond 1998\Raw” directory.

The SURVEY program stores your survey data, by default, in the HYPACK® MARINE SEARCH “Raw” format in the \RAW directory under the current project. Every day, it creates a Catalog (*.LOG) file containing a list of all files collected during the day.

Each time goes “on-line”, it creates a new data file with a unique name.

Standard HYPACK® MARINE SEARCH Naming:

- **If your lines have names**, your data file will be the name of the planned line, plus the extension. For example, if you are logging data on a line named “34+00”, the resulting data file will be named “34P00.RAW”. If you log on the same line again, it creates a data file named “34P00A.RAW”. If you log on the same line once again, it creates a data file named “34P00B.RAW”, etc.

Line names of three or less numeric characters are an exception; they are named as if the lines do not have names.

- **If your lines do not have names**, your data file will be named using a combination of the start line time from the computer clock and the number associated with the line. For example, if you begin line #14 at 13:25, the survey information will be stored in a data file named “014_1325.RAW”. If you start the same line again during the same minute, a data file named “014A1325.RAW” will be created.
- **If you are not using survey lines**, the line names will begin with “000” in place of the line number.

It is impossible to duplicate or overwrite existing files in the SURVEY program.

CLOSING DATA FILES BASED ON TIME

If you anticipate being ‘on line’ for extended periods of time, you can instruct the program to automatically close the current data file and open a new data file without changing the current survey line.

To set an automatic Log Backup Time:

Select OPTIONS–NAVIGATION PARAMETERS and enter a non-zero value in the “Log Backup Time”. The value entered represents the number of minutes elapsed before closing the current data file and opening a new file. New files that are opened using this feature are named using the conventional naming scheme for data files which eliminates duplicate file names.

SIDE SCAN DEVICE CONTROLS

You can **control your sonar settings** from SIDE SCAN SURVEY. Device controls in the interface directly control sonar pinging, and can change the sonar range. For more complex setting changes, the controller icon accesses



the full device controller window from your survey computer instead of using the device controls and without exiting the survey programs. (These tools are unavailable in playback mode.)

FIGURE 106. *SIDE SCAN SURVEY Device Controls (from right to left) — Start/Stop Pinging, Range Controls, Device Controller Access*

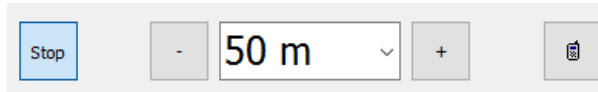
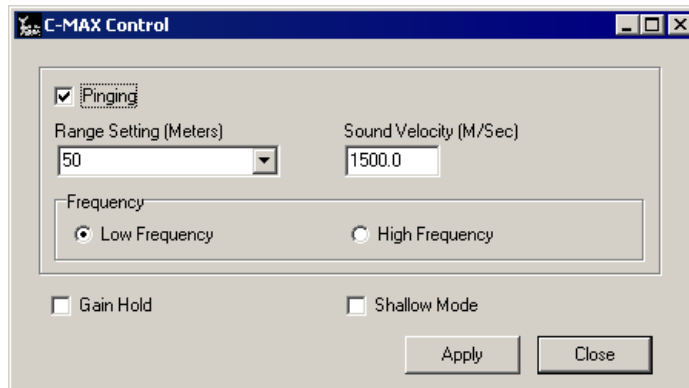


FIGURE 107. *Side Scan Device Control for C-Max CM2 Side Scan*



TARGETING IN SIDE SCAN SURVEY

SIDE SCAN SURVEY has multiple methods for marking targets:

- **Double-click in the waterfall or coverage map display.**
 - **When you mark the target in the waterfall display**, a red circle with an X marks the spot in the waterfall display and the Targets dialog appears with the target information and a screen capture of the waterfall display. Not only is the image stored with the other target information for future reference, but it enables you to measure a targeted object and store that information as well.
 - **When you mark the target in the Coverage Map display**, the Targets dialog appears with only the default timestamp name and the X,Y location.
- **Take a screen capture.** SIDE SCAN SURVEY automatically generates a target centered in the captured area and named like the captured image file.
- **Use the Height Measurement tool** and mark a target at the location.

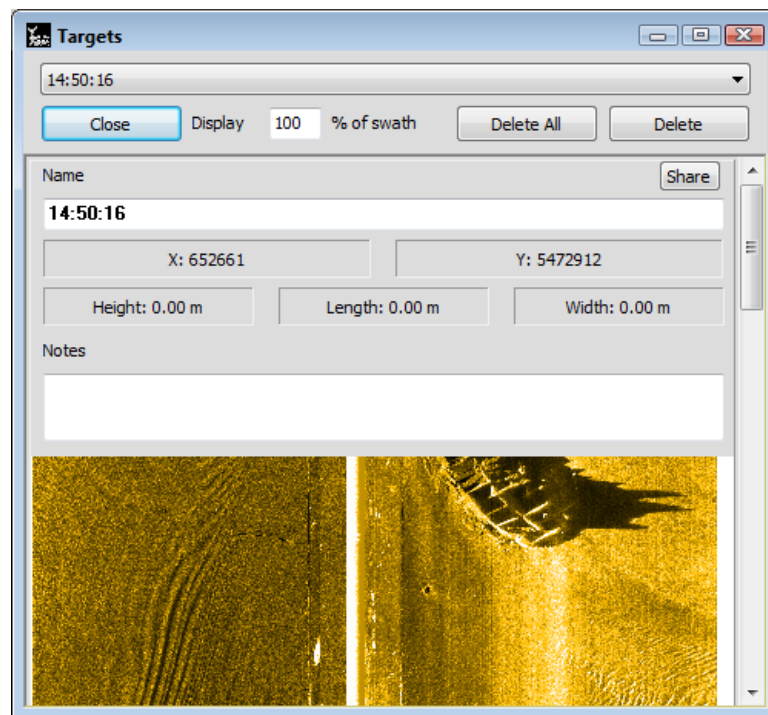
SIDE SCAN SURVEY stores all targets to the SS Survey target group. In addition, it stores the images of the target locations as a

JPG images in the SS Images folder named with the target timestamp.

NOTE: Quickmark targets (F5) are considered HYPACK® SURVEY targets and are always stored in the Survey target group. No image is captured.

When you double-click to mark a target in SIDE SCAN SURVEY, the Targets dialog appears for you to inspect and edit the file entry, email or text the target information, then save or delete the target.

FIGURE 108. *Targets Dialog*



More Information

- [“Marking Targets in Scan View”](#) on page 2-126
- [“Marking Targets in the Height Measurement Dialog”](#) on page 2-99
- [“Marking Targets in Scan View”](#) on page 2-126

EDITING TARGET PROPERTIES IN SIDE SCAN SURVEY

The Targets dialog shows the target position and default timestamp name with an image of the target area, if one has been captured.

To adjust the captured image display, use the **Percent of Swath** option. Less than 100% shows the specified portion of the side scan channel display centered over the target position.

NOTE: *For display purposes only.* The captured image always shows the full swath.

You can edit the target properties using any number of the following methods:

- **Rename your target.** Replace the default timestamp name.
- **Add notes** about the target object.
- **Measure the length and width of your target object.** Click in the corresponding field for the target then click and drag across the target. The distance is then recorded in the selected field.
- **Measure the height of the target object.** Click in the Height field, then click on the top of the target and drag your cursor to the outer edge of its shadow.

More Information

- [“Marking Targets in the Height Measurement Dialog”](#) on page 2-99
- [“Marking Targets in Scan View”](#) on page 2-126

MARKING TARGETS IN THE HEIGHT MEASUREMENT DIALOG

The Height Measurement feature enables you to make measurements of a potential target object in the waterfall window and, optionally, mark a target at the object location.

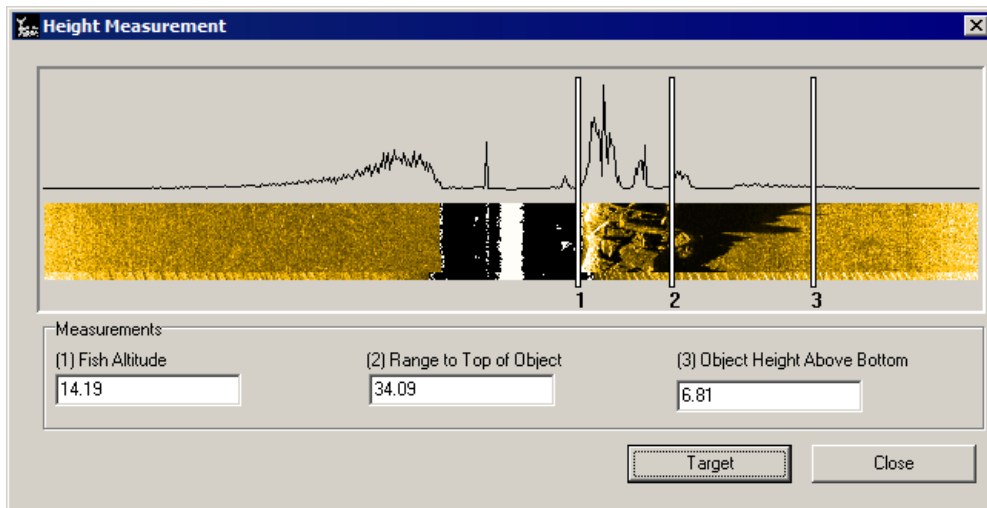
NOTE: This method is potentially more accurate than measuring an object in the Targets dialog. In the Height Measurement dialog, *you* define the bottom track instead of relying on the computer algorithms used in the Targets dialog.

1. **Click the Height Measurement icon, then click on the object you want to measure.** The Height Measurement window appears with a capture of the



section of the scan containing the cursor location, the corresponding Side Scan signal profile and three vertical sliders.

FIGURE 109. Height Measurement Window

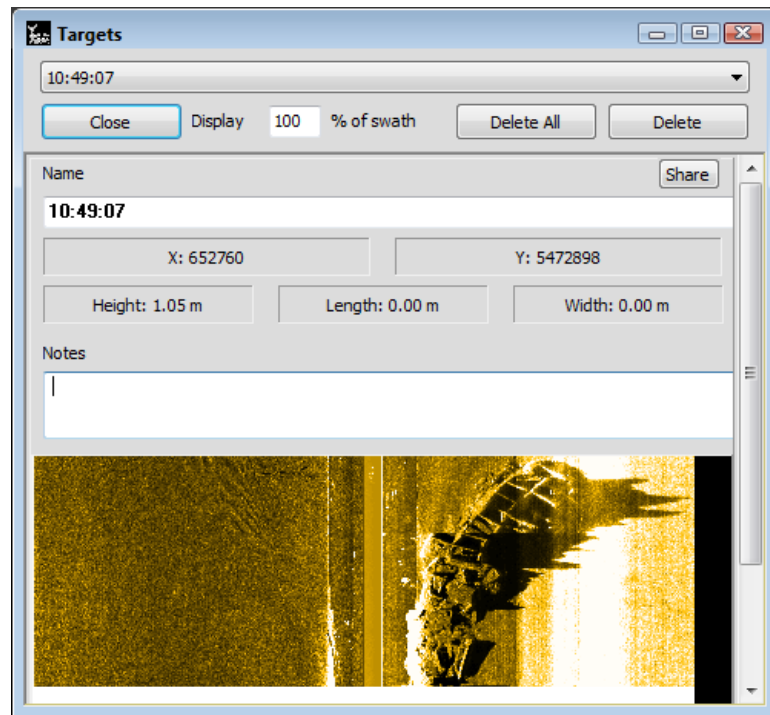


2. **Select and drag the three sliders into place** using the waterfall and signal capture as your guides:
 - Place #1 on the first return.
 - Place #2 on the peak of the object.
 - Place #3 on the outer edge of the shadow.

SIDE SCAN SURVEY calculates:

 - The height of the towfish above the bottom
 - The range from the towfish to the top of the object (assuming a flat bottom)
 - The height of the object above the bottom
3. **Save the information to the Target Database.** (Optional)
Click [Target]. The program creates the target with the default name and position and the Targets dialog appears with the coordinates where you clicked to initiate the dialog, the measured height and an image captured from the waterfall display.

FIGURE 110. Targets Dialog



4. **Add length and width measurements, and notes.** (Optional)
5. **Click [Close]** to return to the SIDE SCAN SURVEY interface.

Tip: To access this dialog without marking a target select TARGETS-EDIT TARGETS.

More Information

- [“Targeting in SIDE SCAN SURVEY”](#) on page 2-97
- [“Marking Targets in Scan View”](#) on page 2-126

TARGETING AND MOSAICKING

The TARGETING AND MOSAICKING program is the side scan processing program where you can edit and smooth track lines, heading and towfish altitude then perform targeting and generate a side scan mosaic in geo-TIF format.

TARGETING AND MOSAICKING saves the edited files to your project Edit folder in the HYPACK® MARINE SEARCH HS2 format.

The TARGETING AND MOSAICKING program reads raw side scan data and draws it to a series of windows in the **Raw Data**

Mode, where you can edit and smooth track lines, heading and towfish altitude.

Scan View Mode enables you to visually examine your data, one file at a time. Select each line using the arrow keys in the shell or by clicking on the track line in the coverage map. Use the scroll bar in the Waterfall window to progress through each data set, while marking targets, making notes and taking measurements at any points of interest.

Mosaic Mode is used to convert side scan data to a mosaic. A **mosaic** is a blending of the side scan data from one or more data files. A mosaic is not a file type in itself. Rather, it is the preview of one or more georeferenced PDF or TIF files that you can then display in your project as background files.

Multiple TIF files may be generated in batches using the SIDE SCAN AUTOMOSAIC program.

RUNNING TARGETING AND MOSAICKING

To launch TARGETING AND MOSAICKING select SIDE SCAN - TARGETING AND MOSAICKING. The program's shell will appear.

FIGURE 111. TARGETING AND MOSAICKING Shell



The shell is used to load your data, to select the program mode and to access the Side Scan Controls.

TARGETING AND MOSAICKING has three modes.

- **In Raw Data Mode:**
 - a. **Load your data and set your Read Parameters.**
 - b. **Omit 'useless' lines.**
 - c. **Set your view options.**
 - d. **Edit your heading.**
 - e. **Edit your track lines.**
 - f. **Set your fish altitude.** This value is important in order to accurately remove the water column from your display and make your mosaic.
 - g. **Save the edited data** to your project's Edit folder in HS2 format.
- **In Scan View Mode:**

- a. **Visually inspect your files.**
- b. **Mark any targets.** (Optional)
- c. **Print data.** (Optional)
- **In Mosaic Mode:**
 - a. **Select the files to be included in the mosaic.**
 - b. **Define the mosaic construction settings.**
 - c. **Build the mosaic.**
 - d. **Edit out small white areas** if desired.
 - e. **Save the results to TIF format.**

LOADING DATA TO TARGETING AND MOSAICKING

TARGETING AND MOSAICKING draws raw side scan data. You may select either individual files or a catalog file. A catalog file is a list of individual data files. If a catalog file is selected, the TARGETING AND MOSAICKING reads the file and provides you with a list of files in the catalog.

IMPORTANT!

IMPORTANT: The catalog listing also shows if any of the files in the catalog have previously been saved to edited format. If you reload the raw data with these notations and save them using the same file naming format, you will overwrite the edited files from the previous editing session.

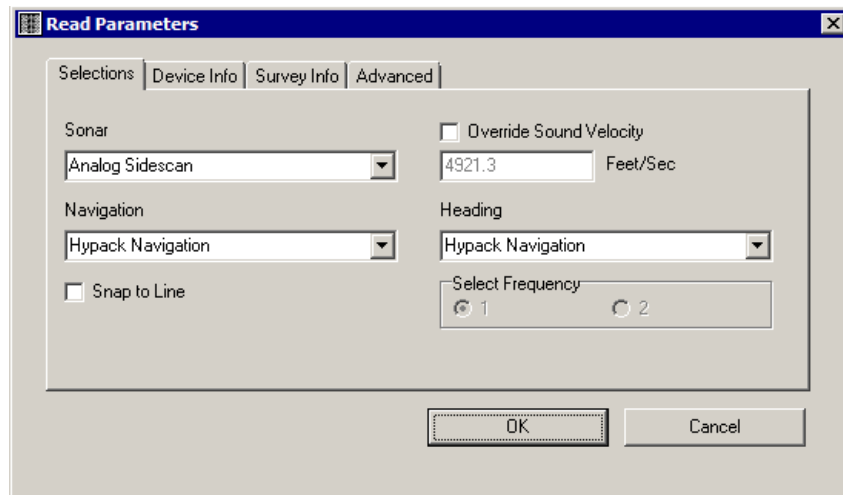
1. **Select FILE-OPEN** (or the File Open icon) and open one or more individual files or a catalog file (*.LOG) of either of these file types.



NOTE: If you collected your data with the HYPACK® MARINE SEARCH SIDE SCAN SURVEY program, catalog files have been automatically created in your Raw folder. If you have collected your data using another system, you will have to create catalog files.

- **If you load raw data** the Read Parameters dialog appears.
 - **If you load edited (*.HS2) files**, they are loaded directly into Scan View.
2. **Enter your Read Parameters options.**

FIGURE 112. Read Parameters Dialog—Selections Tab

**Selections tab:**

- **Select a device of each type from which the program should read.** For example, if your hardware configuration includes more than one position device, you must select the device from which position data will be read for your TARGETING AND MOSAICKING display.
 - **If your side scan is hull-mounted**, choose your HYPACK® MARINE SEARCH Navigation.
 - **If your side scan is towed**, select the HYPACK® MARINE SEARCH Mobile.

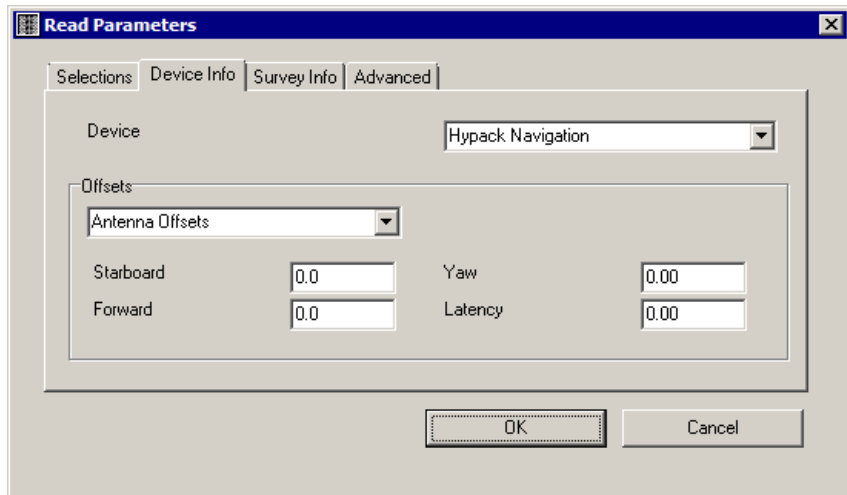
For heading, there will be several options. Experiment with your data to see which gives you the best result. (These selections will be recorded to the header in the edited file.)

- **If you are loading dual frequency data, select the frequency that you want to view.**

NOTE: This is not strictly a choice of high or low frequency. The second frequency is only populated when you have logged two frequencies.

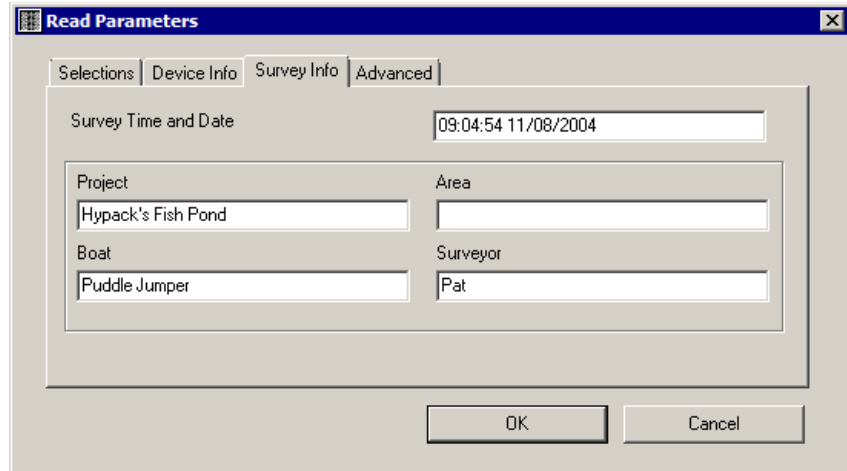
- **Override Sound Velocity** allows you to enter a sound velocity correction value that will replace that recorded during data collection.
- **Snap to Line** takes all of your soundings and moves them perpendicular until they fall right on the planned survey line. *This is a dangerous option.*

FIGURE 113. Read Parameters Dialog—Device Info Tab



The **Device Info** tab offers the opportunity to modify your device offsets. It initially displays the offsets from your hardware configuration. If you have found that any of these settings were incorrect during survey, enter the correct settings. Any modifications you make here will be reflected *only in the edited data* saved from this TARGETING AND MOSAICKING session.

FIGURE 114. Read Parameters Dialog—Survey Info Tab



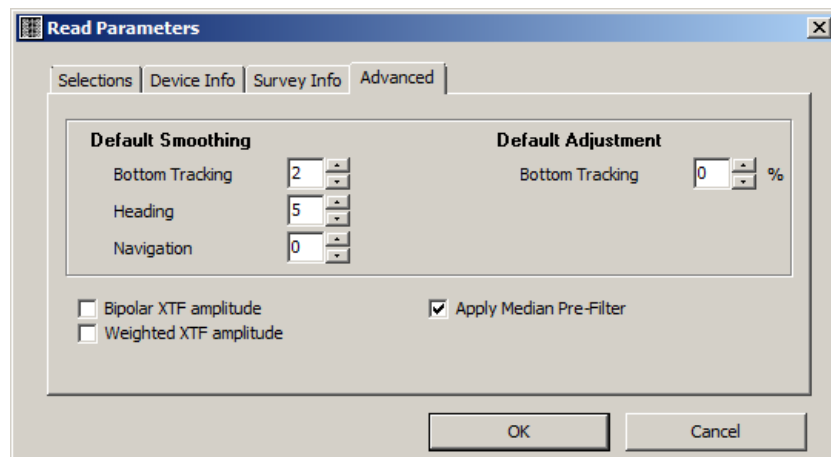
The **Survey Info** tab displays the project information, if you entered any, from SURVEY. You can modify this information, if you wish, for the edited data.

The **Advanced Tab** allows you to automatically smooth the bottom track and heading.



Tip: We recommend that you first manually do these operations to better understand what is happening before automating the process.

FIGURE 115. Read Parameters - Advanced Tab



- **Default Smoothing:** The strength of smoothing of each value: bottom-tracking, heading and navigation. When any of these options is greater than zero, the program automatically smooths the data once when it loads the data.

NOTE: This is an all or nothing operation. The entire track line of all loaded files will be smoothed.

- **Default Adjustment** raises and lowers the bottom track by the defined percentage of the range scale.
- **Bipolar XTF amplitude** tells the program to 'zero' negative amplitudes.
- **Weighted XTF amplitude** corrects striping in the mosaic window which occurs under a specific set of conditions. Select this option only if you see the striping in the mosaic preview.

IMPORTANT! This option is not retained. You must check it each time you load such raw data to the program.

- **Apply Median Pre-filter** removes outlying data spikes, but retains features. This reduces noise and improves blending.

NOTE: A similar filter is available in the blending options of the mosaic mode; however, it is less effective because you apply it to the lower-resolution, completed mosaic rather than the full set of pings available during the loading phase.

3. **When you have completed your Read Parameters settings, click [OK]** and the program will automatically proceed to the Raw Data Mode.

If you have chosen an individual file, it is listed in the drop-down box on the shell.

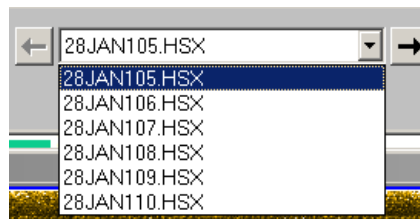
If you have chosen a LOG file, the first file in the catalog is displayed.

Selecting Files to Draw

To select the file to draw to the screen:

- **Scroll forward and back in the catalog** using the arrows on either side of the file list.
- **Select a file from the catalog** using the drop-down list.

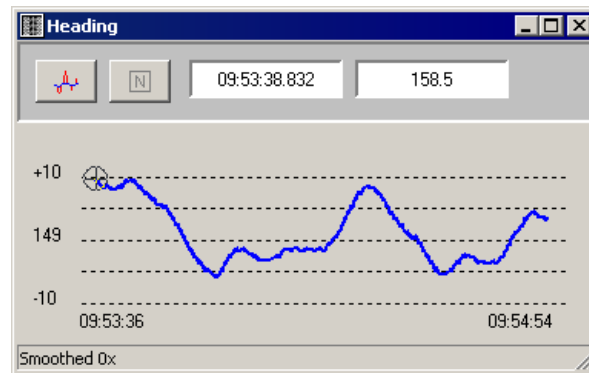
FIGURE 116. *Selecting a File*



- **Click a track line in the Track lines window.**

When a data file is selected, the track line and heading for the selected line will be displayed in the Heading and Track Line windows respectively.

FIGURE 117. *Heading Window*



Drawing Data in the Towfish Altitude Window

Omitting Lines from the Mosaic

To draw the data in the Towfish Altitude window, select whether you want to view the port or starboard data from the 'Show' options. The scans are stacked in order and drawn to the right-hand side of the window to provide an image of the scanned area.

To omit lines from the mosaic, select it in the shell and click the [X] to the right of the arrow button.



More Information

- [“Catalog Files \(*.LOG\)”](#) on page 1-112
- [“Setting your Mosaicking Options”](#) on page 2-149

SETTING DISPLAY OPTIONS

Settings that affect what appears in your display windows, and how it looks are found in the side scan controls and in the View Options dialog.

The side scan controls affect the side scan data itself, while the View Options dialog configures the window displays and HYPACK® MARINE SEARCH processing options (eg. HYPACK® MARINE SEARCH data other than the side scan data, managing targets and smoothing, etc.).

SIDE SCAN CONTROLS IN TARGETING AND MOSAICKING

The side scan controls affect the side scan data itself.

COLORS TAB

The side scan controls optimize the TARGETING AND MOSAICKING displays and control the range to be displayed and included in the mosaic and exported TIF.

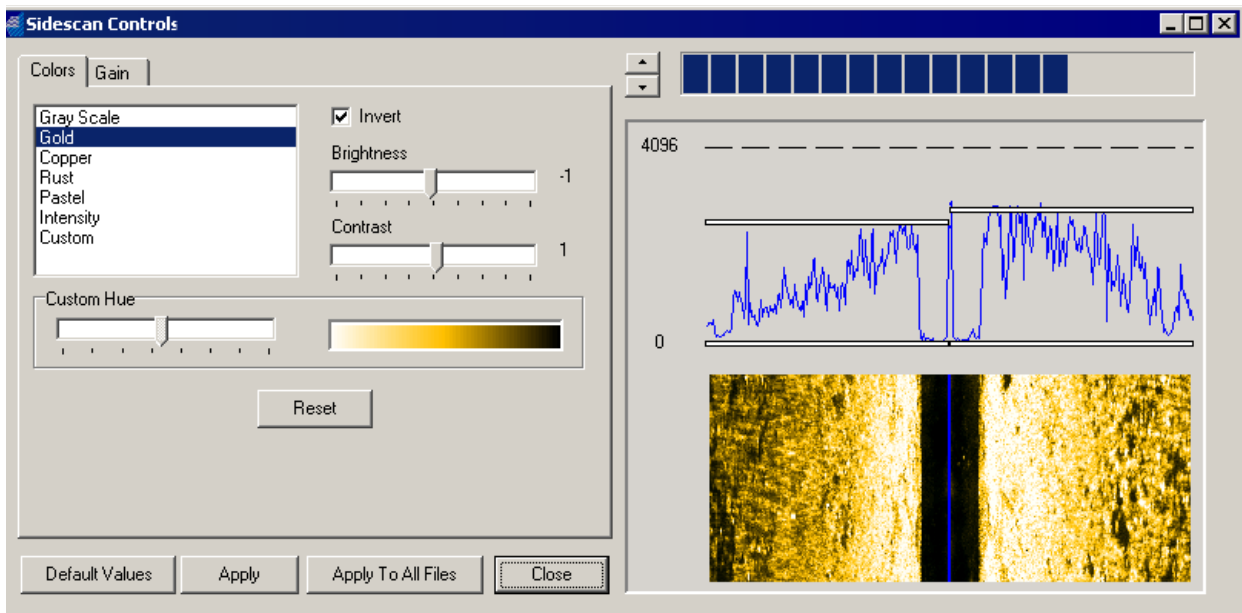
To access the settings dialogs, click the Side Scan Controls icon. All functions in this dialog are the same as in SIDE SCAN SURVEY.



You can use the color preview, which is displayed with the side scan controls, to preview the effects of your display settings.

The color preview window also contains controls for adjusting contrast and brightness. The sliders above and below the signal graph set high and low color saturation limits.

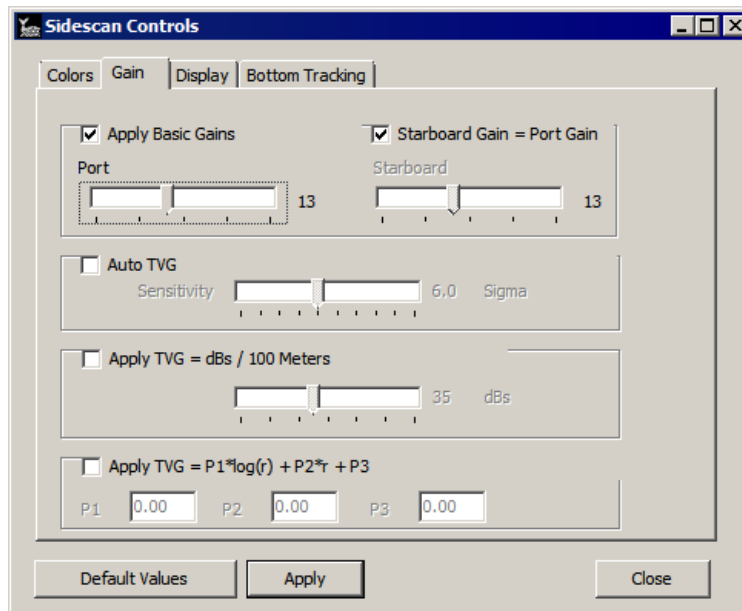
FIGURE 118. Color Preview



GAIN TAB

The basic gain controls are available separately for port and starboard transducers. Check 'Apply Basic Gains' and use the sliders to optimize your displays.

FIGURE 119. Side Scan Controls Dialog



The **basic gain** can be used to shift the intensities of an entire channel (port or starboard or both) up or down.

TVG (Time Varied Gain) balances the intensities across a channel.



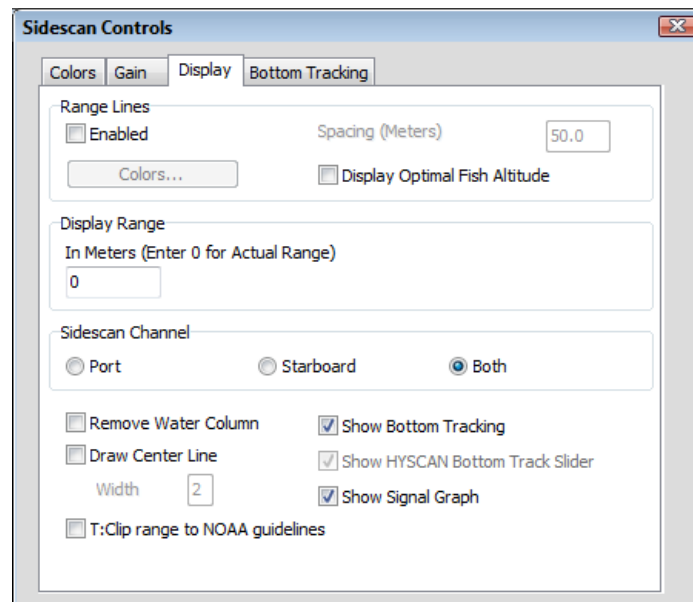
Tip: For beginners, we would recommend the AutoTVG with a Sensitivity = 7.

Display settings only affect the line currently displayed. Click **[Apply to all Files]** to make the settings consistent for all files in the log.

DISPLAY TAB

The Display Tab contains options which determine the method to calculate the data to be displayed.

FIGURE 120. Side Scan Controls Dialog—Display Tab



Remove Water Column shows the side scan data corrected for slant ranges.

Beware!

BEWARE! *During acquisition this is dangerous, as you lose the indication of how high the towfish is above the bottom. It is not recommended for normal operations. In post-processing, the same option is used to omit the water column from your output mosaic. Failure to remove the water column will result in a dark strip down the TIF which will affect the accuracy of the georeferencing.*

NOTE: For this option to work well, your towfish altitude must be accurately measured.

Draw Center Line draws a line vertically between the port and starboard channels in the waterfall display.

Show Signal Graph displays the side scan signal below the toolbar.

Show Bottom Tracking (recommended) superimposes a blue line that represents the bottom tracking in the Survey window.

Show HYSCAN Bottom Track Slider displays a bar above the waterfall display with a blue bar for the bottom track and a red bar on each side to define the amount the bottom track can change vertically per second before adjusting the bottom tracking. This helps filter bad soundings.

Range Lines draws reference range lines at the user-defined Spacing Interval and color from the water column outward.

Display Optimal Fish Altitude draws a red line at 10% of the sonar ping range—typically the height at which you can record the best quality data.

Display Range can be used to limit the data *for display purposes only*. For example, the side scan might be set to scan 100m, but you only wish to view 50m. The SURVEY program still logs all of the side scan data for post-processing. Set this value to 0 and the window automatically scales according to the full extent of the data.

Smoothing eliminates minute depth changes.

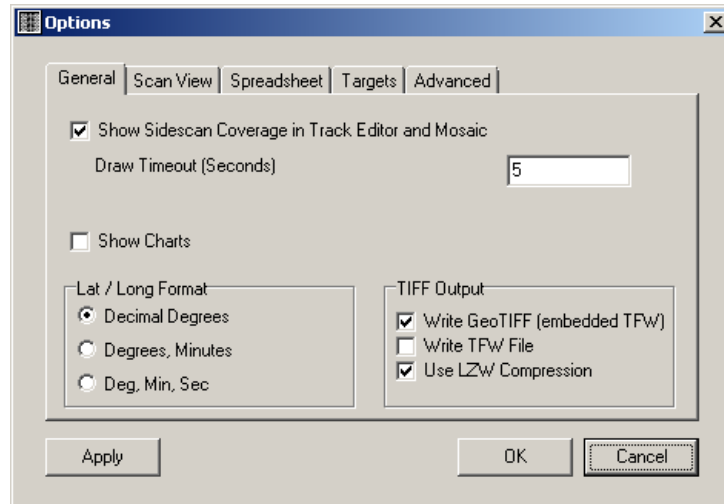
The **Side Scan Channel options** enable you to view both channels (recommended) or the Port or Starboard channel alone.

Clip Range to NOAA Guidelines reduces the range of the mosaic produced when the towfish gets too close to the bottom. When it is less than the 8% of the device range scale from the bottom, the range of the mosaic created is 12.5 times the towfish altitude. For example, at a 100 meter range scale with the towfish at 5 meter altitude, the mosaic will extend only to 62 meters (5 x 12.5).

VIEW OPTIONS DIALOG- GENERAL TAB

Settings in the View Options dialog, which may be accessed by selecting VIEW – OPTIONS (F9), configure the interface displays.

FIGURE 121. TARGETING AND MOSAICKING View Options Dialog—General Tab



Show Side Scan Coverage in Track Editor and Mosaic draws lines perpendicular to the track line to demonstrate coverage area.

Draw Timeout: If drawing the coverage lines is too slow (as with very dense data), this option omits them. If the coverage line can not be drawn within the user-specified time, it will proceed with only the track line.

Show Charts in Track, Coverage and Mosaic windows.

Lat/Lon Format determines how these grid coordinates will be displayed in the Target dialog and in the TARGET VIEWER.

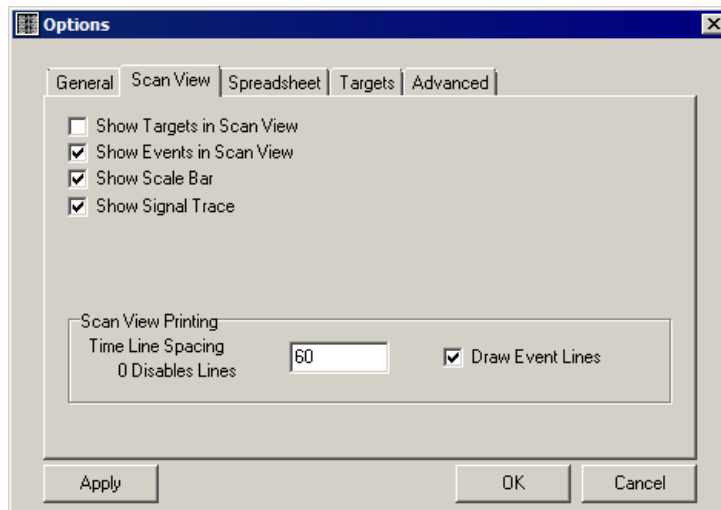
TIFF Output:

- **Write GeoTif** (embedded TFW).
- **Write TFW** file enables you to generate a separate file that contains coordinates that describe the location, scale, and rotation of the TIF. It is used by geographic information systems (GIS) software for locating areas in raster map images.
- **Use LZW Compression:** This is a lossless compression algorithm that significantly reduces the resulting file size without losing resolution of the image.

VIEW OPTIONS DIALOG- SCAN VIEW TAB

The Scan View tab includes options specific to the Scan View phase.

FIGURE 122. View Options - Scan View Tab



Show Targets in Scan View displays your targets in the in Scan View window. A square is drawn around the target area. Targets marked while viewing the current line are red. Targets marked while viewing overlapping lines are blue.

NOTE: The Coverage window always shows each target as a triangle symbol with the target name (time) at the target location.

Show Events in Scan View annotates the display with a horizontal line and event time.

Show Scale Bar shows across track distances.

Show Signal Trace shows the sonar return at the current cursor position.



Tip: The Show Signal Trace, Show Targets and Show Events options are also accessible through a right-click menu from the Scan View window.

Scan View Printing Options:

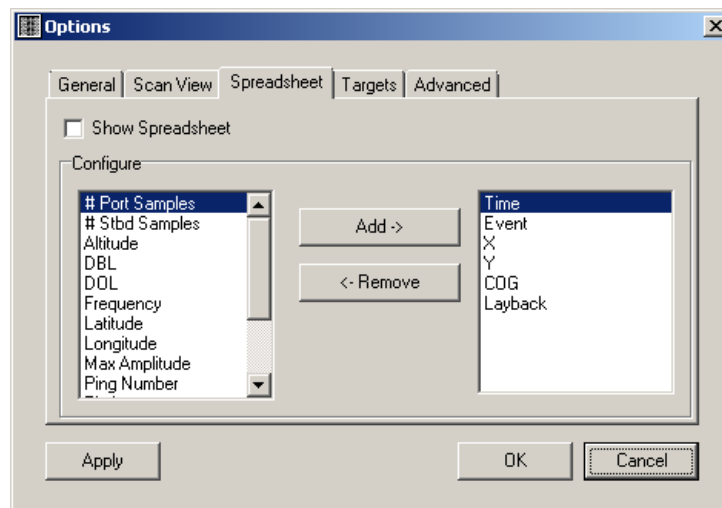
- **Time Line Spacing:** Interval in seconds where annotation marks will be drawn in gray and labeled with the time.
- **Draw Event Lines:** Events are annotated in blue and labeled with 'EventNumber.Time'.

VIEW OPTIONS DIALOG- SPREADSHEET TAB

The Spreadsheet Tab enables you to display a configurable spreadsheet window when you advance to Scan View. Each time you click in the Scan View display, the spreadsheet display

automatically synchronizes and highlights the record corresponding to the click position.

FIGURE 123. *Spreadsheet Tab*

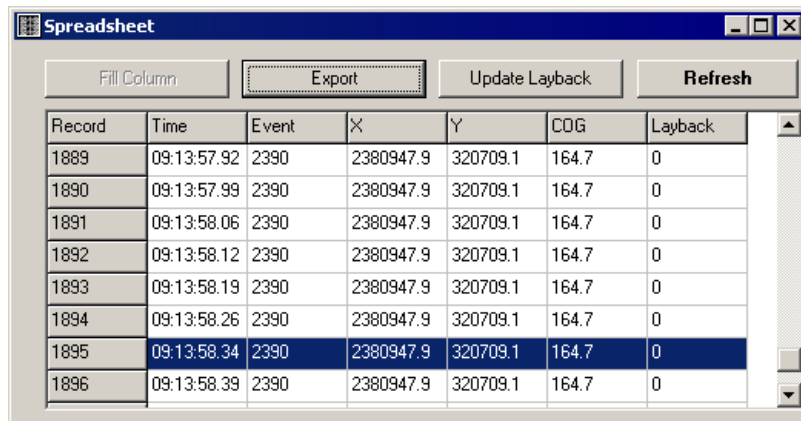


Items available are listed on the left, while items selected are listed to the right. Select items in either column then use the [Add=>] and [<=Remove] to include or omit them from your spreadsheet display..

NOTE: The list of items available is maintained in alphabetical order. The list of items selected shows the order that the columns will be displayed in the spreadsheet. Normally, they will be listed in the order that they are selected. However, if you wish to insert a column in the middle of the list, select the item in the selected items list that you wish your new selection to follow. The next added items will be inserted there.

Alternatively, you can right-click in the Spreadsheet interface and select or deselect items through the menu.

FIGURE 124. Spreadsheet Window

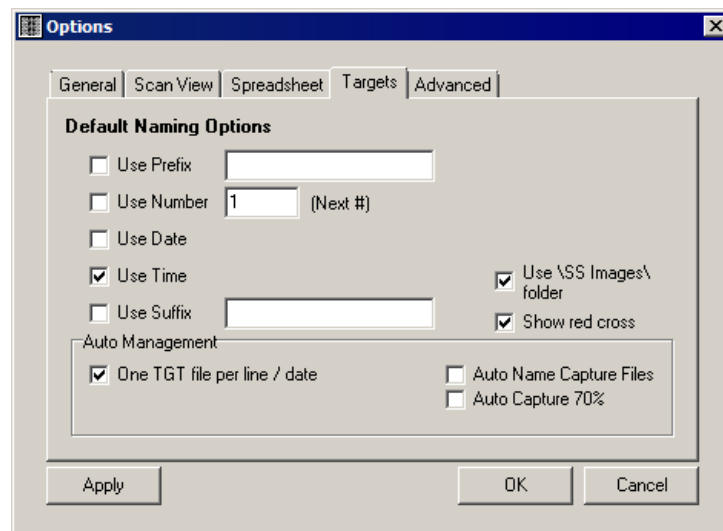


Record	Time	Event	X	Y	COG	Layback
1889	09:13:57.92	2390	2380947.9	320709.1	164.7	0
1890	09:13:57.99	2390	2380947.9	320709.1	164.7	0
1891	09:13:58.06	2390	2380947.9	320709.1	164.7	0
1892	09:13:58.12	2390	2380947.9	320709.1	164.7	0
1893	09:13:58.19	2390	2380947.9	320709.1	164.7	0
1894	09:13:58.26	2390	2380947.9	320709.1	164.7	0
1895	09:13:58.34	2390	2380947.9	320709.1	164.7	0
1896	09:13:58.39	2390	2380947.9	320709.1	164.7	0

VIEW OPTIONS DIALOG- TARGETS TAB

The options in the Targets tab enable you to customize the handling of your targets marked in Scan View.

FIGURE 125. View Options - Targets Tab



Options

General | Scan View | Spreadsheet | **Targets** | Advanced

Default Naming Options

☐ Use Prefix

☐ Use Number (Next #)

☐ Use Date

☒ Use Time

☐ Use Suffix

☒ Use \\SS Images\\ folder

☒ Show red cross

Auto Management

☒ One TGT file per line / date

☐ Auto Name Capture Files

☐ Auto Capture 70%

Apply OK Cancel

Default Naming Options: Choose the components with which the program will automatically name targets you mark in Scan View.

NOTE: If you want each target to have a unique name, you must select at least the 'Use Number' option. You may also add any of the other options, if they suit your purpose.

- **Use Number:** Numbers the targets consecutively beginning with a number defined in the corresponding field.

- **Use Date:** Uses the date in the format *mm/dd/yyyy*.
- **Use Time** (default): Uses Military time in the format *hh:mm:ss*.
- **Use Prefix:** Each target name begins with '*Prefix_*' where *Prefix* is defined in the corresponding field. If this is the only selected option, each target is named *Prefix*.
- **Use Suffix:** Each target name ends with '*_Suffix*' where *Suffix* is defined in the corresponding field. If this is the only selected option, each target is named *Suffix*.
- **Use \SS Images folder:** Stores images associated with targets in the project \SS Images folder. Otherwise, it defaults to the project folder.

Show Red Cross: A red '+' appears at the target location in the Target dialog.

Auto Management:

- **One Target File Per Line/Date** determines how each target is saved.

TABLE 8. *Target AutoManagement Save Option.*

Program Option 'One TGT per line /date' Checked?	Target Save Routine
Yes	The program automatically appends each target to two target files; one target file for the current line and one target file for the survey date. For example, a target created in line 005_0920_ss1.hs2 that was surveyed on November 8, 2004 is saved to 005_0920.tgt and 11082004.tgt.
No	Targets are saved to the HYSCAN target group.

When the **Auto Name Capture** Files option is checked, the program automatically names individual targets and their screen captures according to the naming options. Otherwise, you are given the opportunity to provide another name.

Auto Capture 70%: When you click [Save Target], Auto Capture 70% automatically stores an image file (jpg) that is 70% of the port or starboard Scan View display where the target is marked. This provides a set of image files of uniform shape and size.

NOTE: Using the capture image icon, to manually define the capture area overrides this option for the current target.



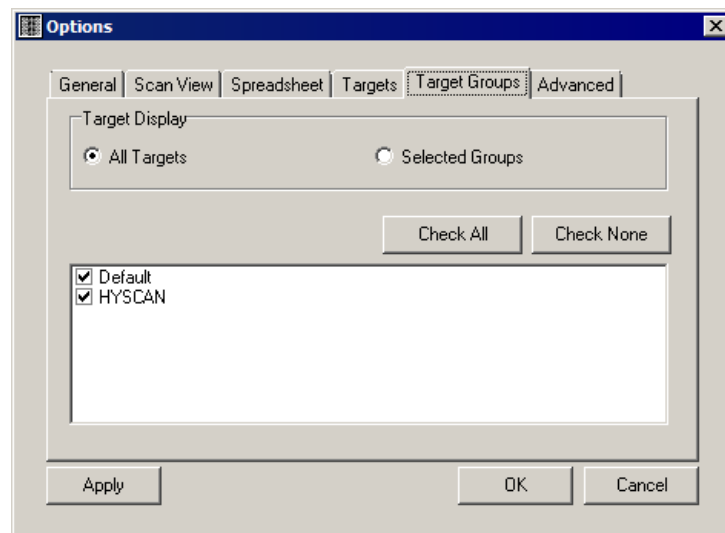
VIEW OPTIONS DIALOG - TARGET GROUPS TAB

The Target Groups tab displays a listing of all project target groups. You can choose to show all project targets or only targets from selected group.

To display all project targets, select All Targets (or check Selected Groups and check all of the target groups from the list).

To display select target groups, select Selected Groups and check the target groups you want to display from the list.

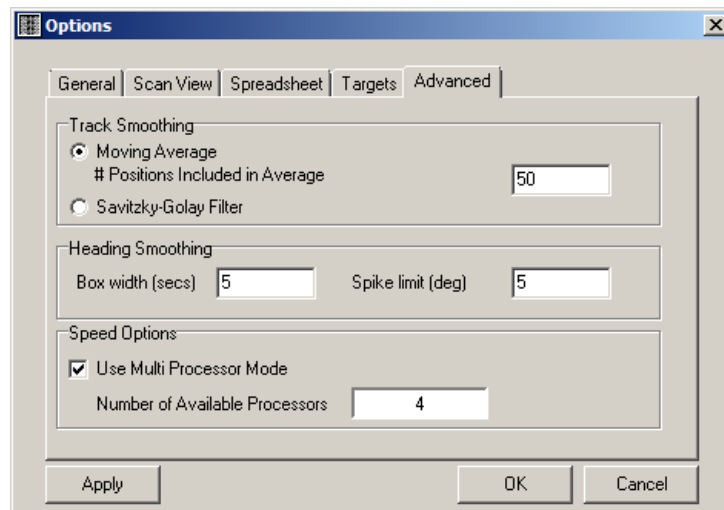
FIGURE 126. View Options - Target Groups Tab



VIEW OPTIONS DIALOG- ADVANCED TAB

The Advanced tab contains options that do not exactly affect the display. These options are described with the procedures they affect.

FIGURE 127. View Options - Advanced Tab



Track Smoothing Options:

- **Moving Average:** (recommended) Does a great job smoothing, but doesn't respond to small changes in heading.
- **Savitsky-Golay Filter:** Typically smooths your data while retaining more detail than the Moving Average method. More appropriate for a boat than a towfish.

Heading Smoothing Options affect how the smoothing is implemented in the Heading window. A wider Box Width and narrower Spike Limit each result in a stronger filter.

Speed Options: Check Use Multi Processor Mode if your computer is equipped with dual core processing to improve your processing speed.

EDITING YOUR SIDE SCAN DATA

There are three parts to editing side scan data. You can edit:

- **Track Lines** to remove position spikes by smoothing the track line or by deleting one or more segments from the defined track.
- **Heading:** You can smooth or manually define the heading for the entire length of the line or for one or more user-defined segments of it.
- **Towfish Altitude** to smooth and vertically adjust the altitude of the line or segments of it, and remove the water column to allow the targeting in Scan View to be properly georeferenced.

Each time you smooth the line in any of the three windows, the counter in the status bar of that window increments. This count is

maintained only for the current session. A similar count is maintained for each vertical adjustment in the Towfish Altitude window.



Tip: If editing operations have produced unsatisfactory results, you can reverse them, in the reverse order in which they were performed, using the Undo icon on the toolbar.



When your track lines and heading are edited, and you have a satisfactory towfish altitude defined, click the Scan View icon to progress to Scan View Mode.

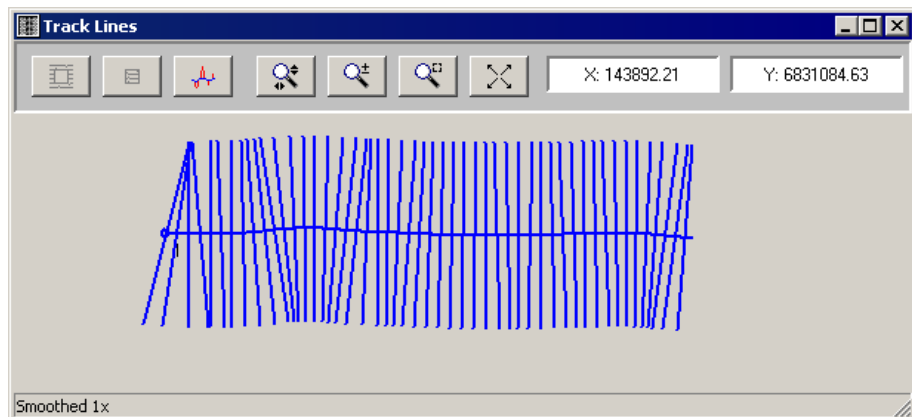
Edited Side Scan data is saved to HS2 format with an “_ss” appended to the filename (ex.000_0904_ss.hs2), which distinguishes them from multibeam data (000_0904.hs2) that may be derived from the same raw data.

In Scan View, you can also edit layback and sound velocity.

EDITING TRACK LINES IN TARGETING AND MOSAICKING

The Track Line Editor displays the track lines and coverage of all loaded files. The line currently selected in the shell is blue, while the remaining tracks are gray. Use the zoom and pan tools to optimize your view.

FIGURE 128. Track Line Editor



In the Track Line Editor, you can remove position spikes, and smooth your track lines.

REMOVING PORTIONS OF THE TRACK LINES

Remove position spikes by block editing the track lines:

1. **Use your mouse to drag a box around your data.**



2. **Click the Delete In/Out buttons** to remove data where the tracks fall inside/outside the box.

If you remove a portion of the track line that does not include an end point, the program assumes a straight track across the space.

HIDING/SHOWING IMAGERY

In the Tracklines display, you can *temporarily* mark areas to be omitted from the mosaic, omitting the data inside or outside each user-defined area.

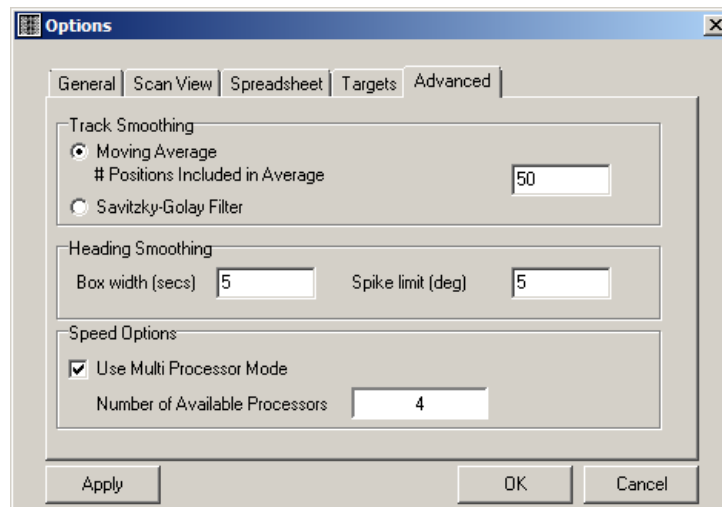
1. **Use your mouse to drag a box around an area of data.** The Imagery buttons become enabled.
The red buttons remove data inside or outside your defined area.
2. **Click the appropriate Hide Imagery icon** according to which portion of the data you want to omit. The track line for the hidden data turns red.
3. **Repeat these steps to mark additional areas.**

To restore the hidden areas, use the green Show Imagery buttons in the same manner. You can either correct areas marked in error, or restore the full dataset.

SMOOTHING YOUR TRACK LINES

1. **Select VIEW- OPTIONS (F9).**

FIGURE 129. Track Smoothing Options



2. **In the Advanced tab, configure your smoothing option and click [OK].** There are two Track Smoothing options:
 - **Moving Average** (recommended) does a great job of smoothing, although fine direction changes may be lost. You must set the number of positions for each average.
 - **Savitzky-Golay Filter** is more appropriate for a boat than a towfish.

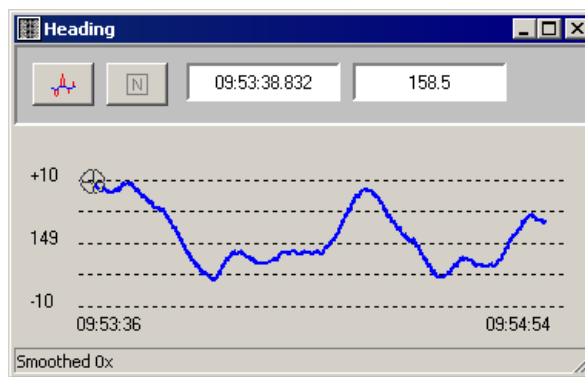
3. **If you want to smooth only a portion of the line, use your cursor to drag a box** around the portion to be smoothed.
4. **Click the Smooth icon** in the Track Line Editor.
Your GPS track line usually needs little or no smoothing.



EDITING HEADING IN TARGETING AND MOSAICKING

Minute changes in towfish heading seem to be exaggerated when we stack the scans to create the mosaic. Smoothing the heading improves the quality of the mosaic.

FIGURE 130. Sample Heading Window



You can smooth the entire line with just one click of the smoothing icon, or first drag your cursor across a range in the Heading window to define the segment of the line that will be smoothed.



A little smoothing (once) is a good thing; however, too much smoothing (3 or more) can alter the positions of objects on the outside of the side scan swath

You can also manually enter a heading value for the line, or for one or more segments of the line.

1. **Use the cursor to draw a box around the segment (any portion including the entire line) for which you want to define the heading.**
2. **Click the 'Fill' icon.** A dialog will appear.
3. **Enter the new heading value and click [OK].** The defined heading will be applied to all data within the defined area.

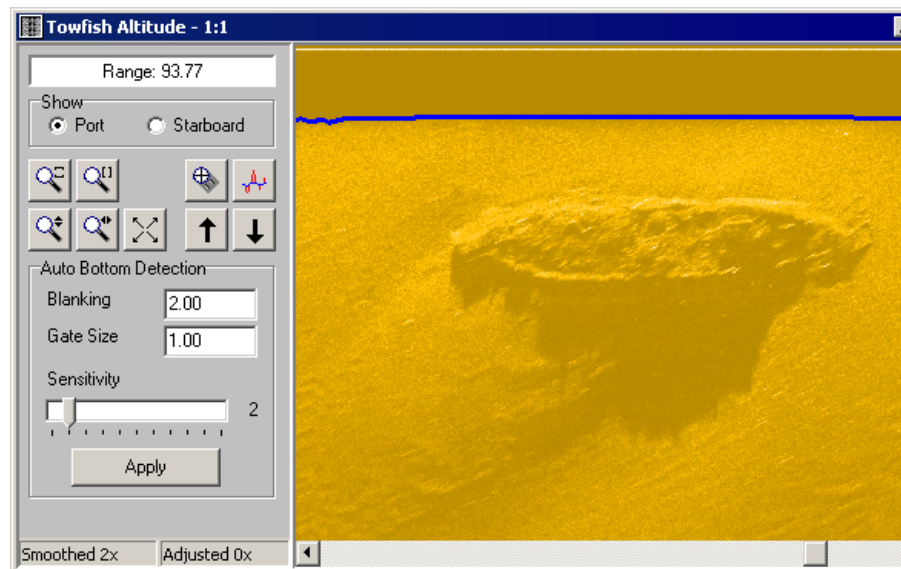


TOWFISH ALTITUDE IN TARGETING AND MOSAICKING

Determining the fish altitude is important to be able to accurately remove the water column before creating your mosaic.

Some side scan devices have an altitude sensor and the fish altitude is recorded in the data files. It is wise to check these values for unlikely spikes and smooth them out. Other devices do not include altitude sensors and we must create fish altitude records based on the sounding data.

FIGURE 131. Sample Towfish Altitude Window



The Towfish Altitude window shows either the port or starboard side scan data. The towfish altitude is indicated by the blue line. There is one bottom detect for both channels. If it does not match between the two channels, your towfish is not flying level.

The initial altitude is from the towfish altitude sensor, if you have one. Otherwise, it is based on a bottom detection algorithm from SURVEY.

Beware!

To Optimize Your View:

BEWARE! Failure to remove the water column will result in a dark strip down the TIF which will affect the accuracy of the georeferencing.

Zoom tools are provided to change the horizontal and vertical zoom scale of your data.

Icon	Function
Horizontal Zoom In 	Reduces downsampling for display purposes, which increases the resolution but displays less of the line at once.
Horizontal Zoom Out 	Increases downsampling for display purposes, which reduces the resolution but displays more data at once..
Vertical Zoom In 	Click the icon, then drag your cursor vertically across the data to define the display range.
Vertical Zoom Out 	Shows full vertical range of your data.
Zoom Extents 	Downsamples enough to display the full data set in the window.

To establish tow-fish altitude:

- **Auto-Bottom Detection:** This method works particularly well where there is little noise in the water column and the initial bottom returns are strong. Three parameters control auto detection.
 - **Blanking** is a minimum altitude value where zero provides no bottom tracking and a very high setting can set the bottom tracking at a depth greater than the true depth. A low value of 5-10 feet will usually improve the detection process.
 - **Gate Size** is the maximum expected change in towfish altitude. Altitude points outside the gate are rejected unless there are many of them.
 - **Sensitivity** affects how receptive the tracking is to changes in the water column. Increase sensitivity if altitude detection is beyond the end of the water column. Decrease sensitivity if water column noise (usually aeration) is consistently mistaken as the bottom.
- **[Apply]** activates the auto-detection.
- **Digitizing:** Manually mark the towfish altitude using your mouse on the side scan record.
 - a. **Click the digitize button** to activate digitize mode
 - b. **Use the mouse to digitize points** from left to right across the side scan record. Your marks will appear as red dots.
 - c. **Click the digitize button** again to apply the digitized altitude.



Once the altitude is established you can further improve the fit of the profile to your data by making vertical adjustments, smoothing or both.

Adjust the defined altitude profile using the arrow buttons. Each click raises or lowers the profile by 1 percent.



Smoothing rounds sharp angles in the profile.



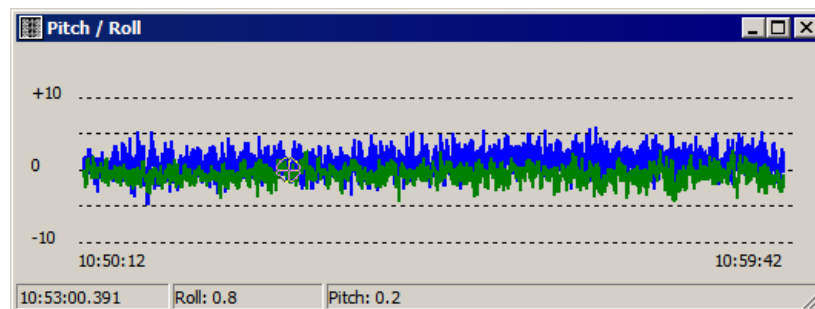
NOTE: You can confine the auto-detection, adjustment or smoothing to a select segment of the line by dragging a box around the data before clicking the corresponding icon or [Apply].

The status bar displays a count of times you have smoothed the full line of data *during the current session*.

PITCH ROLL WINDOW IN TARGETING AND MOSAICKING

For systems with pitch and roll sensors, SIDE SCAN SURVEY records the data and displays it, graphed against time, in the Pitch/Roll window. It is not used to correct the side scan returns in any manner.

FIGURE 132. Pitch/Roll Window



SCAN VIEW

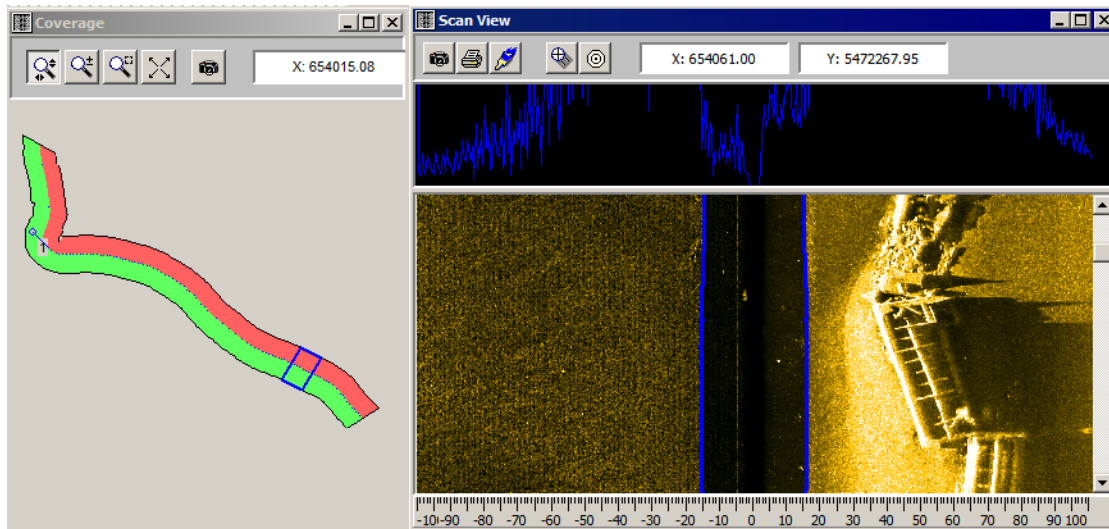
To access Scan View Mode, click the Scan View Icon in the TARGETING AND MOSAICKING shell. The displays in the shell, Scan View and Coverage windows are synchronized.



Scan View Mode enables you to visually examine your data, one file at a time. Select each line using the arrow keys in the shell or

by clicking on the track line in the coverage map. Use the scroll bar to progress through each data set, while marking targets, collecting images, making notes and taking measurements at any points of interest.

FIGURE 133. Coverage Window (left), Scan View (right)



The signal window at the top shows the sonar return at the current cursor position and the scale at the bottom shows across track distances. You can toggle these two features off and on in the Scan View tab of the View Options dialog.

The View Options (F9) provide the choice to display targets and event marks in the Scan View.

The **Coverage window** displays an outline of the scanned area with starboard scans in red and port scans in green. A blue border defines the area currently in view in the Scan View window.

Using the **View Options** (F9), you can opt to also display background charts, and targets to help locate the features seen in the Scan View. The **Side Scan Controls** (Shift+F9) enable you to remove the water column, add scale lines or modify the display range.

EDITING LAYBACK AND SOUND VELOCITY IN TARGETING AND MOSAICKING

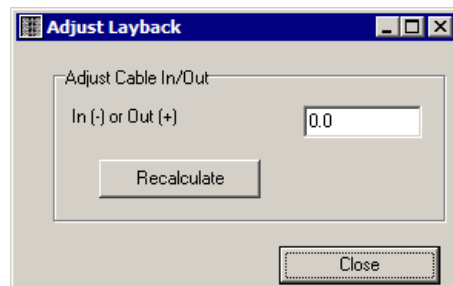
Layback and Sound Velocity are the only editable values in the Spreadsheet window.

- **Type new values into individual cells** or
- **Reset one or more contiguous cells at the end of the line to the same value** by changing the first value in the series and

clicking [Fill Column]. If you start with the first cell, all cells in the column will be the same.

- **Adjust Layback by a constant amount:**
 - a. **Select TOOLS-ADJUST LAYBACK.** A dialog will appear.

FIGURE 134. *Adjust Layback Dialog*



- b. **Enter your new Cable Out value and click [Recalculate].** The program will tell you when the calculations are complete.
- c. **Click [OK].** The Adjust Layback dialog will close.

To see the results in the Coverage Map window, use one of the icons in the Coverage Map window to cause the display to redraw.

MARKING TARGETS IN SCAN VIEW

You can create targets to mark points of interest as you inspect your side scan data.

The program names and saves the targets according to your selections in the Targets tab of the View Options dialog and in the HYSCAN target group. The targets can then be loaded to the HYPACK® MARINE SEARCH window with your data files and the georeferenced TIF file from the TARGETING AND MOSAICKING program to see them in the context of your survey area.

If you select the **Show Targets in Scan View** option in the Scan View tab of the View Options dialog, red squares denote all targets marked while viewing the current line. Targets marked while viewing overlapping lines are blue.



Tip: The Show Targets option is also accessible through a right-click menu from the Scan View window.

Once you have set your target options in the View Options, the program supports two methods of marking targets:

- **Full-record method,** when you mark each target, you may also measure the targeted object, classify it, store an image of it and make short notes about the target location.

- The **Quick Mark** method enables you to mark multiple target locations in quick succession, each with a screen capture, but there are no additional records about the target location.

FULL-RECORD TARGETS

When you mark each target using the Full Record method, you may also measure the targeted object, classify it, store an image of it and make short notes about the target location.

1. **Mark your targets.** Double-click at the target location in the Scan View. When each target is marked, the Target dialog appears. If you have selected the Show Red Cross option in the View Options, a red '+' appears at the target location in the Targets dialog.
2. **Measure your targeted object.** (Optional) This populates the Altitude, Range to Target and Height values in the Target dialog.
3. **Assign a Classification ID of your targeted object.** (Optional)

FIGURE 135. Target Dialog

Target

(1) Fish Altitude

(2) Range to Target

(3) Height

Name

Date

Time

Event

X

Y

WGS84 Latitude

WGS84 Longitude

Heading

Length

Width

Survey File

Capture File

Notes

Classification ID

4. **Edit any of these values** to suit your needs.

NOTE: NOTE You can also reposition the target by clicking [+], then clicking the new position in the area view at the right.

5. **Click [Save Target].**

The following values are saved to the project targets listing.

- **Date and Time** of the survey at that target position.
- **Event:** Last Event Number at the target location.
- **X, Y** position of the target.
- **WGS84 Lat/Lon** position of the target.
- **Heading** of your vessel when that location was scanned.
- **Altitude:** Fish height above the bottom

- **Range to target:** Distance (measured diagonally) from the sonar head to the object.
- **Height:** Height of the object of the bottom.
- **Length and Width** of your target object.
- **Survey Line File** on which the target is marked.
- **Capture File:** If you take a screen capture using the Capture Image icon, the file name (jpg) appears here when you close the Capture File window. Capture files also appear in the Side Scan Images folder of the HYPACK® MARINE SEARCH Project Items list.
- **Notes:** User-defined memo regarding target position.
- **Classification ID:** Classification assigned from your classification database.

NOTE: If you have selected the 'One Target File Per Line/Date' option in the View Options (F9) dialog, the program also generates those TGT format target files. (This is the one place where HYPACK® MARINE SEARCH may generate new TGT format target files.)

QUICK MARK TARGETS

- The **Quick Mark** method enables you to mark multiple target locations in quick succession, storing a screen capture of each, but there are no additional records about the target location.
1. **In the View Options (F9), select the Show Targets in Scan View option.** (Required) This enables you to see where you mark targets. Otherwise, it appears nothing is happening until you review your work in the Target Viewer or in the HYPACK® MARINE SEARCH TARGET EDITOR or Project Items list.
 2. **Enable the Quick Mark feature.** Click the Quick Mark target in the Scan View toolbar. 
 3. **In the waterfall, click and drag a window around the area to be marked with a target.** The program generates the target at the center of the defined area and stores a JPG image of the defined area, by default, to the project \ssimages folder. You can repeat this step multiple times to mark multiple targets.

More Information

- [“Setting Display Options”](#) on page 2-108
- [“Measuring Objects in the Targets Window”](#) on page 2-130
- [“Target Classification”](#) on page 2-558

MEASURING OBJECTS IN THE TARGETS WINDOW

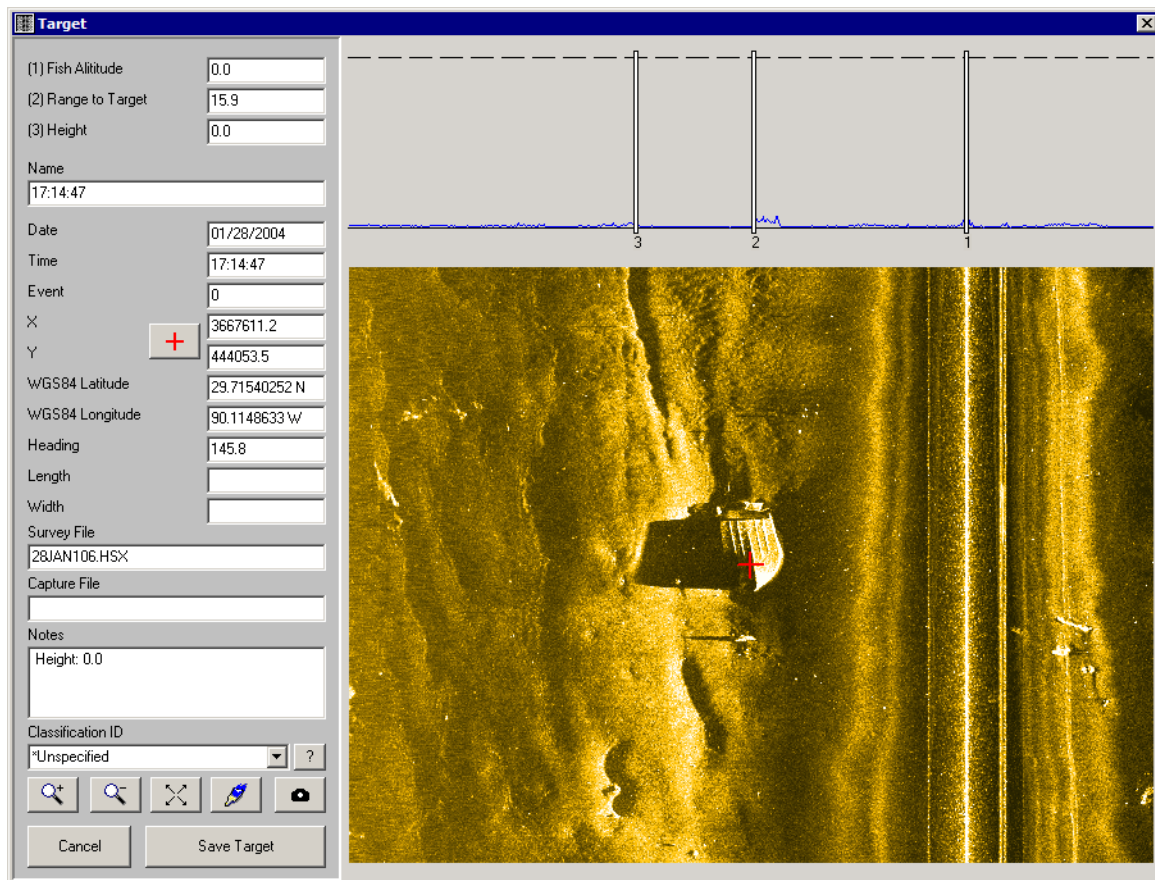
You can use the features in the Target dialog to measure the following distances:

- Fish height (Fish Altitude)
- Height of the object (Range to Target)
- Height of the object off the Bottom (Height)
- Length and width of the object (Length and Width)

To make vertical measurements, drag the numbered bars over the return profile. All three bars must be positioned to obtain the correct measurements.

1. **Double-click on the object that you would like to measure in the Scan View.** The Target dialog appears with a section of your scan that includes the object of interest and a profile of your side scan returns at that point. If you have selected the Show Red Cross option in the View Options, a red '+' appears at the target location.

FIGURE 136. *Measuring Objects based on Side Scan Return*



Three sliding bars, each representing a vertical measurement, are superimposed on the return profile.

NOTE: If you are displaying the red 'X' at the target location, it will be hidden as you use each bar during the measuring process.

2. **Drag Bar 1 to the top of the water column** represented by the edge of the area of low return in the return profile. (This corresponds to the dark stripe in your scan view.) The Fish Altitude value on the left will update accordingly.
3. **Drag Bar 2 to the top of the object.** There should be an area of high returns in the profile, proportionate to the size of the object you are measuring, Place the bar on the edge of it closest to the water column. The Range to Target value on the left will update accordingly.
4. **Drag Bar 3 to the end of the shadow.** The Height value on the left will update.

To make horizontal measurements: Click in the length or width field then click and drag with the mouse across the corresponding dimension of the target object. The measurement at the left will update according to the distance between the click and release of the mouse button.

SCREEN CAPTURES IN SCAN VIEW

You can capture images when you mark a target. The process varies according to the Auto-management options in the Targets tab of the View Options dialog (F9).

In the Target dialog, you can capture a selected part of the scanned image to a JPG and to a georeferenced TIF or PDF file. These images are stored to the SSImages folder.

Later, you can view the JPG images, each with its target information in the TARGET VIEWER and load the georeferenced images as background charts.



Tip: To quickly enable and disable all such images in the project, use the SS Images options in the toolbar.

TABLE 9. Screen Capture Options and Procedures

Task	Auto Name	Auto Capture	In the Target Dialog, Do This:
Automatically Capture and Name Your Images	N/A	Y	Click [Save Target].
Automatically Name an Image of a User-defined Area	Y	N/A	1. Click the Capture Image icon. 2. Use the cursor to drag a box around the area you want to capture. 3. Click [Save Target].
Manually Capture and Name an Image	N	N	1. Click the Capture Image icon. 2. Use the cursor to drag a box around the area you want to capture. The defined area is drawn to a separate window. 3. If the defined area is satisfactory, click the Save icon in the pop-up window. A File Save dialog appears. Otherwise, close the window and define a new area. 4. Name your file, select your file type and click [OK]. The program generates a simple JPG or a georeferenced TIF or PDF file. The TIF files are created according to the Tiff Output options in the General tab of the View Options (F9) dialog. All 5. Click [Save Target].

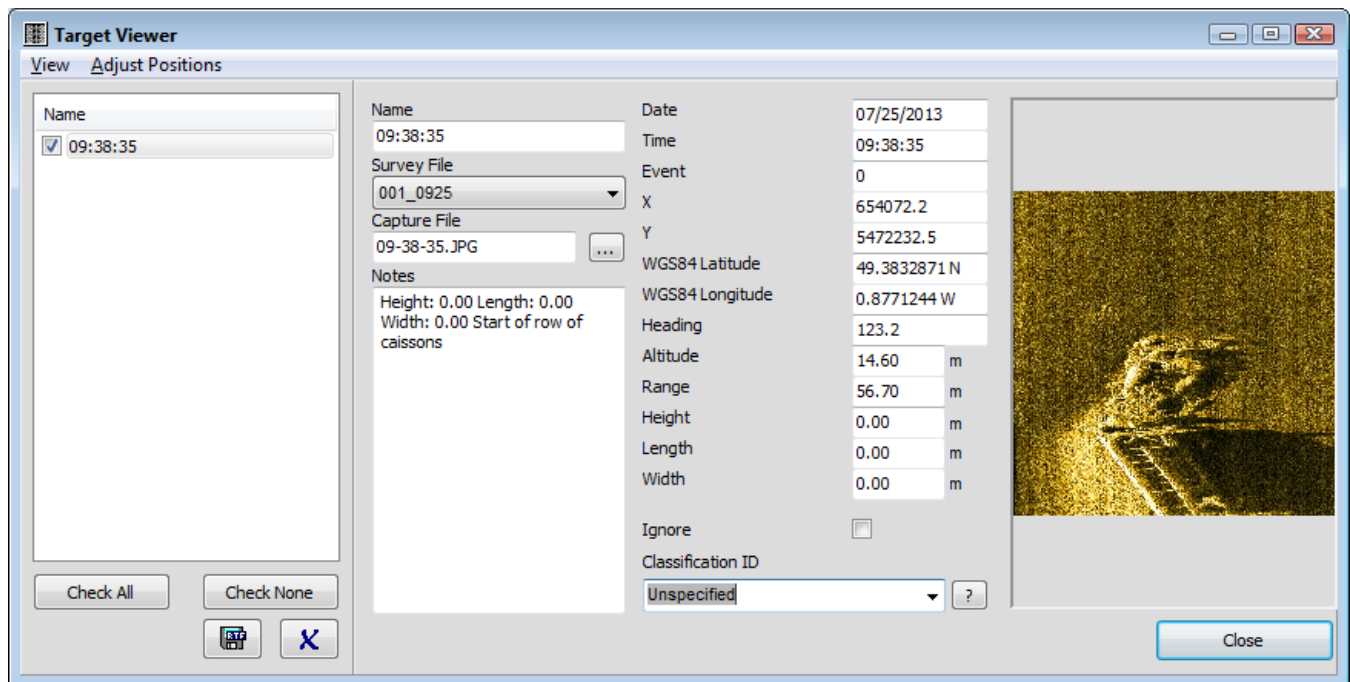
More Information

- [“View Options Dialog- General Tab”](#) on page 2-111
- [“Marking Targets in Scan View”](#) on page 2-126
- [“Reviewing Targets in the TARGET VIEWER”](#) on page 2-132

REVIEWING TARGETS IN THE TARGET VIEWER

The TARGET VIEWER displays all information about each target in one window.

FIGURE 137. Sample TARGET VIEWER Display



1. In **TARGETING AND MOSAICKING**, select **TOOLS-TARGET VIEWER**. The targets included, in this case, depends on whether you have selected the 'One Target File per Line/Date' option in the Targets Tab of your program options (F9).

TABLE 10. Targets Displayed in TARGET VIEWER

'One Target File per Line/Date' Option Selected?	TARGET VIEWER does this...
Yes	Loads all of the target files associated with the lines you have loaded, except the one named by the survey date.
No	Loads the currently loaded target file.
No	Displays a file select dialog for you to choose your target file.

2. **Highlight a target in the list** to view the target, its corresponding statistics and screen capture (if you have saved one).
3. **Modify any information in the center column** as necessary.
 - **Name:** The target name.
 - **Survey File:** The survey line file that covers the area where the target is located.
 - **Capture File:** Image file typically generated in **TARGETING AND MOSAICKING**.

- **Notes:** Short notes about the target.
- **Classification:** A classification code from the target classification database.

To delete the target currently displayed, click the Delete icon. If you are automatically managing your targets, the target will be deleted from both target files in which it resides.



More Information

- [“Screen Captures in Scan View”](#) on page 2-131
- [“Target Classification”](#) on page 2-558

ADJUSTING TARGET POSITIONS IN TARGETING AND MOSAICKING

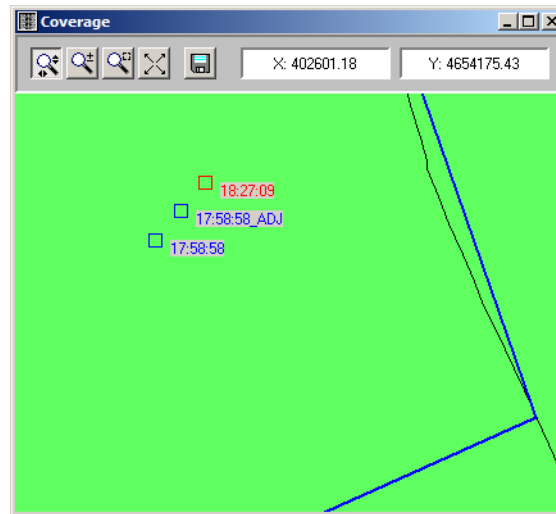
When you merge multiple scans to build your mosaic, you may see distinct bottom features positioned slightly differently between scans. These differences occur due to the number of variables involved in calculating the exact position of the towfish: cable out, catenary factor, whether the vessel towing the fish is going straight, and underwater currents to name a few.

To determine the true position of the feature, as accurately as possible, the Target Viewer includes a Target Adjust routine which calculates the 'true' position, as accurately as possible based on the position of multiple targets using your choice of three methods, and generates a new target at that position.

- **Average:** Mathematically averages the coordinates of the checked targets.
 - **High Confidence** requires three or more targets. The position of the target that you are currently viewing (highlighted) is favored in the calculation. It gets 50% confidence while the remaining 50% is divided between the other checked targets.
 - **Known Point:** Moves all of the checked target positions to the position of the highlighted target.
1. **Load the side scan data into TARGETING AND MOSAICKING.**
 2. **In Scan View, mark the same, distinctive point in the feature on each scan.**
 3. **Select TOOLS-TARGET VIEWER.**
 4. **If you are using the High Confidence or Known Point method, highlight the favored target.**
 5. **Check the targets you want to include in the calculation.**

6. **Select ADJUST POSITIONS and your choice of methods.**
The program generates a new target at the calculated position named with the time appended by '_ADJ'.

FIGURE 138. *Three Targets—Two Outer Target Positions Averaged to the Center Adjusted Target Position*

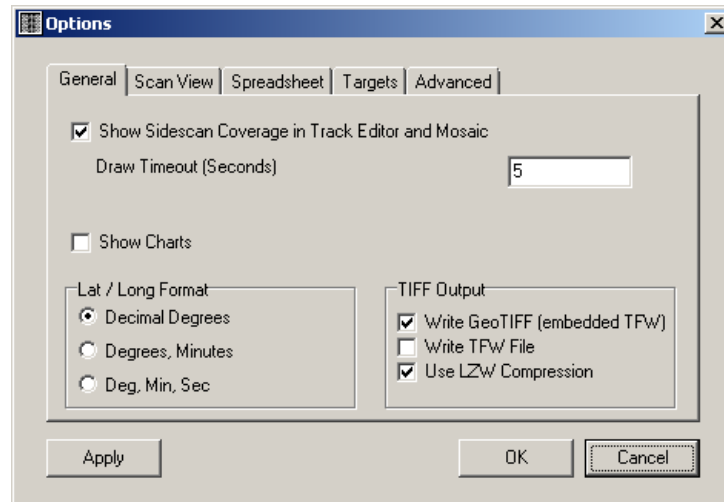


CONVERTING THE SIDE SCAN COVERAGE MAP TO GEOREFERENCED TIF FILES

You can export the content of the Coverage window to a georeferenced TIF file. This geo-tif can be used as a background chart in other HYPACK® MARINE SEARCH modules.

1. **Set your TIF Save options** in the View Options dialog.

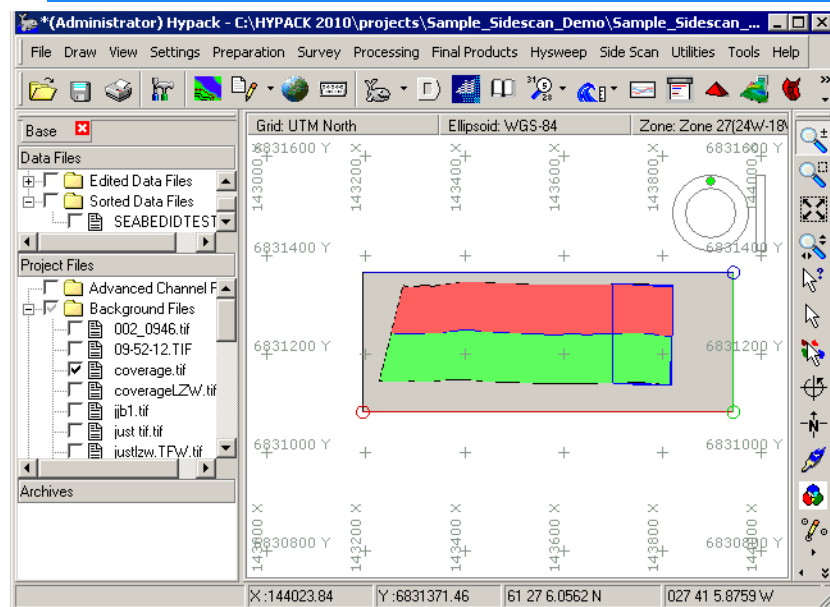
FIGURE 139. *TIF Save Options*



- **Write GeoTif** (embedded TFW).
 - **Write TFW** file enables you to generate a separate file that contains coordinates that describe the location, scale, and rotation of the TIF. It is used by geographic information systems (GIS) software for locating areas in raster map images.
 - **Use LZW Compression:** This is a lossless compression algorithm that significantly reduces the resulting file size without losing resolution of the image.
2. **Click the Save TIF File icon in the Coverage Map window.**
 3. **Name your output** and click [OK].



FIGURE 140. Coverage Map Geo-TIF in HYPACK® MARINE SEARCH

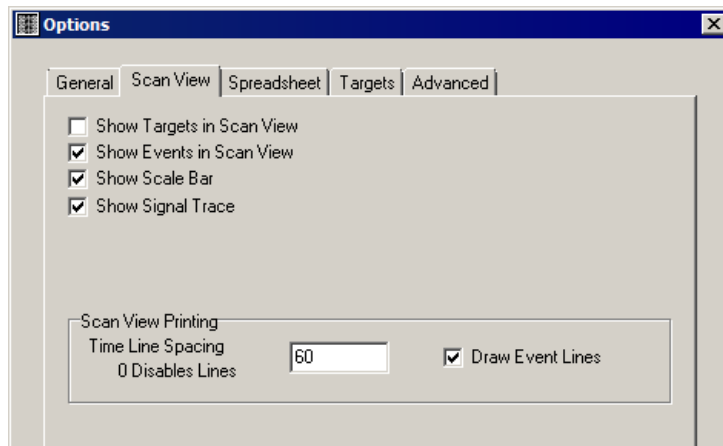


PRINTING THE SCAN VIEW IMAGE

If you would like a hard copy of your data, you can print the Scan View display.

1. **Set your print options.** Select VIEW-OPTIONS (F9), enter your print options in the Scan View tab and click [OK].

FIGURE 141. TARGETING AND MOSAICKING View Options-Scan View Tab

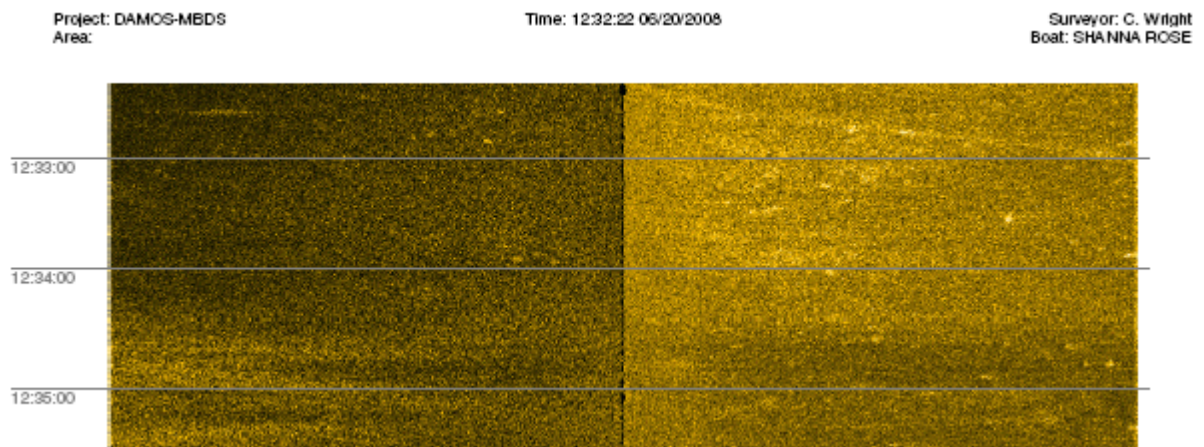


Under Scan View Printing:

- **Time Line Spacing in secs.:** Enter an integer to define the time interval at which the printout will include annotation lines. Enter '0' to disable this feature.
 - **Draw Event Lines:** Check this option to annotate events in the printout.
2. **Click the print icon in the Scan View Window.** The Windows Print dialog will appear.
 3. **Set your printer options and click [OK].**

The hard copy includes your project information and the path of the project as well as the data, annotated according to your settings.

FIGURE 142. Segment of Sample Hard Copy



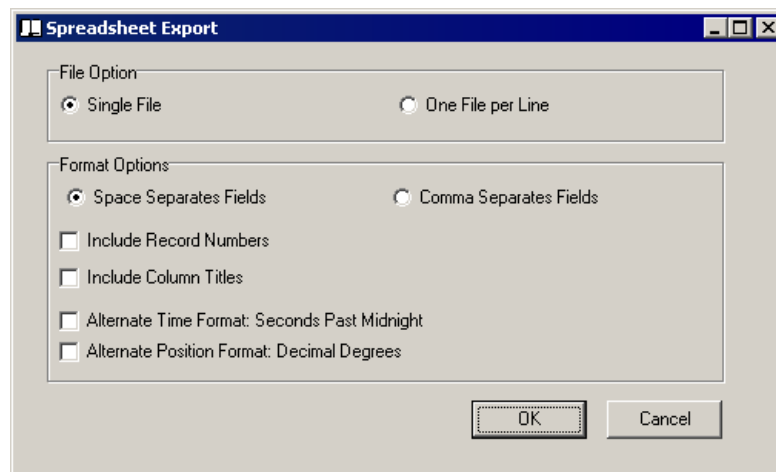
EXPORTING SPREADSHEET INFORMATION FROM SCAN VIEW

You can configure and export a text file from the data in the Spreadsheet window. This text file can then be imported to any ASCII text editor or to your favorite spreadsheet program.

To export your spreadsheet data:

1. Click **[Export]** at the top of the Spreadsheet window. The Spreadsheet Export dialog will appear.

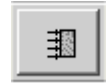
FIGURE 143. Configuring the Spreadsheet Export Report



2. Set your export options and click **[OK]**.
 - **File Option:**
 - **Single File:** Generates one text file that contains the data from all survey lines loaded.
 - **One File per Line:** Generates one text file for each survey line loaded.
 - **Format Options:**
 - **Space Separates Fields or Comma Separates Fields:** Choose your preferred delimiter between values on each line.
 - **Include Record Numbers**
 - **Include Column Titles**
 - **Alternate Time Format: Seconds Past Midnight.** If this is not selected, it will export in hh:mm:ss.ss format.
 - **Alternate Position Format: Decimal Degrees.** If this is not selected, it will export in X, Y format.

CREATING GEOREFERENCED TIF OR PDF FILES IN MOSAIC MODE

To access the **Mosaic Mode** select MODE-MOSAIC or click the Mosaic icon on the toolbar.



The mosaic process corrects the data for heading and position changes, and merges the data to display your mosaic. It then creates one or more georeferenced TIF files or a georeferenced PDF file. Either output may be used as a background file in your project.

If you generate georeferenced PDF files, you must output one file with all of the selected data.



Tip: To generate one PDF per line, you can load the full data set, but you must generate each PDF manually. Select a line, set your output file name, and click [Make Mosaic]. When the output is complete, clear the first selection and repeat the process with each of the other lines.

If you generate georeferenced TIF files, you have some options:

- **Output one file per line**
- **Output one or more TIF tiles for all of the selected data.**
When you choose to generate one output for all of the selected data files, the program automatically suggests one or more tiles¹ based on the size of your data set, the resolution, and the resources available on your computer. It then generates one TIF per tile that you will typically display together to show the full extent of your data selection.

NOTE: Since the number of TIF tiles depends, in part, on the resources available on your computer at the time you generate the TIF output, the program may generate a different number of tiles at different times or on different computers.

- **User-defined tiles ¹.**

The process is simple:

1. **Load your data files.**
2. **Choose the your mosaic area.** Accept the default settings and include the full data set or limit the output as follows:
 - Mosaic only select data files

1. A **tile** defines the boundaries of your output file, together with the mosaic setup options. The program generates one output file for each tile.

- Mosaic only the area defined by loading a border file (*.BRD).
 - Create user-defined tiles
3. **Calculate the size of each tile at the default resolution.**
 4. **Adjust the resolution (optional).**
 5. **Set remaining options for the mosaic construction.**
 6. **Generate the mosaic.**
 7. **Save the mosaic** to a georeferenced TIF or PDF.

More Information

- [“Mosaic Mode Interface”](#) on page 2-140
- [“Choosing your Mosaic Area”](#) on page 2-141
- [“Optimizing the Image Resolution in TARGETING AND MOSAICKING”](#) on page 2-148
- [“Setting your Mosaicking Options”](#) on page 2-149
- [“Constructing Mosaics and TIF or PDF Files from Side Scan Data”](#) on page 2-151
- [“Merging Georeferenced TIF Files”](#) on page 2-169

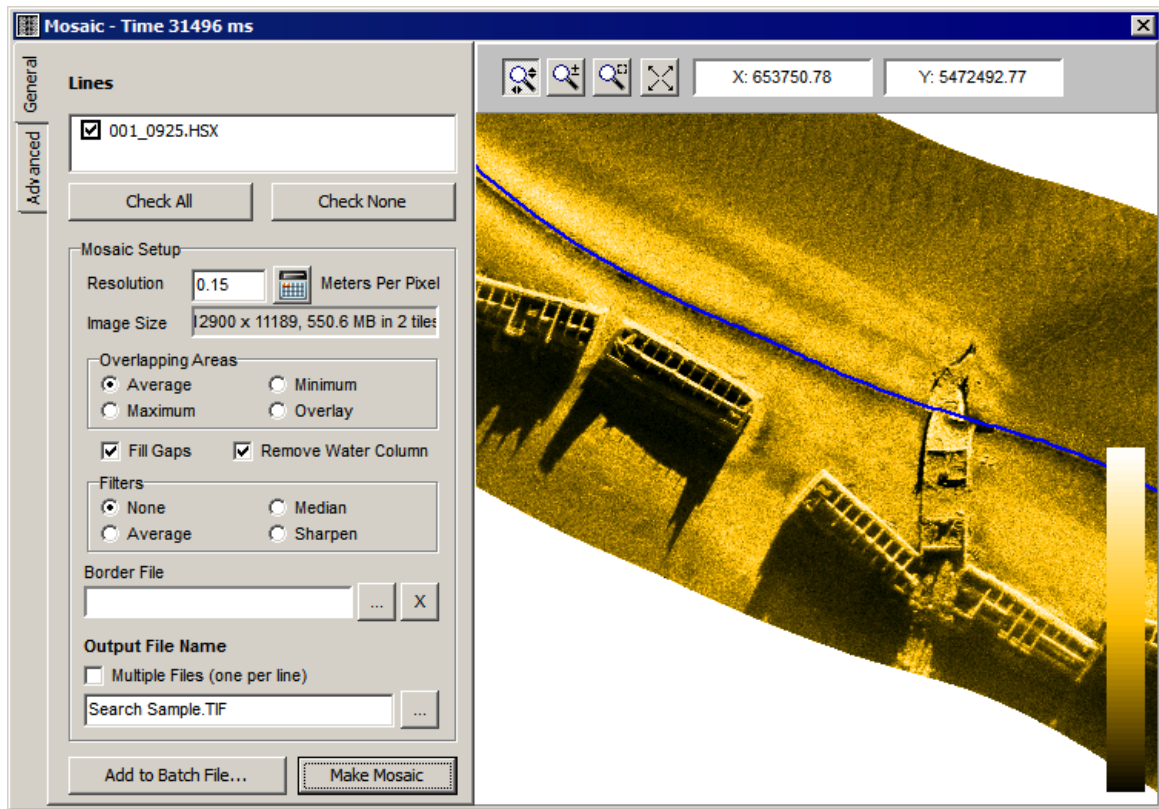
Mosaic Mode Interface

The Mosaic Mode is composed of a set of controls at the left, and the mosaic display on the right. When you first enter, the mosaic display is blank. The loaded files are listed, but must be selected to be included in the mosaic from which your output file will be produced. You can also display enabled charts, coverage diagrams or both through a right-click menu.

Show Charts displays charts currently enabled in your project.

Show Coverage displays a line drawing of the track and side scan swaths.

FIGURE 144. Mosaic Mode

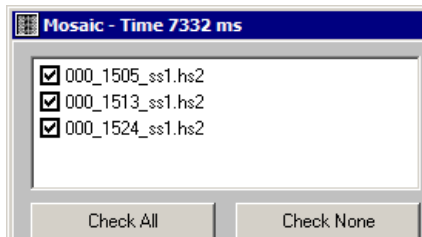


CHOOSING YOUR MOSAIC AREA

All of the files that you have loaded to TARGETING AND MOSAICKING are listed in the Mosaic window.

Use the checkboxes to select the files that you want to include in the mosaic (and ultimately the output chart file). The selected lines are blue in the mosaic display.

FIGURE 145. Choosing Lines for the Mosaic



In addition to selecting the data files, you also define the physical area and mosaicking instructions for an output file.

A **tile** defines the boundaries of your output file, together with the mosaic setup options. The program generates one output file for each tile.

TARGETING AND MOSAICKING automatically suggests tiles to fit your data set (the default tile set). You can use the tools in the Advanced tab to add, remove and modify tiles.

FIGURE 146. Advanced Tab

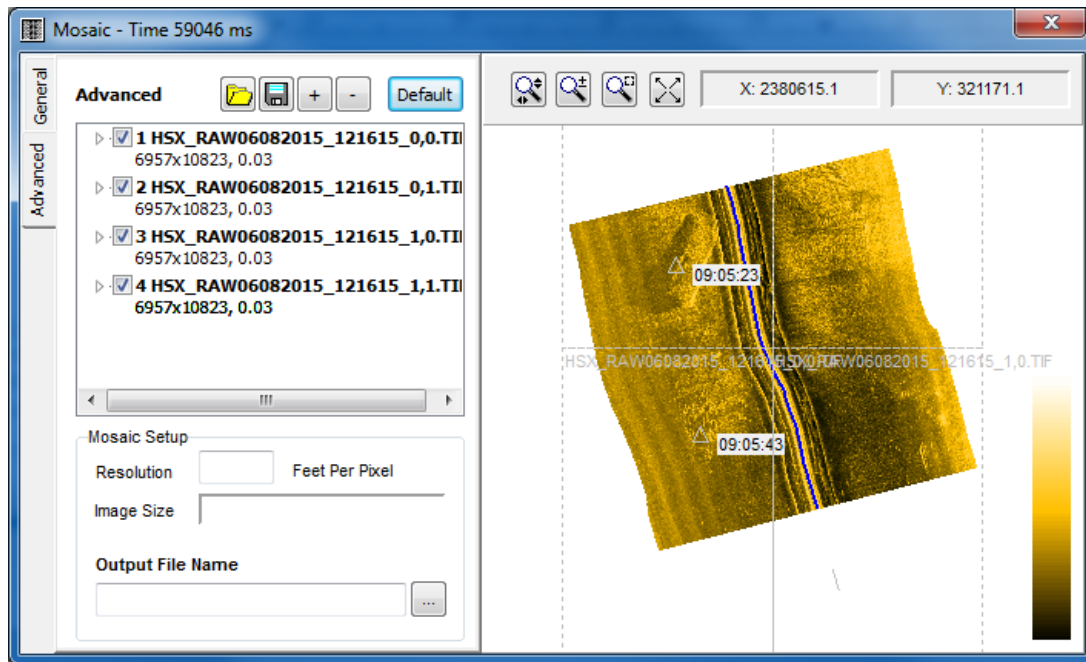


TABLE 11. Modifying your Tile Set

Task	Icon	Action
Adding a Tile	[+]	Click the Add Tile Icon then position and resize it to your needs.
Removing a Tile	[-]	Select the tile in the list and click [-].
Resizing/Relocating a Tile	None	Use your cursor to click and drag the tile borders to the desired position.

To restore the originally suggested tiles, click [Default].

FULL DATA SET

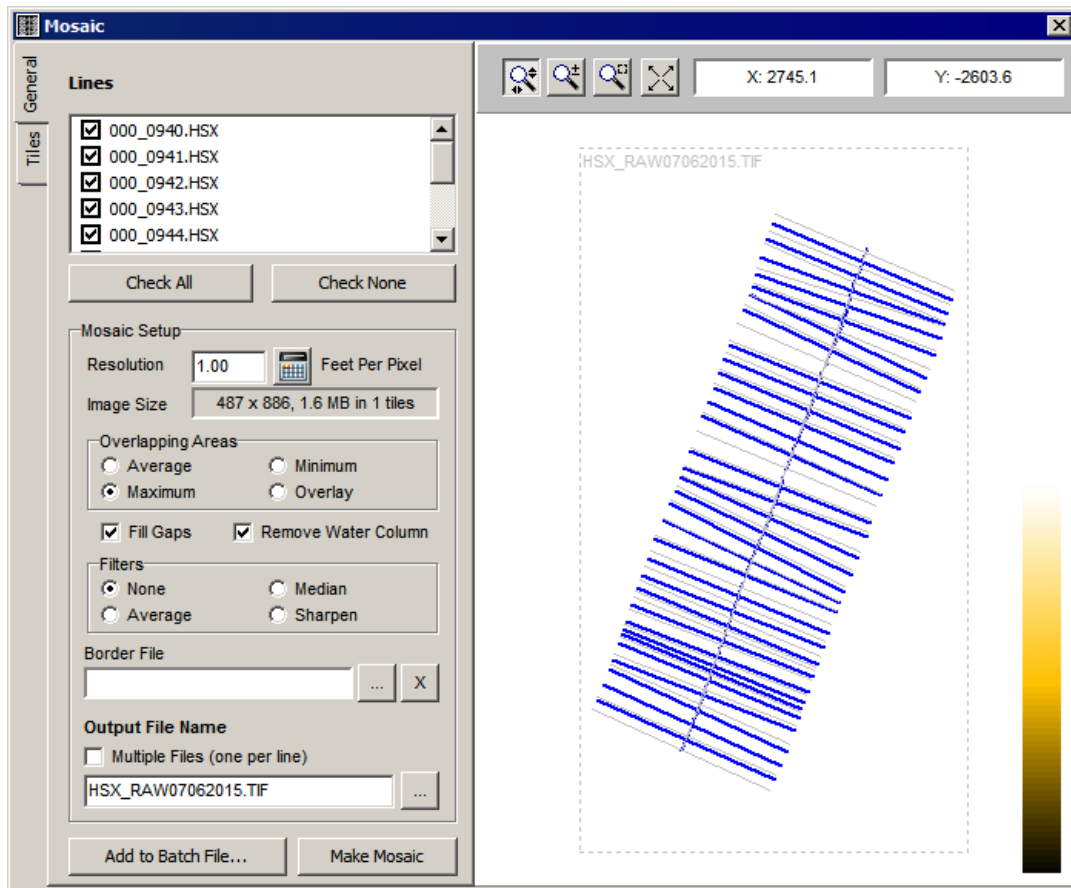
The program automatically limits the size of the output geo-TIFs according to the resources of your computer. To do so, it suggests one or more tiles based on the size of your data set, your specified resolution and your computer resources. This is reflected in the Image Size field and by the tiles outlined in the map window.

If the program generates more than one file, it automatically appends numbers to the end of the file name to name the output (eg HSX_RAW07062015_1.tif, HSX_RAW07062015_2.tif, etc).

NOTE: This is your only option to output a georeferenced PDF.
PDF output requires only one tile.

1. **Clear the Multiple Output Files option.** The program suggests the LOG file name for your output file.
2. **If you want a different file name or type than what is suggested, rename your output file.** Click [...], choose the output file type, enter a name and click [Save].

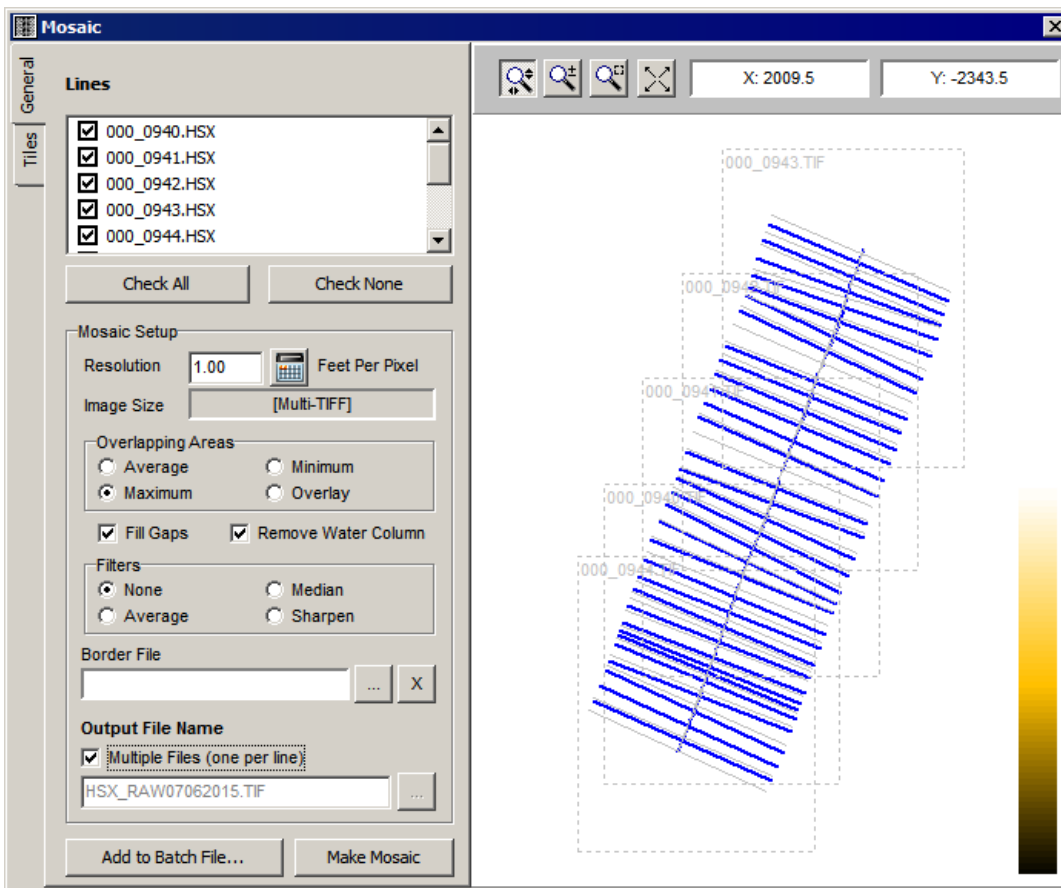
FIGURE 147. Generating Tiles for Full Data Set



ONE OUTPUT PER LINE

The **Multiple Output Files** option automatically generates a tile for each selected survey line and names it with its corresponding line name. It's much faster than generating each line manually.

FIGURE 148. Generating One TIF per Line

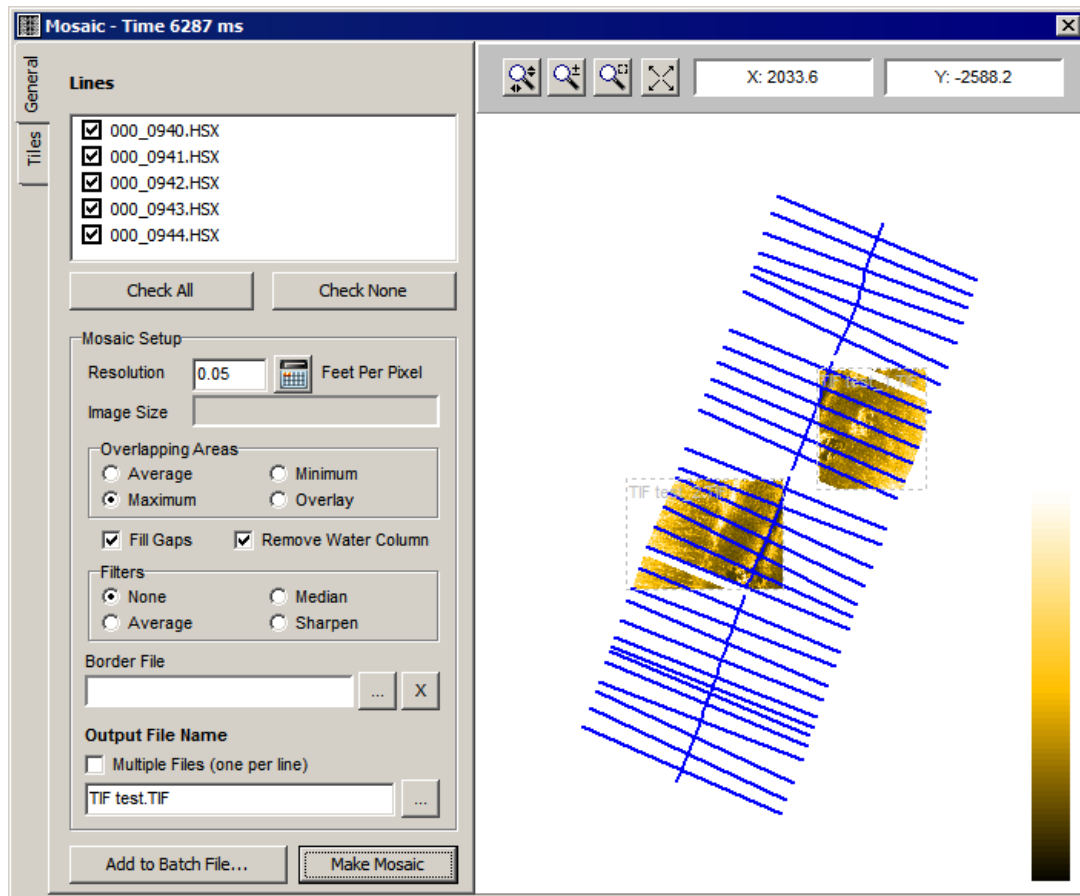


USER-DEFINED TILES

In the Advanced tab, you can manually define tiles to suit your needs. This can be handy if, for example, you want to generate a higher resolution geo-TIF of isolated areas in your dataset.

1. **Add a tile.** Click [+]. The program adds a tile to the list, displays an outline in the map display and suggests a name.
To remove a tile, select it in the Tiles list and click [-].
2. **Resize and position the tile.** In the map display, use your cursor to drag the edges of the tile outlines.
3. **Rename the output file.** (Optional.) Click [...], enter a name and click [Save].

FIGURE 149. Resulting TIFs of User-Defined Areas



BORDER FILES

To further restrict the mosaic area within each tile, enter a BRD file in the **HYPACK® MARINE SEARCH Border File** field. The program mosaics the area defined by the border file and generates one TIF for each tile with which it intersects.

FIGURE 150. TARGETING AND MOSAICKING Suggested Two Tiles for the Line (left) and the Border File Limits the Output TIF to the Area Inside (right)

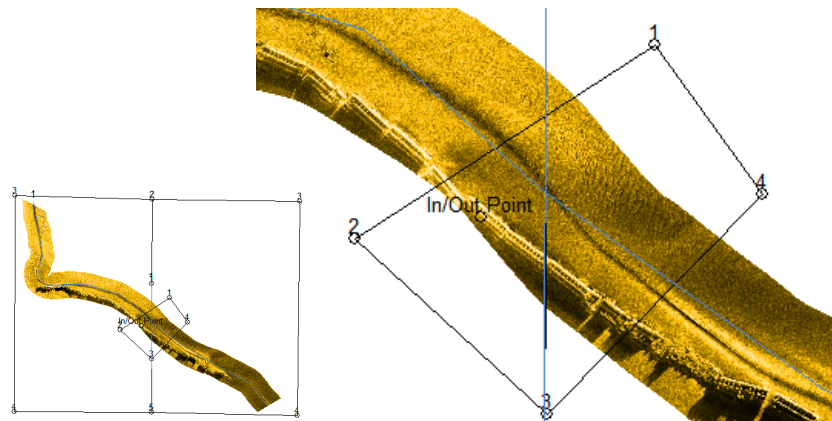
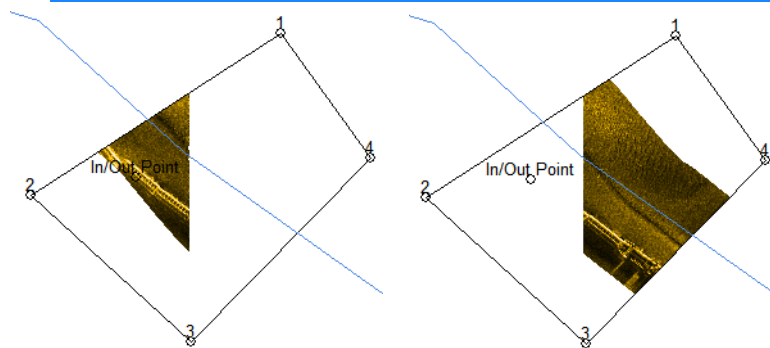


FIGURE 151. Resulting Georeferenced TIFs. One from Each Original Tile



TEMPORARY OMISSIONS

If there are areas in your data you want to omit from your mosaic, TARGETING AND MOSAICKING provides Imagery tools in the Track Lines window.

This feature was developed for (but is not restricted to) data collected on lines with sharp turns. The mosaic where the vessel turned sharply will be of poor resolution. Deleting positions results in straight line interpolation, so it does not correct this problem.

Tip: You can mark these areas in the Track Line window at any time; however, you may find it useful to build a preliminary mosaic to guide this process,



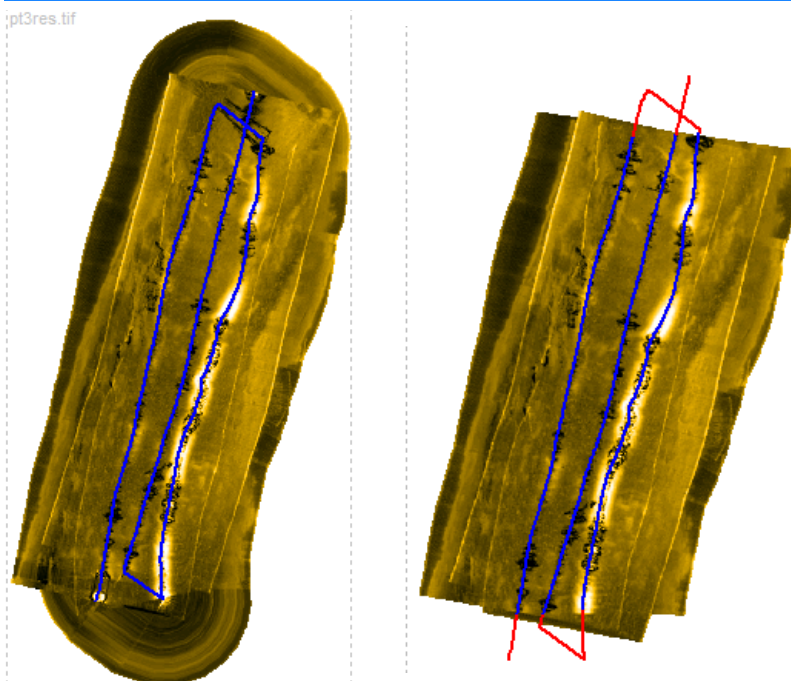
TABLE 12. Imagery Tools in TARGETING AND MOSAICKING

Tool	Function
	Hide Imagery Inside Block (left) and Hide Imagery Outside Block (right) mark areas for the mosaicking process to omit scan data.
	Show Imagery Inside Block (left) and Show Imagery Outside Block (right) reverse the effects of the Hide Imagery icons.

1. **In the Track Lines window, define one or more rectangular areas to omit from the mosaic.** For each area, do the following:
 - a. **Use the default cursor to click and drag a rectangle** from one corner to the corner diagonally opposite. The Imagery icons become enabled.
 - b. **Click one of the Hide Imagery icons** to hide the scan data inside or outside of your defined area.

The track lines turn red where data is hidden and, if you have made a preliminary mosaic, the track line in the Mosaic window also turns red.
2. **Set your mosaicking options.**
3. **Click [Make Mosaic].** The resulting mosaic omits the hidden areas.

FIGURE 152. Mosaicked Data—Full Data Set (left) and Hidden Turns (right)





To restore the hidden areas, follow the same process using the Show Imagery icons.

Tip: You can define an area that includes multiple hidden areas and restore them all in one operation.

More Information

- [“Side Scan Controls in TARGETING AND MOSAICKING”](#) on page 2-108

OPTIMIZING THE IMAGE RESOLUTION IN TARGETING AND MOSAICKING

Once you have chosen your files for the mosaic, TARGETING AND MOSAICKING calculates the size of the TIF file that will result from the selected data at the current resolution. If the file size is too large, you can reduce the size by adjusting the resolution or reducing the mosaic area.

Adjusting the resolution affects file size and clarity of the image. A larger resolution makes a smaller, less detailed file. This feature can be especially useful if you have limited hard drive space as you can predetermine the completed mosaic size will be no larger than your available space.

The **Resolution Calculator** computes three resolutions (m/pixel): digitization resolution (across-track digital sampling rate), across-track resolution, and along-track resolution (based on average speed). The across-track resolution typically generates the sharpest mosaic.

Once you know the optimal resolution, you can reconsider your file choices and your resolution, which recalculates the file size, until you achieve a satisfactory balance. A larger resolution value decreases the sharpness of the resulting image, but it also decreases file size.

NOTE: Decreasing the calculated resolution value *will not improve your mosaic results*.

1. **Access the Resolution Calculator by clicking the icon.** The calculator appears with a display of the average runtime properties read from your data files.



NOTE: You may also access the calculator through the Tools menu, but the results are not transferred to the

TARGETING AND MOSAICKING interface when you close the calculator. This feature enables you to try different settings without affecting your data.

2. **Input the sonar properties** supplied by the sonar the manufacturer. The average altitude, range, and speed are detected from the loaded data, but you may choose to overwrite them.

Additional specifications for several sonar models are hard-coded in the Load Sonar menu for your convenience. If the model of your sonar is not pre-defined, manually enter the specifications from the device manufacturer.



Tip: If you have saved your sonar properties, select your sonar model through the Load Sonar menu.

3. **Save your sonar properties.** (Optional) Click [Save Sonar]. The current Sonar Properties will be saved to a file that populates the Load Sonar menu. The next time you process data collected by the same sonar model, you can quickly and easily load the properties by selecting the correct sonar in the Load Sonar menu.
4. **Click [Close].** The calculated optimal resolution is copied to the Resolution field in the TARGETING AND MOSAICKING interface.

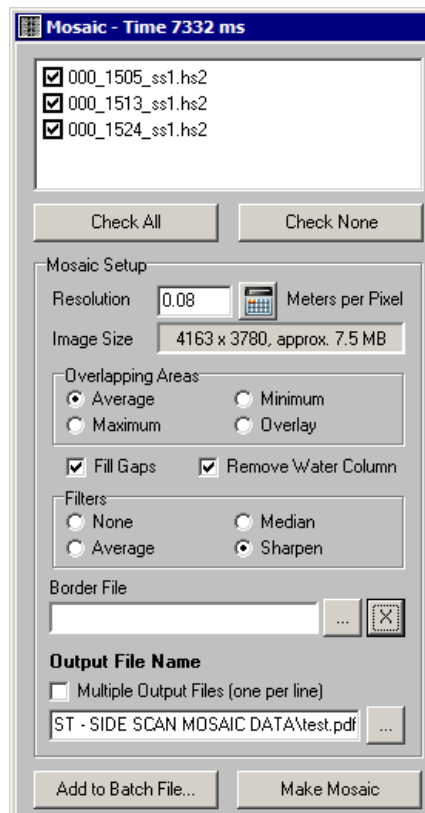
To remove a custom sonar from the Load Sonar menu, select the sonar then click [Delete]. You can only delete sonars you have added to the menu.

SETTING YOUR MOSAICKING OPTIONS

TARGETING AND MOSAICKING provides several options regarding the processing of your data into the mosaic.

NOTE: Remember that the mosaic is also affected by the settings in the Side Scan Controls (F9).

FIGURE 153. Mosaicking Options



Overlapping Areas options instruct the program what values to use where there are multiple layers of data.

Fill Gaps: Interpolates the data to fill uncovered areas.

Remove Water Column removes the portion of the side scan record before the sound reaches the bottom (the blank stripe in the middle) from the output TIF, creating a more accurate image. Otherwise, the mosaic will have a white space between the port and starboard swaths.

NOTE: For this option to work well, your towfish altitude must be accurately measured.

Filters:

- **Average:** Smooths the mosaic by setting each pixel to the average of the eight adjacent pixels.
- **Median:** Smooths the mosaic while preserving edges by setting each pixel to the median of the pixel and its eight adjacent pixels.
- **Sharpen Image:** Sharpens the mosaic by enhancing pixel contrast relative to its adjacent pixels.

Output File Name: TARGETING AND MOSAICKING provides a default output file name based on the catalog (or raw) file name. When it generates multiple tiles to cover your survey area, it creates a unique file name for each output geo-TIF by appending tile positioning indicators to the default file name (eg. HSX_RAW09092015_0,0, HSX_RAW09092015_0,1).

If the current output file name may cause you to overwrite existing files, the program warns you so you can escape the process and change the Output File Name.

CONSTRUCTING MOSAICS AND TIF OR PDF FILES FROM SIDE SCAN DATA

Once the files are loaded to the TARGETING AND MOSAICKING program, and the resolution, data selection and construction options are set, you are ready to mosaic the data.

The **mosaicking** process, corrects the data files for heading and position changes, and merges them to create a georeferenced file. The results may be stored to a georeferenced TIF or a georeferenced PDF, by default, in the project \Post Processed Mosaic folder where you can enable and disable them in your project display.

NOTE: If you are using a datum shift file in GEODETIC PARAMETERS, the program cannot generate a georeferenced PDF.

IMMEDIATE MOSAIC PROCESSING

To generate the mosaic now, just click [Make Mosaic]. The program generates the mosaic according to your instructions. If you have enabled Show Charts display option, the resulting mosaic then appears in the map display.

NOTE: *This method is required for PDF output.*

DELAYED MOSAIC PROCESSING

To generate the mosaic in TIF format later, you can save the processing instructions to a batch file to be run at a later time using the SIDE SCAN AUTO MOSAIC program. This is useful particularly if you are processing multiple sets of data or very large data sets.

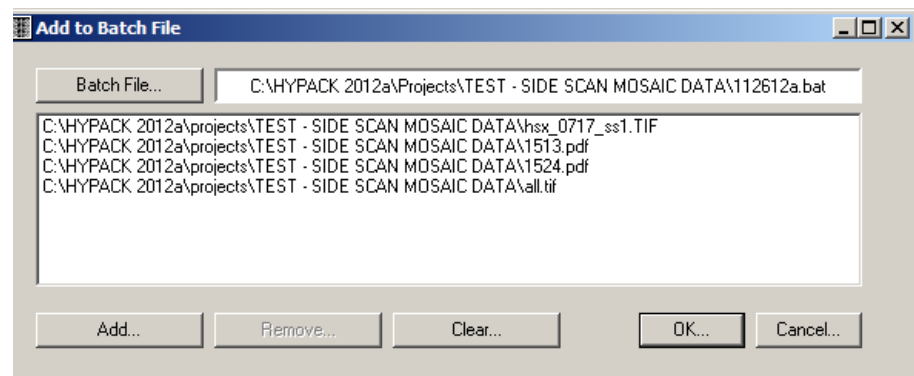
NOTE: This method is required for user-defined tiles.

A **Batch File** (*.BAT) is a series of programming commands. In this case, a batch file includes the file name and all of your chosen settings to create the mosaic and TIF. This enables you to edit and choose settings for individual or groups of files, but build the mosaics and generate the geo-TIFs at a later, more convenient time.

1. **For each file or set of files do the following:**
 - a. **Load and process your files in TARGETING AND MOSAICKING and set your options in Mosaic mode.**
 - b. **Add the information to a batch file.**
 - i. **In the General tab, click [Add to Batch File] or, in the Advanced tab, click the Add to Batch File icon.** The Add to Batch File dialog appears.



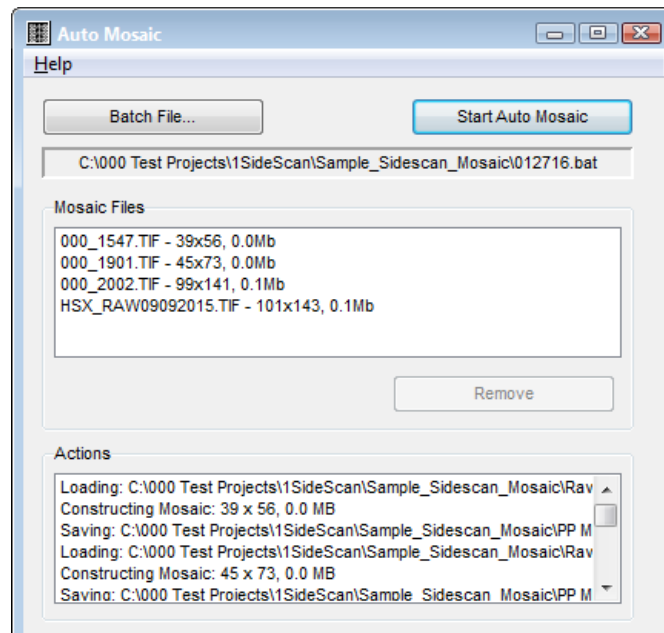
FIGURE 154. Add to Batch File Dialog



- ii. **Select the batch file to which you want to add the processing directions.** Click [Batch File], name your file and click [OK]. You can select an existing batch file or generate a new one by entering a new name.
 - iii. **Click [Add]** and an output file name for each tie appears in the lower section.
To remove a file from the batch, select it and click [Remove].
To remove all files from the batch, click [Clear].
 - iv. **Click [OK].**
2. When you have a block of time when your computer is free, **generate all of the mosaics and TIF files in the batch file at once** using the AUTOMOSAIC program.
 - a. **Launch AUTO MOSAIC** by selecting SIDE SCAN-SIDE SCAN AUTO MOSAIC.
 - b. **Click [Batch File] and select the batch file you want to process.** The TIF files that are included in the batch will be listed under 'Mosaic Files'.

- c. **Omit select TIFs from processing, if necessary.** Select any TIF to be omitted and click [Remove]. This only removes the TIF from the processing list for this session.
- d. **Click [Start Auto Mosaic].** All of the processes saved to the batch will be run. The Actions area display messages regarding the progress and the georeferenced TIF files are saved, by default, to the project folder.
- e. **Exit AUTOMOSAIC by clicking the [x].** If you have removed any TIF files from the current batch, it will ask if you want to make the change permanent. **To restore the removed TIF to the batch,** click [No].

FIGURE 155. Auto Mosaic Program



You can load the TIF files as a background file in your project or drape them over the TIN Model in 3D TERRAIN VIEWER.

FIGURE 156. Displaying the TIF File as a Background File in HYPACK® MARINE SEARCH

