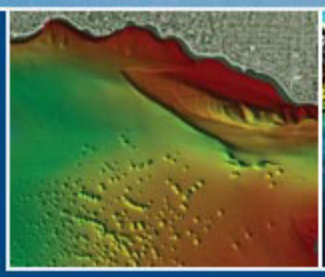
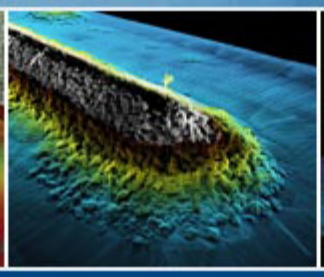
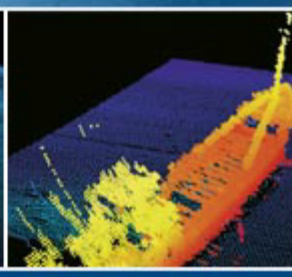
CARIS **HIPS and SIPS 9.1**

Tools







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Acknowledgements

The development of HIPS and SIPS as a modern and powerful bathymetric and side scan sonar processing system was made possible through the cooperation of several organizations:

- The Canadian Hydrographic Service (CHS)
- The Ocean Mapping Group of the University of New Brunswick
- The National Oceanic and Atmospheric Administration (NOAA)
- University of New Hampshire

Data courtesy of the Shallow Survey Conference Common Data Set 2001 (CCOM - UNH).

Cover images (from left to right):

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June 2016

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Preface

This guide describes the functions of the various tools, utilities and support files in CARIS[1] HIPS[2] and SIPS[3].

"Tools" on page 11
"Batch Processor" on page 87
"Generic Data Parser" on page 93
"Calibration" on page 161
"HIPS Utilities" on page 115
"Sounding Rounding" on page 169

See also "Workflow in HIPS and SIPS" on page 19 of the User Guide.

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Table of Contents

1

Tools

Most HIPS and SIPS commands can be activated from toolbars as well as from menus. Data can be selected using various selection tools.

Tools to measure distance and to save the display as an image are also described.

In this chapter...

HIPS and SIPS toolbars

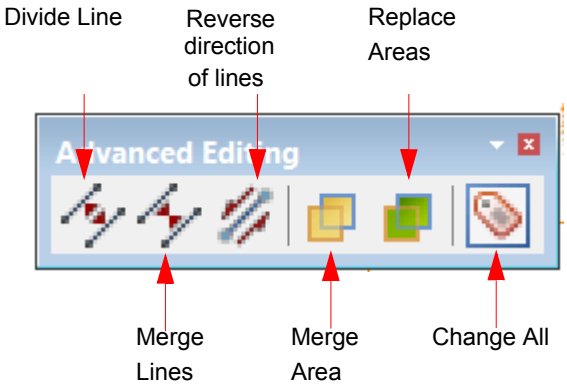
HIPS and SIPS commands can be executed from tools organized into toolbars. Any toolbar can be displayed by selecting it by name from the View > Toolbars menu.

The following toolbars are automatically displayed when the related editor is opened:

You can also create a custom toolbar, for example, with tools you use most often (see "Create a Custom Toolbar" on page 29).

Advanced Editing

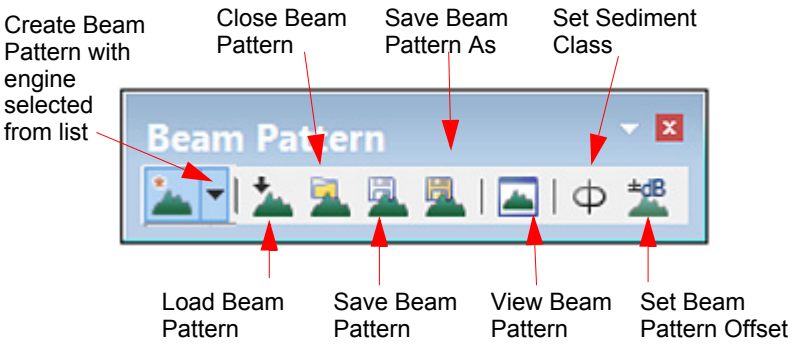
Tools for editing features.



- Divide Line: split a line at an existing vertex to create two new line features.
- Merge Lines: merge two or more line features into a new, single, continuous line feature
- Reverse direction of lines: change the direction of a line.
- Merge Area: merge two or more selected areas into a single new area feature.
- Replace Area: create a single new feature using the geometry of multiple existing area features.
- Change All: change feature class or attributes, map features, or shift depth and height values for all selected features.

Beam Pattern toolbar

Activates functions for creating and adjusting beam patterns for use in beam pattern correction.

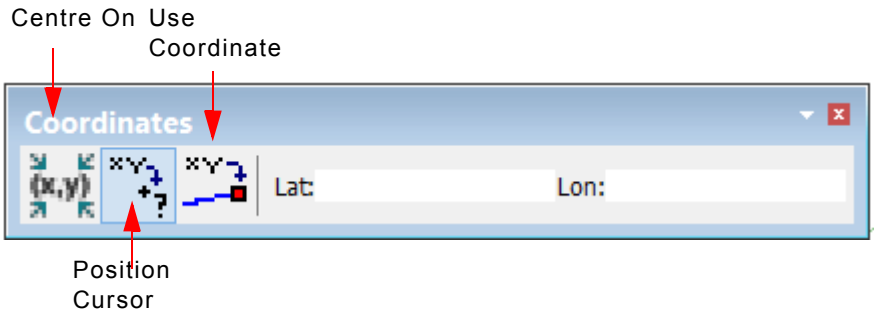


- Create Beam Pattern: Create a beam pattern file using the SIPS Backscatter, SIPS Side Scan or GeoCoder engine.
- Load Beam Pattern: Open an existing beam pattern file for use during Beam Pattern Correction.

- Close Beam Pattern:
- Save Beam Pattern: Save an open beam pattern file.
- Save Beam Pattern As: Save an open beam pattern file under another name or location.
- View Beam Pattern: Open the Beam Pattern graph window to display the average beam pattern intensity as a function of angle from nadir.
- Set Sediment Class: Add sediment class data into beam pattern correction file.
- Set Beam Pattern Offset: Offset the beam pattern by a uniform amount.

Coordinates

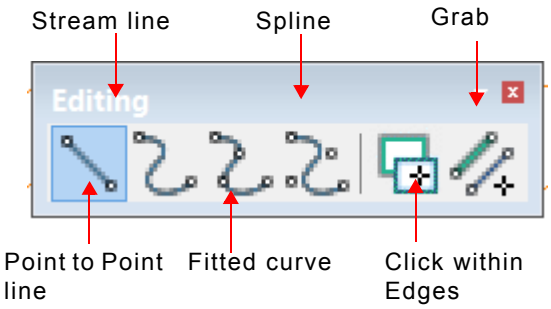
These tools all open the Coordinates Entry dialog box so you can either navigate to, centre the display on or position your cursor at set coordinates.



- Centre On: centre the display on set coordinates.
- Position Cursor: move cursor to the position set in the Coordinate Entry dialog box.
- Use Coordinates: use the coordinates set in the Lat and Lon fields.

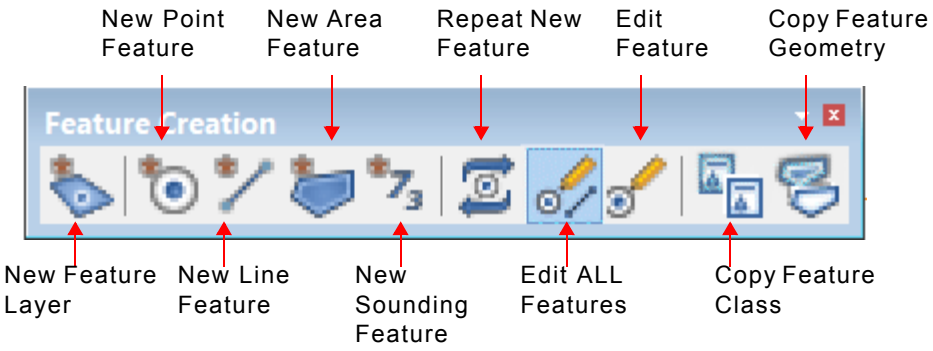
Editing

Tools for feature editing. This toolbar is located by default along the right side of the Display window.



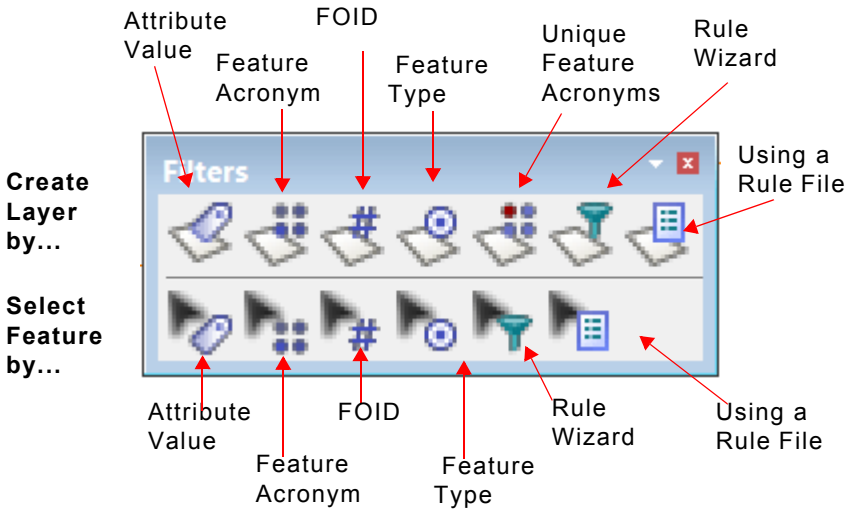
Feature creation

Contains tools to create a feature layer, add and edit point, line, area and sounding features. This toolbar is located by default along the right side of the Display window.



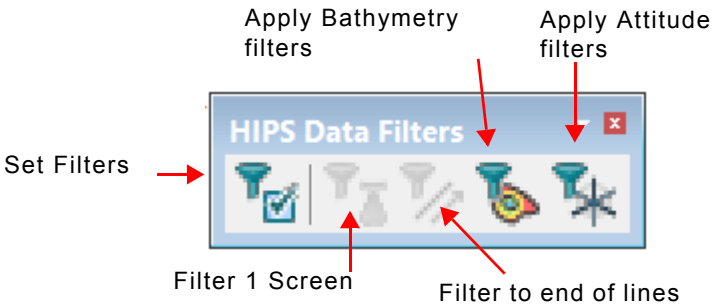
Filter toolbar

Use filters to create layers and select features.



HIPS Data Filters

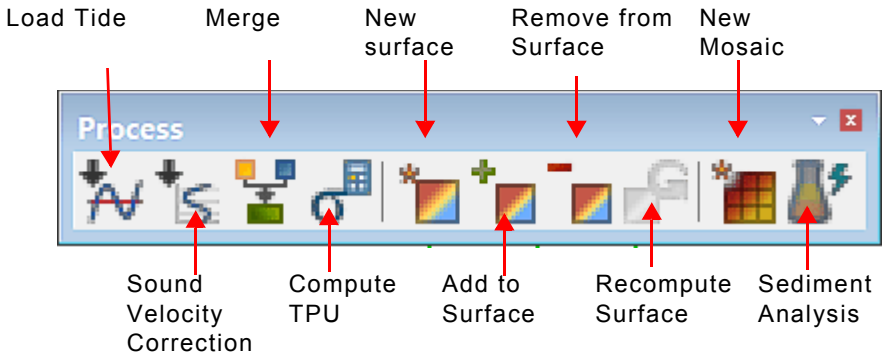
Functions for defining and executing automatic filters.



- Set Filters: open the dialog box to set parameters for a selected filter.
- Filter 1 Screen: apply filters only to the soundings that are currently visible.
- Filter to End of Line: Apply the filters to the track line, from the first sounding currently visible in the editor to the end of the line.
- Apply Bathymetry filters:
- Apply Attitude filters: to all open survey lines.

Process toolbar

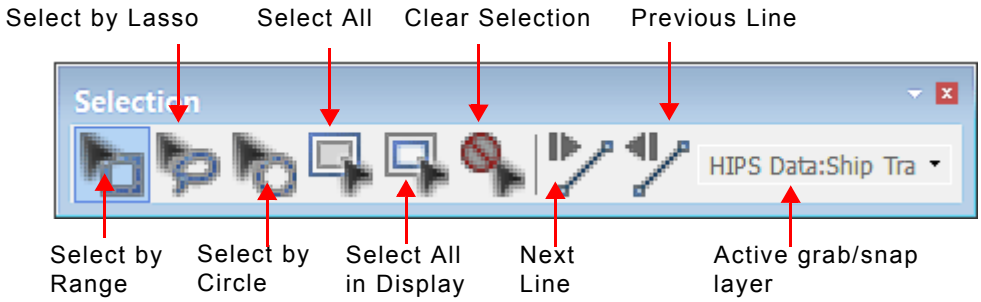
Tools on the Process toolbar launch such processes as loading tide and TrueHeave, as well as Merge and Compute TPU. The toolbar also holds the tools for creating and editing surfaces.



- Load Tide: correct for tide by loading tide data
- Sound Velocity Correction: to set SVC options and apply SVP file.
- Merge: set options and run the Merge function.
- Compute TPU: set parameters and compute TPU.
- New Surface: run the New Surface wizard
- Add to Surface: apply new track lines to an existing surface
- Remove from surface: remove survey line from surface
- Recompute surface: rebuild a surface and regenerate the surface image.
- New Mosaic: create a new mosaic.
- Sediment Analysis: compute sediment analysis

Selection toolbar

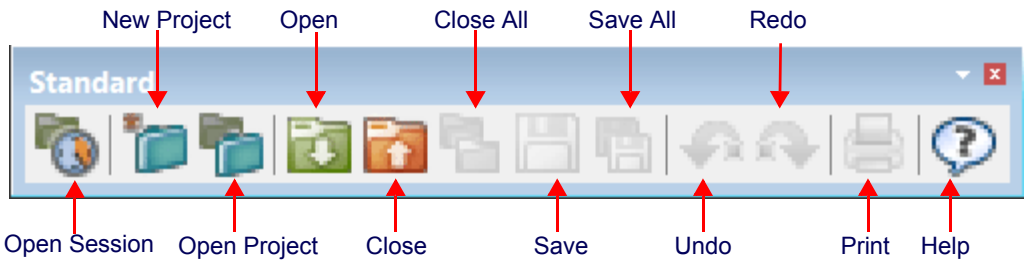
Contains tools for selecting objects in the 2D Display window.



- Select by Range: select objects by drawing a rectangle around them.
- Select by Lasso: select objects by drawing a loop around them.
- Select by Circle: select objects by drawing a circle around them
- Select all in Display: select everything visible in the current extent of the Display window.
- Select All: select all the objects on a selected layer.
- Clear Selection: de-selects everything previously selected
- Next Line: select the next line by ascending file order in an editor
- Previous Line: select the previous line by ascending file order in an editor
- Active grab/snap layer: Select a layer from the list as the active snap/grab layer.

Standard Toolbar

Activates standard Windows commands such as Open Project, Save, Copy and Undo. Also contains the Restart Cleaning tool button.

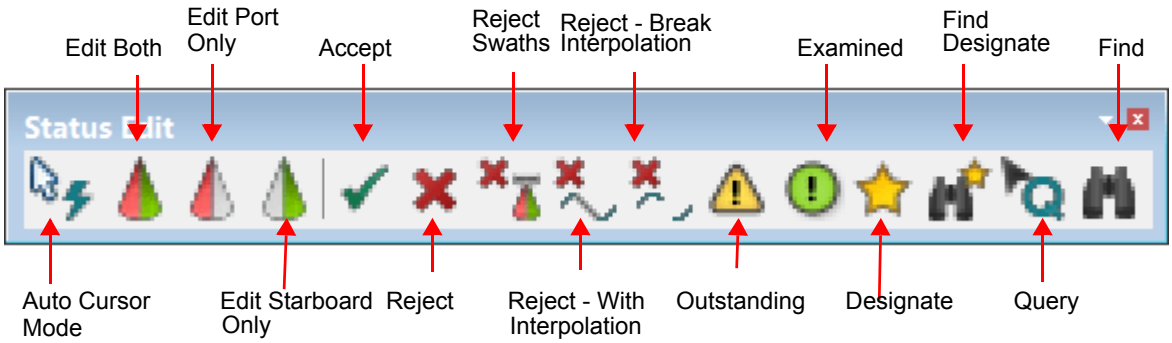


- Open Session: opens a previously saved session
- New Project: opens the New Project dialog box. Command also on File > New menu.
- Open Project: opens the Open dialog box that will display *.hips and *.hpf files.
- Open: opens the Open dialog box to open any of the listed supported formats
- Close: Closes the currently selected layer.
- Close All: closes all open data.
- Save: Saves editing changes to data
- Save All:

- Undo: reverse the editing done in a HIPS and SIPS editor.
- Redo; restores the previously state that was Undone.
- Print: opens a Print dialog box.
- Help: can also be launched from the Help menu, or by pressing F1 key.

Status Edit toolbar

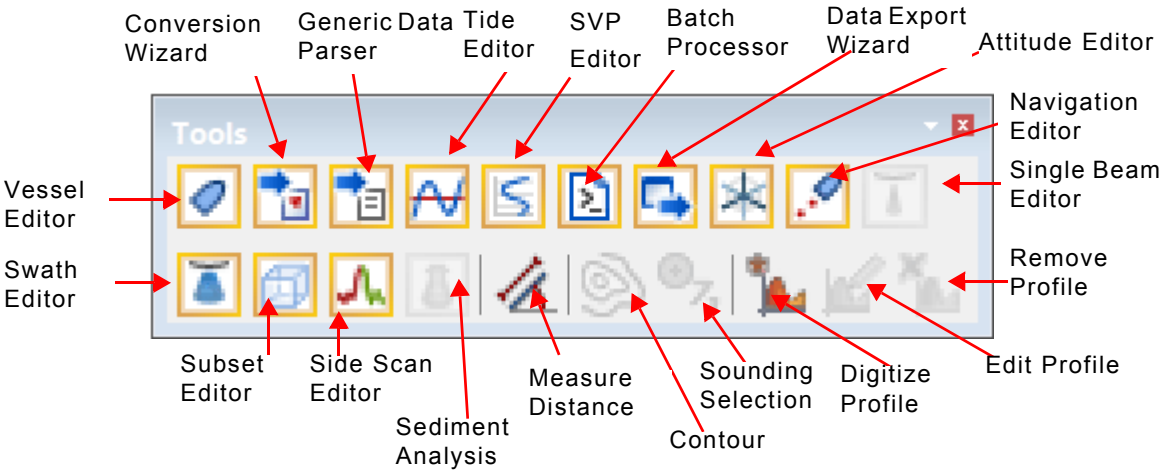
Activates functions used for editing HIPS data.



- Auto Cursor Mode: Activated, it combines the Accept/Reject/Query functions with the Select action in a single procedure.
- Edit Both: select to edit the status an entire ping.
- Edit Port/Starboard Only: select to edit only the port or only the starboard data of the ping.
- Accept: reverts the status of rejected data to accepted.
- Reject: rejects data to exclude it from further processing.
- Reject Swaths: reject all soundings in one or more swaths.
- Reject—With Interpolation: interpolate positions for soundings so that data can be processed further
- Reject—Break Interpolation: reject soundings without interpolating positions
- Outstanding: flag data as requiring further examination
- Examined: flag data as having been examined
- Designate: flag the shoalest sounding in a feature
- Find and Designate: automatically search for and designate the shoalest sounding in a cluster of highlighted soundings
- Query: Examine data details for selected lines or soundings
- Find: Search a survey line for a specific swath or beam.

Tools toolbar

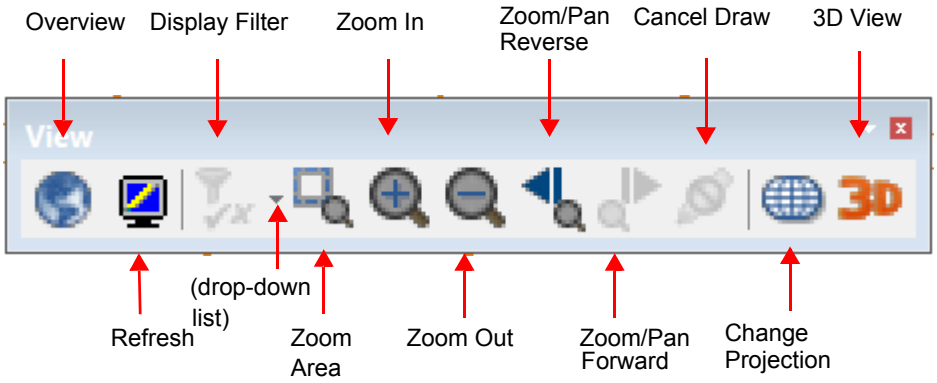
Tool buttons on this toolbar open HIPS and SIPS editors and wizards in new windows.



The toolbar also contains the Measure Distance tool (see "MEASURE DISTANCE AND ANGLE" ON PAGE 39).

View toolbar

Use these tools to control the view in the Display window.

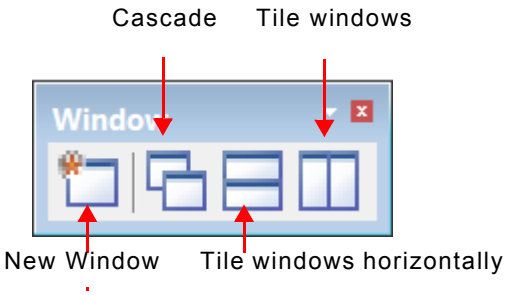


- Overview: Zoom out display to extent of data.
- Refresh: Redraw the contents of the Display window.
- Display Filter: Display or hide Rejected, Accepted, Designated, Examined and Outstanding data from view in the HIPS editors (Default is to display all but the Rejected data.)
- Zoom Area: magnify a rectangular area drawn with the mouse in the Display window.

- Zoom In: Magnify the display by the Zoom Factor set in Tools > Options > General tab.
- Zoom Out
- Zoom / Pan Reverse and Zoom / Pan Forward: Move back to previous view or forward to next in series created by zooming in and out.
- Cancel Draw:
- Change Projection
- 3D View:

Window toolbar

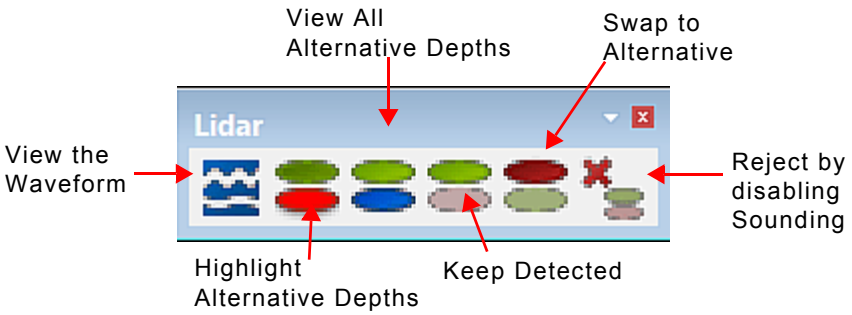
Show or hide windows in the 2D/3D Display window .



See also "Display Window" on page 502 of the Reference Guide.

LIDAR toolbar

The LIDAR toolbar contains tools to examine soundings recorded by a LIDAR system. The LIDAR tools are also accessible from the Edit menu, and are activated when LIDAR data is opened in Swath Editor.



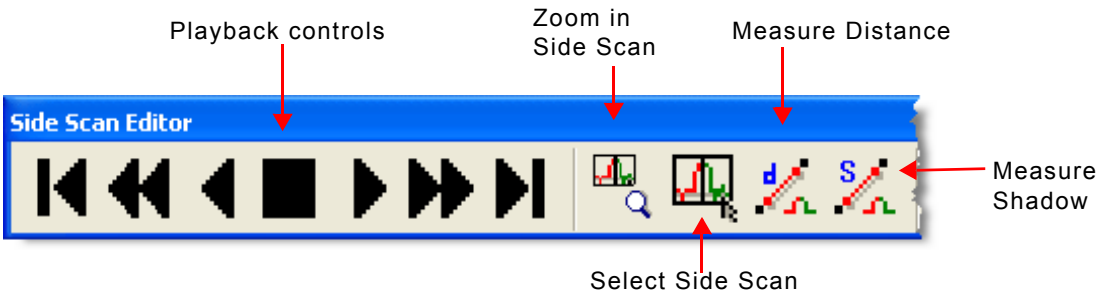
- View the waveform: Display waveform data for a superselected sounding.
- Highlight Alternative Depths: Highlight soundings that contain alternative depth values.

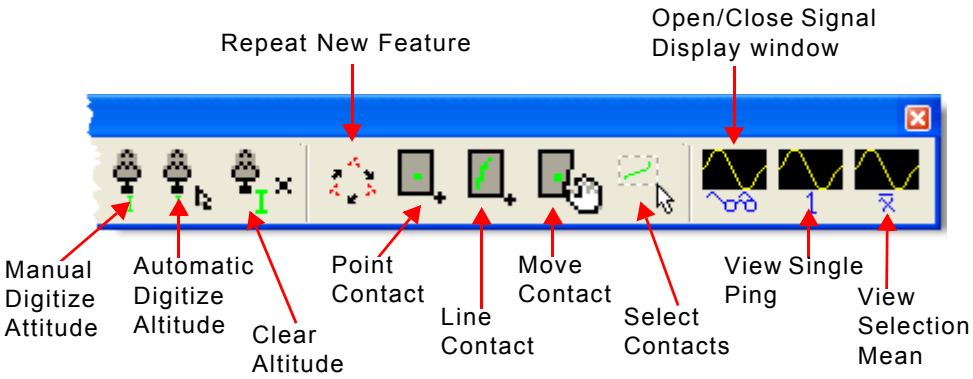
- View All Alternative Depths: Refresh the display so that alternative depths for soundings with a Quality 1 flag are shown.
- Keep Detected: Retain the detected depth value instead of an alternative depth value.
- Swap to Alternative: Apply an alternative depth in a superselected sounding to the detected depth.
- Reject by Disabling Sounding: Remove sounding from Merge and post- processing operations.

For LIDAR workflow, see "LIDAR DATA IN HIPS" in the CARIS HIPS and SIPS Editors Guide.

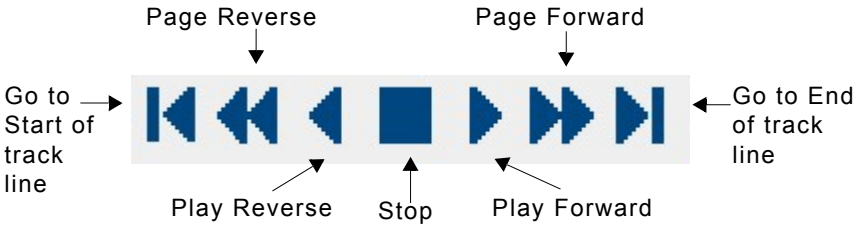
Side Scan Editor toolbar

Functions for viewing data, measuring distance and shadow height and creating contacts.





- Playback: controls for scrolling forward and back along the track line to examine data in waterfall view.



- Zoom in: opens the Zoom View to display selected data.
- Select Side Scan: select single ping or a range of pings in the waterfall view.
- Measure distance: measure distance between two points by dragging the mouse across data in processed mode.
- Measure shadow: measure the shadow of an object in processed view to determine its height.
- Manual Digitize Altitude: digitize the water column by drawing the line between column and sea bed.
- Automatic Digitize Altitude: have SIPS digitized the line automatically.

- Clear Altitude: clears any altitude digitizing lines from the waterfall view.
- Repeat new feature: create a series of the same type of contact.
- Contacts: add new point or line contact, and move contact.
- Open Signal Display Window: opens window to view waveform of selected pings.

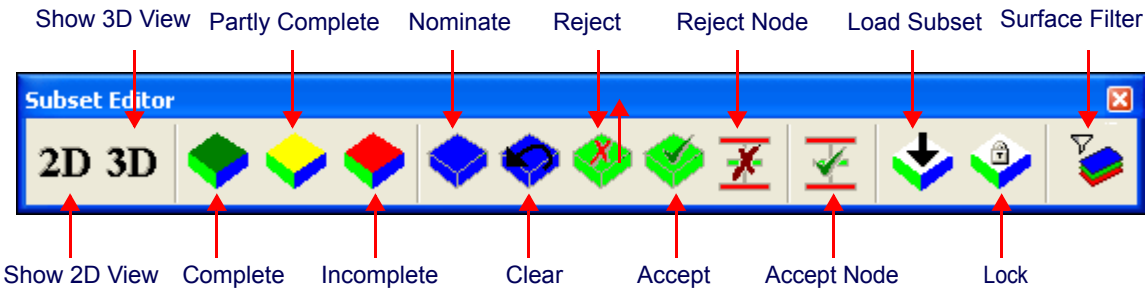
Single Beam Editor toolbar

Set whether Primary or Secondary single-beam data is designated as selected (in the case of dual head data). Primary is selected by default.

- Primary: Designate Primary data as the data to be processed
- Secondary: Designate Secondary as data to be processed.

Subset Editor toolbar

Activates functions for examining and cleaning sounding data in the Subset Editor.

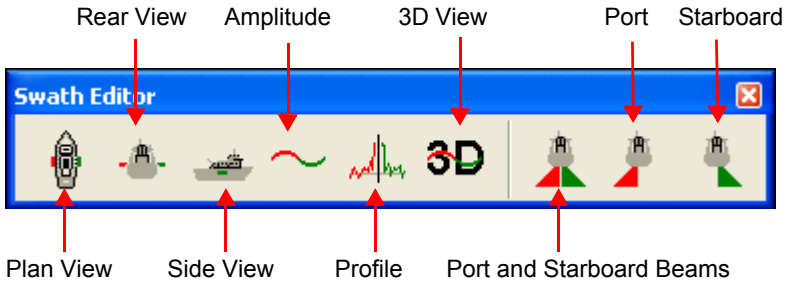


- Show 2D View / Show 3D View: open or close the windows displaying data in 2D or 3D.
- Complete: Set cleaning status of tiles to show progress.
- Partly Complete: Set status of tiles to show where cleaning has been started, but not completed.

- Incomplete: Set status of tiles to show where cleaning has not been started.
- Nominate: Select an alternative depth hypothesis to be used instead of the one proposed by disambiguation.
- Clear (Hypothesis Nomination): Remove the “Nominated” status of an alternative hypothesis during hypothesis editing
- Reject (Hypothesis): Remove selected data from further processing.
- Accept (Hypothesis): Revert a “Rejected” hypothesis back to “Accepted” status.
- Reject Node: Remove from further processing, all hypotheses associated with selected node.
- Accept Node: Return all hypotheses associated with a selected “Rejected” node back to “Accepted” status.
- Load Subset: Generate a subset of your data to appear in the 2D and 3D View windows in the Editor.
- Lock (Subset): Lock the subset area so it cannot be moved or re-sized.
- Surface Filter: apply a filter to a subset of a Reference surface loaded in Subset Editor.

Swath Editor toolbar

Contains functions for viewing sounding data so it can be cleaned.

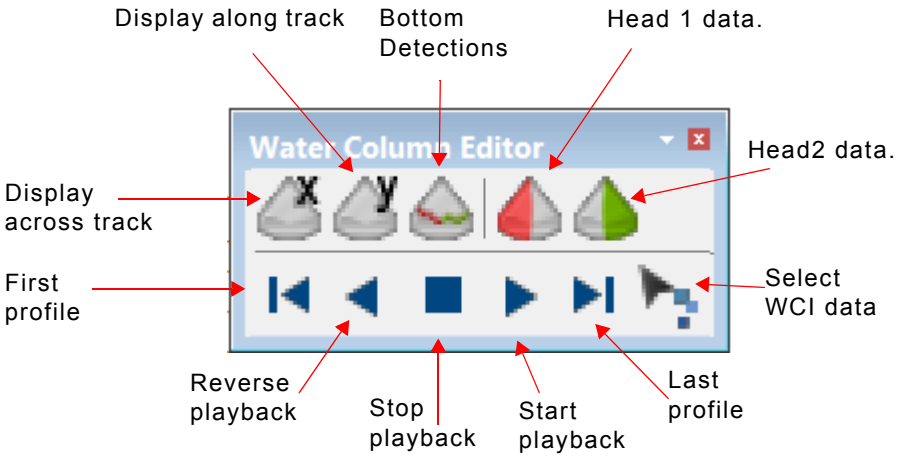


- Plan View: open or close window displaying Plan View of data.
- Rear View: open or close the window displaying Rear View of data.
- Side View: open or close the window displaying the Side View of data.
- Amplitude: open or close the window displaying beam-averaged amplitude data.

- Profile: open or close the window displaying a profile of a single swath.
- 3D view: open or close the window displaying the data in 3D.
- Port and Starboard Beams: display data from both port and starboard beams.
- Port: display only port swath data
- Starboard: display only starboard data

Water Column Editor toolbar

These tools are available when water column data is opened in Swath Editor.



One set of tools control the display of the data:

- Display across-track: open and close the window containing the water column data as viewed from the stern of the vessel (also called a swath profile, or polar plot).
- Display along-track: open and close the window containing the along track image of the nadir beam as defined by all profiles.
- Bottom Detection: Toggle bottom detection line on and off in the across track and along track windows.
- Head 1 data: Set imagery from port head (Head 1) to be on top of starboard / Head 2 data.
- Head 2 data: Set starboard/head2 imagery to be on top of port / Head 1 data.

The playback controls allow you to scroll through the data, to "play" it much like playing side scan data in Side Scan Editor.

- First profile: Goes to the start of the track line.

- Reverse playback: scroll backwards from current profile.
- Stop playback: stop
- Start playback: Start scrolling from the first profile toward the end of the track line.
- Go to last profile: Goes to the end of the track line.

Moving and Hiding Toolbars

Most toolbars are visible when the application is opened. They are arrayed below the menu bar. Toolbars can be moved from this location and positioned within the HIPS and SIPS interface, or on your desktop.

You can also close toolbars so they are not visible in the desktop

To remove a toolbar from. view:

Menu	View > Toolbars

1. Select the View Toolbars command.
2. Click a toolbar name from the Toolbars sub-menu so it is no longer checked.

The toolbar is removed from the desktop.

To make a toolbar visible again, select the toolbar name from the sub-menu so it is checked.

Move toolbars

Toolbars can be moved to any location on the desktop.

1. Position the cursor over any area of the toolbar not covered by a button, or double-click the double bar grab handle on the left side of the toolbar.
2. Press and hold the mouse button while dragging the toolbar to a new location.
3. Release the mouse button to position the toolbar.

Toolbars will automatically dock when they are close to certain areas of the HIPS interface. To stop the toolbar from automatically docking, hold down the <Ctrl> key while moving the toolbar.

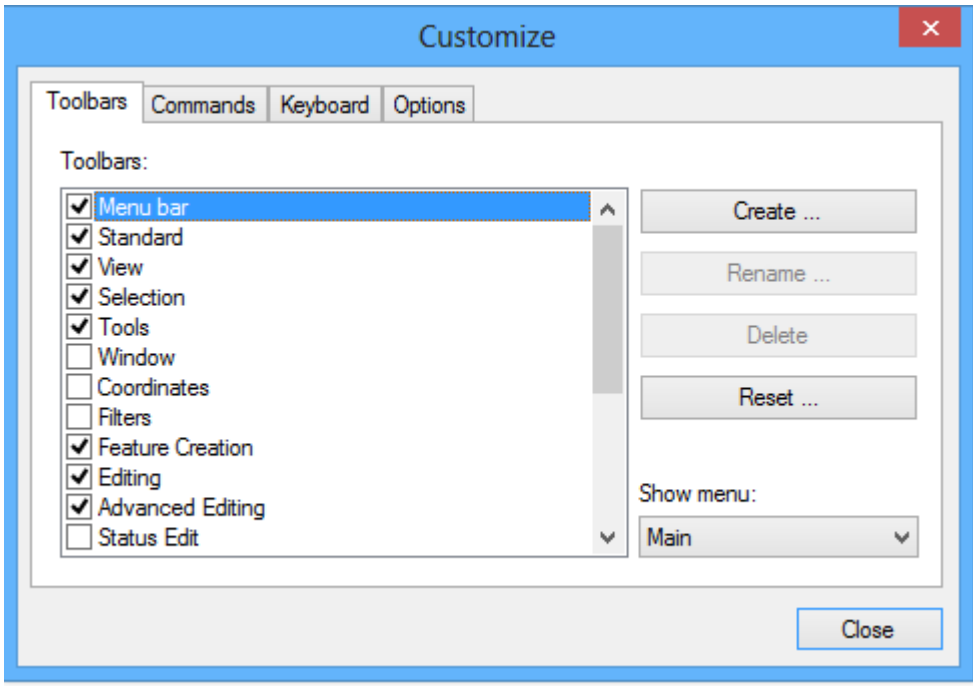
Customize toolbars

Menu	View > Toolbars > Customize

You can create, rename and delete toolbars, add command tool buttons, and create custom toolbars and keyboard shortcuts using the Customize command.

1. Select the Customize command.

The Customize dialog box is displayed.



There are four tabs in the Customize window:

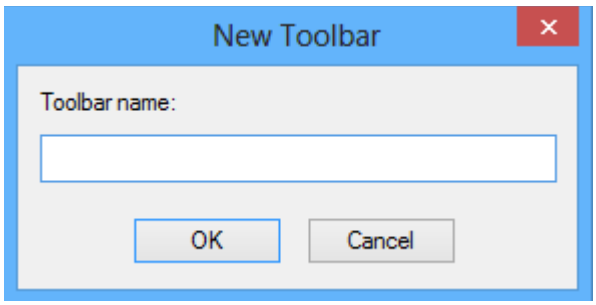
- *Toolbars:* Create custom toolbars and select the tools to display in existing toolbars. See "Create a Custom Toolbar" on page 29
- *Commands:* List of available commands. See "Add a Command to a Toolbar" on page 30
- *Keyboard:* Create keyboard shortcuts for menu and toolbar commands. See "Create Keyboard Shortcuts" on page 31
- *Options:* Customize the way tools are displayed in the toolbars. See "Set Display Options" on page 32

Create a Custom Toolbar

Create a custom toolbar with selected tool buttons. New toolbars can be renamed and deleted.

1. Select the Toolbars tab.
2. Click **Create**.

The Toolbar dialog box is displayed.



3. Type a name for the toolbar, and click **OK**.

The new toolbar is displayed in the HIPS and SIPS interface, and its name is listed in the Toolbars tab.

To add commands to the toolbar:

4. Select the Commands tab.

The *Categories* field lists all the HIPs and SIPS menus, and the *Commands* list displays the commands in a selected menu.

5. Select a menu from the *Categories* list.
6. Select a command.

A definition of the command is shown in the *Description* field.

7. Drag the command from the dialog box onto a toolbar.

The same command can be added to more than one toolbar.

8. Repeat Step 7 until you have added all the required commands.

Use the same process to add buttons to existing open toolbars.

Delete a toolbar

Use this command to remove a *new* toolbar from the interface. (It will not delete default toolbars.)

1. Select the Customize command.

The Customize dialog box opens.

2. Select the *Toolbars* tab (if the tabbed window is not already visible).
3. Select the new toolbar's name in the *Toolbar* section, so the name is highlighted.

The **Delete** button is activated.

4. Click **Delete**.

The toolbar is removed from the desktop and is no longer listed in the Customize dialog box.

Add a Command to a Toolbar

Add commands to and remove commands from both existing and custom toolbars.

1. Select the Commands tab.

The Categories list contains all the menus in the Product Editor.

Add commands

To add a command to a toolbar:

2. Select a menu from the Categories list.

The Commands list displays the commands in that menu.

3. Select a command.

A definition of the command is shown in the Description field.

4. Drag the command from the dialog box onto a toolbar.

You can add commands to more than one toolbar.

Delete commands

You can also delete commands from toolbars.

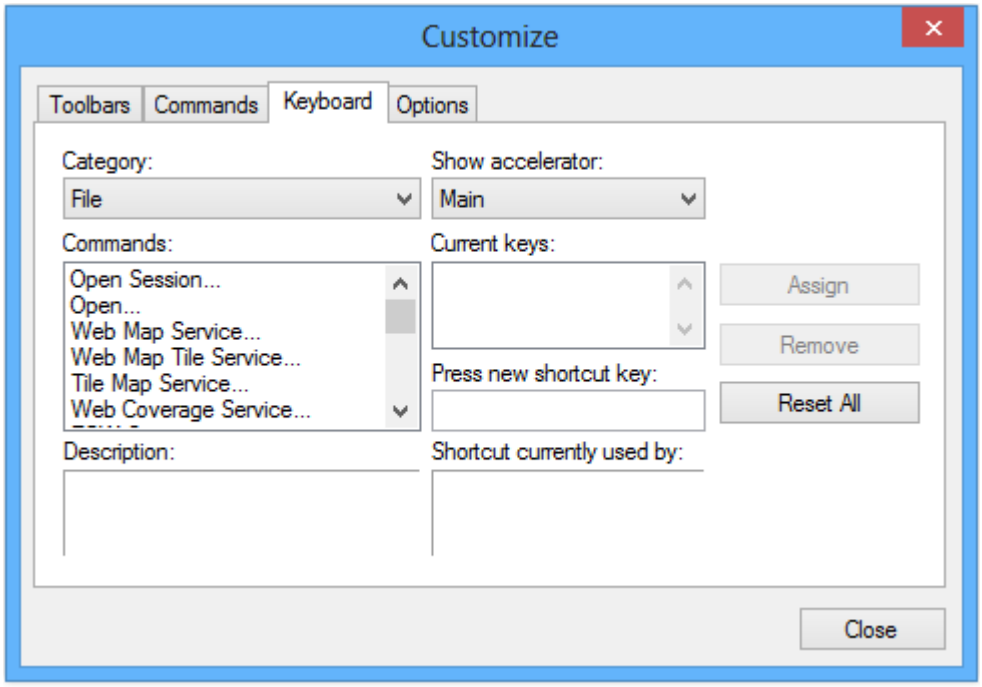
1. With the Commands tab open, select the command on the toolbar.
2. Drag the command off the toolbar.

You do not have to drag it onto the Customize dialog box.

Create Keyboard Shortcuts

Create custom keyboard shortcuts for quick access to commands.

1. Select the Keyboards tab.



2. Select a menu from the *Category* list.

The *Commands* list displays the commands in the selected menu.

3. Select a command from the *Commands* list.

A brief definition of the command is displayed in the *Description* field. If the command already has a custom keyboard shortcut associated with it, this is displayed in the *Current Keys* field.

If the shortcut you type is already assigned to a command, it is displayed in the *Shortcut currently used by* field, and the **Assign** button is disabled.

4. In the *Press new shortcut key* field, type the keys to be used for the keyboard shortcut.

Non-character keys (such as the <Ctrl> key) are shown in the field by their names. For example, if you press <Ctrl> then type 1, the shortcut is displayed as Ctrl+1.

5. Click **Assign**.

The new shortcut is created.

Delete a shortcut

To delete a keyboard shortcut:

1. Select the shortcut in the *Current Keys* field.
2. Click **Remove**.

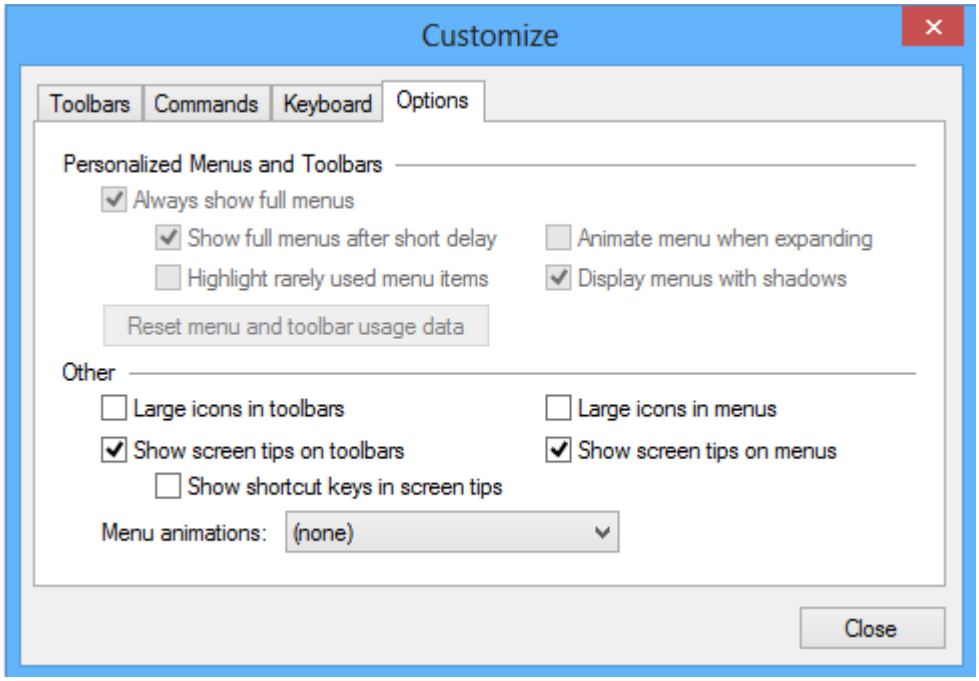
To remove all custom shortcuts:

1. Click **Reset All**.

Set Display Options

The Options tab controls display options for the toolbars and menus.

1. Select the Options tab.



2. Set options.

Option	Description
Large icons in toolbars	**On**: Toolbar icons are 32 x 32 pixels. **Off**: Toolbar icons are 16 x 16 pixels
Show screen tips on toolbars	**On**: A pop-up label is displayed when the cursor hovers over a tool on the toolbar. *Show shortcut in screen tips* becomes active. • **On**: The shortcut key is displayed in the screen tip • • **Off**: No shortcut key is displayed in the screen tip.**Off**: No screen tips are displayed.
Large icons in menus	**On**: Icons in the menu are 32 x 32 pixels. **Off**: Icons in the menu are 16 x 16 pixels.
Show screen tips on menus	**On**: A pop-up label is displayed when the cursor hovers over a menu item. **Off**: No screen tips are displayed.
Menu animations	Choose an item from the list to set how menu items behave when you select them.

Selection Tools

You can select an individual track line or object in the display by clicking on it with the mouse so it is highlighted.

You must select a survey line in order to use these editor tools:

- Attitude Editor
- Navigation Editor
- Single Beam Editor
- Swath Editor
- Side Scan Editor

You must select one or more survey lines to use the following tools and processes:

- single beam filters
- swath filters
- Total Propagated Uncertainty (TPU) filters
- restart cleaning
- load tide
- sound velocity corrections
- compute GPS tide
- compute TPU
- close track lines
- merge
- recompute towfish navigation

While you can select a group of objects by holding down the <**Ctrl**> key while clicking on each object in turn, the following tools make selection of multiple objects easier.

Select by Range

Select one or more objects.

Menu	Select > By Range
Tool	

1. Select a layer in the Control window.
2. Choose the Select by Range command
3. Press and hold the mouse button while dragging the cursor to define a rectangular area.

The selected objects from the layer are highlighted.

Select By Lasso

Use the By Lasso tool to select objects by enclosing an area of data.

In the Display window:

1. Select the layer in the Control window that contains the objects you want to select.
2. Select the By Lasso command.
3. Using your mouse click a series of points to outline the area that you want to select.

The points are connected by a line as you continue clicking. When you have outlined the area:

4. Press <**End**> to close the lasso outline.

When the lasso is closed, all objects inside the defined area are selected and displayed in the Selection window.

Use Lasso in editors

In editor windows the area can be defined using the mouse in one of two ways:

- by dragging around the area to be selected, or,
- by inserting a series of points to create an outline.

In editor windows, for example the Plan View in Swath Editor or a data viewer in Attitude Editor:

1. Select the By Lasso command.

Menu	Select > By Lasso
Tool	

2. Click and drag the mouse in the editor window, to draw the outline of the area you want to select,
   OR
   click a series of points in the editor window to outline the area.

These two modes can be used together in the editor windows.

3. Close the lasso outline. This can be done by:
   - releasing the mouse button and right-clicking inside the selected area.
   - press the letter <**C**> key.

The first and last points will be connected and the lasso shape will be closed. The objects within the enclosed area are highlighted as selected.

To view the selection:

4. Right-click and select Query to see the selected data in the Selection window.

Select By Circle

Use the By Circle tool to select objects by enclosing an area of data.

Menu	Select > By Circle
Tool	

1. Select a layer in the Control window.
2. Choose the By Circle command.
3. Drag the cursor to define a circular area.
4. When the circle outlines the area you want to select, release the mouse button.

The data within the circle will be selected.

Select All in Display

Select objects that are totally or partially in the current viewing extent of the Display window.

This command is useful for selecting a single object or group of objects in an enlarged section of the Display window.

Menu	Select > All in Display
Tool	

1. Select a layer in the Control window that contains the objects you want to select.
2. Use the zoom tool to enlarge a section of the Display window.
3. Choose a Select All in Display command.

Objects that cross or are completely within the current view of the Display window are highlighted.

Select All

Select all objects in a layer.

Menu	Select > Select All
Tool	
Key	<Ctrl+A>

1. Select a layer in the Control window that contains the objects you want to select.
2. Choose the Select All command.

All objects are highlighted.

Select Next Line

Select track lines by ascending file order.

The file order can be sorted according to time or name by right-clicking in the Project window and selecting Sort > By Name or By Time from the pop-up menu.

Menu	Select > Next Line
Tool	

1. Select the Next Line command.

The track line directly below the currently selected line in the project data tree is highlighted.

Select Previous Line

Select track lines by descending file order. The file order can be sorted according to time or name by right-clicking in the Project window and selecting Sort > By Name or By Time from the pop-up menu.

Menu	Select > Previous Line
Tool	

1. Select the Previous Line command.

When you select the command, the track line directly above the currently selected line in the project data tree is highlighted.

Select Lines From the Control Window

1. Make sure the Control window is open.
2. Select the Project window.
3. Click on a track line file in the list so that it is highlighted.

The track line is highlighted in the Display window.

You can also select more than one file.

- To select a Project, Vessel or Day folder, click the folder. All files in that folder are highlighted.
- To select multiple track lines, press and hold the <Ctrl> key while clicking the track line files with the mouse.
- To select a range of files, click the first file in the range, press and hold the <Shift> key while clicking the last file in the set. This highlights all adjacent files between the first and last file.

Clear Selection

Remove selected track lines or objects from a selection.

Menu	Select > Clear
Tools	

1. Select the Clear command, or click anywhere in the display away from the selected features.

The previously selected track lines or objects are no longer highlighted.

Measure Distance and Angle

Measure the distance and angle between points in the Display window. Distance is shown in the units you have set in the Display Units tab of the Tools > Options dialog box.

Distances can be displayed as Geodetic (distance on the ellipsoid) or as Projected (projected distance on a map), as set in the Measurements Reference field in the Display Units tab.

There is also a measure distance tool in the 2D and 3D View windows in Subset Editor and in the waterfall view in Side Scan Editor. However, the functionality is different. See "MEASURE DISTANCE IN SUBSET EDITOR" ON PAGE 829 and "MEASURE DISTANCE IN SIDE SCAN VIEW" ON PAGE 79 for more information on using this tool.

Measure Distance in Display

Menu	Tools > Measure Distance and Angle
Tool	

To use Measure Distance and Angle tool in the Display window:

1. Select the Measure Distance and Angle command.

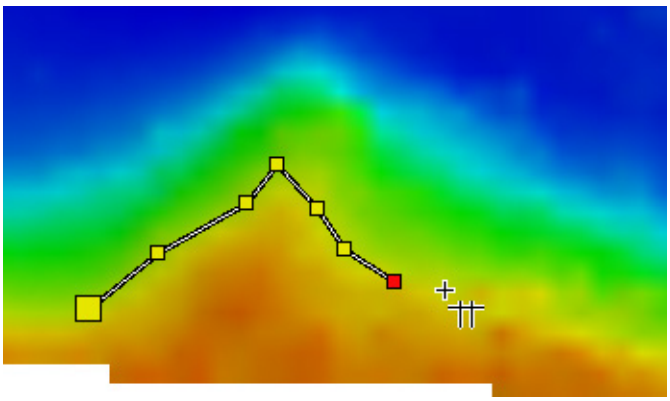
The cursor will change to indicate that the tool is active. 

2. Click in the Display window to place the starting point for the measurement.

A yellow control point will be added to the display to indicate the start of the measurement line.

3. Click again to add a second point.

Additional points are added each time you click in the display, with a larger square representing the starting point, and a smaller red square representing the last point added.



The location of each point is recorded in the Coordinates window. As you add points, the accumulated distance between the starting point and the last point is updated in the Coordinates window.

Coordinates

	Latitude	Longitude	Distance (m)	Angle	Total Distance (m)	Distance To Home (m)	Angle To Home
1	43-04.456545N	070-42.831905W	85.98	152-15-51.45N	0.00	0.00	
2	43-04.415443N	070-42.802426W	98.30	38-32-22.55N	85.98	85.98	332-15-52.66N
3	43-04.456970N	070-42.757304W	90.10	139-01-28.63N	184.28	101.27	269-33-19.47N
4	43-04.420232N	070-42.713780W	67.84	111-02-03.03N	274.38	173.87	292-45-01.04N
5	43-04.407082N	070-42.667135W			342.22	241.68	292-16-09.14N

The values contained in a given line in the Coordinates window can be copied to the clipboard, and pasted into another application, such as Notepad. The entire Coordinates window can also be saved as an ASCII file.

Place Points Using Snap

For more accurate measurements, the snap function can be used to place points.

To place a point using snapping:

4. Press and hold <S> while clicking the Display window.
5. Continue adding points as necessary.
6. [Optional] To remove the last point added, press the <Backspace> key.
7. To end the current measurement without turning off the tool, right-click and select Distance > Cancel from the pop-up menu.
8. To turn off the measurement tool select Distance > Quit from the pop-up menu, or click the <**End**> key.

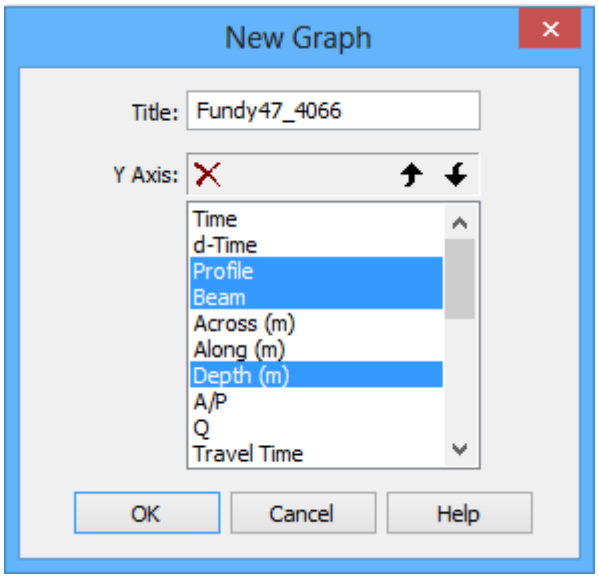
Graph tool

Data from the Selection window can be displayed in graphical format in a graph window. The X-axis displays the record number as listed in the Selection window. The Y-axis values are chosen from a list.

To graph selected data:

1. Select or Query data so that data is displayed in the Selection window.
2. Right-click in the Selection window, and select New Graph from the pop-up menu.

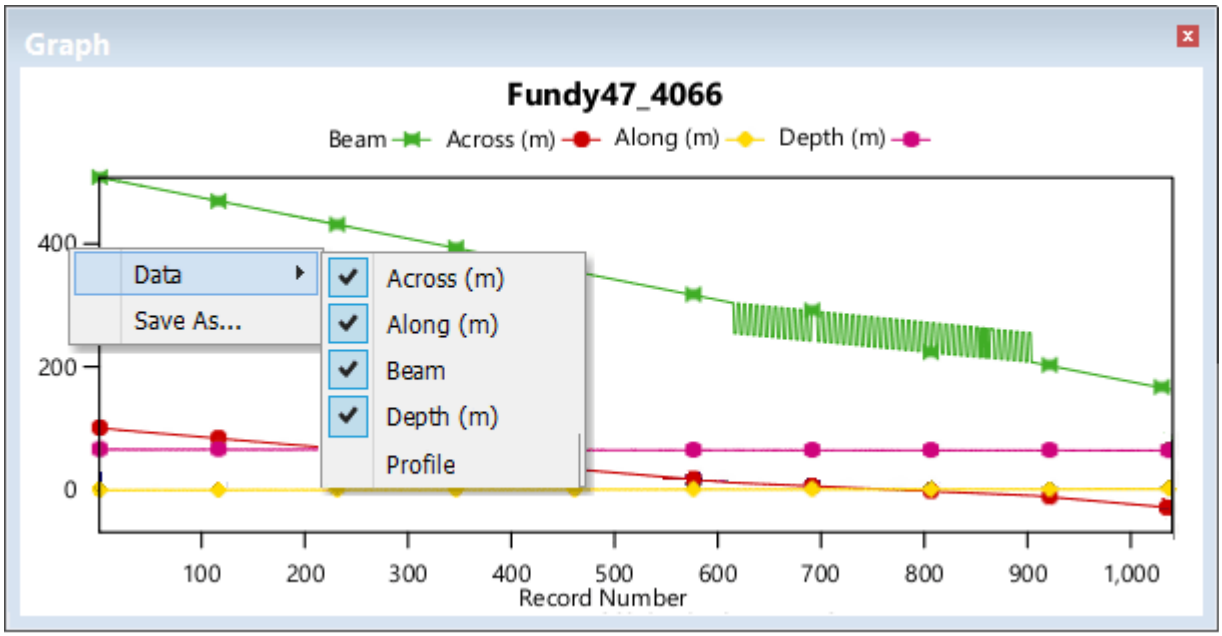
The New Graph dialog box is displayed.



Fields are displayed in the graph in the same order as the columns are listed in the Selection window. This order can be adjusted by dragging a selected field name to a new level in the list.

3. Type a name for the graph in the *Title* field.
4. Select the field(s) containing the values to be graphed on the Y-axis.
5. Click **OK**.

A graph is created in a new window.



To view or hide the displayed Y-axis lines in the graph:

6. Right-click in the graph window, and select or de-select the check box.

The graph can be saved to these formats:

- Comma Separated Value text file (*.csv)
- TIFF image (*tif)
- Bitmap image (*.bmp)
- JPEG image (*.jpg)
- PNG image (*.png)

To save the graph:

7. Right-click in the graph window, and select Save As from the pop-up menu.

The Save As dialog box is displayed.

8. Select a destination for the saved file.
9. Type a name for the file.
10. Select a format from the *Save as type* list.
11. Click **Save**.

The graph is saved.

Raster Legend

Surfaces attribute layers are mapped to a colour file, such as Rainbow. To help identify the range of values to which each colour is mapped, you can display a raster legend.

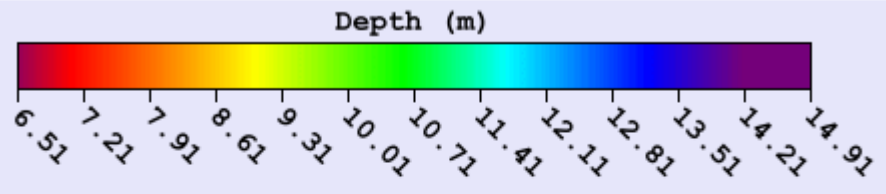
To set a legend of an attribute layer in a surface.

1. Select a surface attribute layer (depth, density, mean, etc.) in the Layers window.
2. Right-click the layer and select Properties from the pop-up window.
3. In the Properties window for the attributes layer, select *Show Legend.*
4. Select a *Location* from the drop-down. The legend bar will maintain the set position in the Display window, as you zoom or pan.
5. Set *Labels* options to True to display a title, name of surface, colour of the labels and the scale tick marks.
   - The title will appear above or to the right of the colour bar, depending on the location of the legend in the display.
   - The name of the surface will appear in the same line as the title.
   - Set a *Label Colour* to determine the colour of the text and the tick marks on the legend.

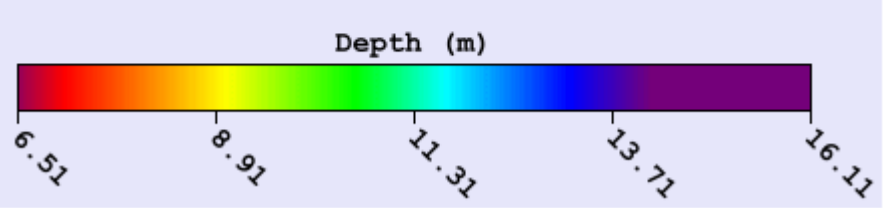
The *Interval* field controls the tick values displayed on the scale, and the range of colours displayed in the legend.

Below is an example of the difference between an interval set to `.50` and set to `1.50` for the same attribute later.

Interval set to `.50`



Interval set to `2.00`



6. Set the *Interval* for the range of values to show on the legend.

Colour Map Editor

Use the Colour Map Editor to modify a colour map file used on a surface attribute layer or to create new colour maps.

This function is available in the Display Properties, for example, for data in HIPS editors, for surface attribute layers (such as Depth and Density, and for Mosaic layers (such as Intensity).

To open the Colour Map Editor:

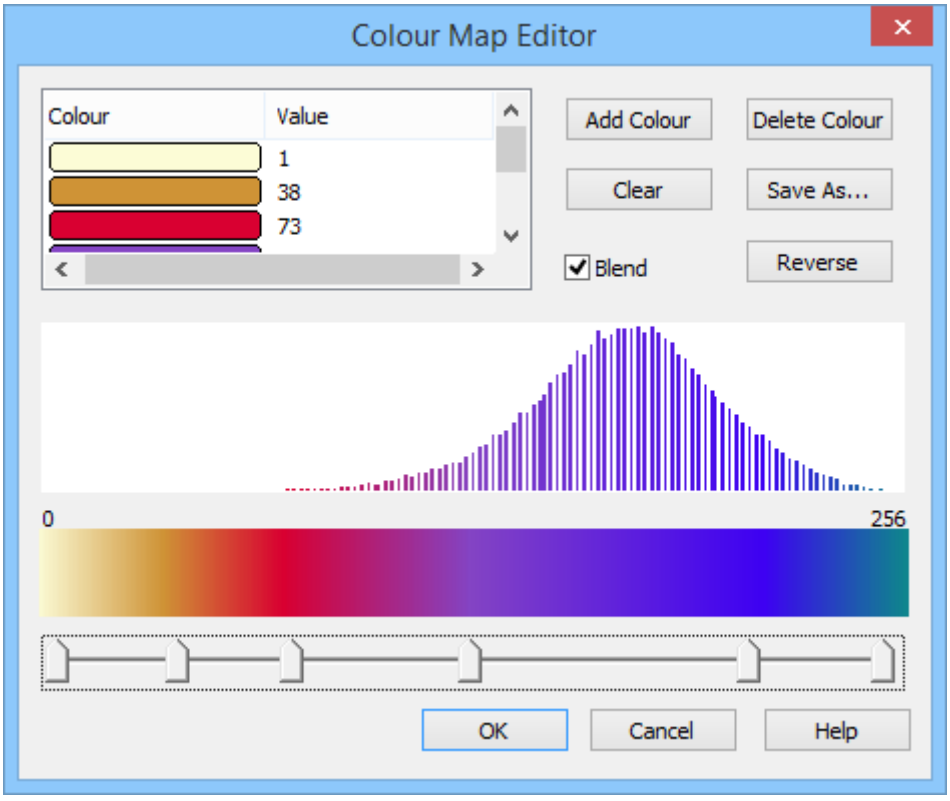
1. Select the surface or mosaic attribute layer in the Layers window.
2. In the Properties window, select Colour Map from the *Colour Type* drop-down list.

The Colour File field displays the active colour file. The default colour map is Rainbow.cma. (See "COLOUR MAP FILE (*.CMA)" ON PAGE 49 for an illustration of this *.cma file.)

Certain colour maps are read-only. If you select one of these you will be alerted that the file cannot be edited.

3. Select *New* or *Edit* from the *Colour File* drop-down list.

The Colour Map Editor is displayed.The example below illustrates colour mapping.



The table at the top left of the Editor displays the colours and pixel values that represent attribute data. In this example, the

colour file lists seven colours and their pixel value (1, 38, 73...255). Depending on the data selected, a third column will display data values, such as depth, mean or density values.

In the histogram the horizontal axis represents the colours used in the surface, and the vertical axis represents the data distribution.

Below the histogram is a customizable colour bar displaying the colours for pixel values from 0 to 256. Each of the sliders on this bar represent a colour defined in the table. Pixel value 0 is always assumed to be transparent.

Change colour mapping

You can change the mapping of an individual colour using the table or the slider control. If you are remapping one of the default colour files, it's advisable to save your amended colour map with a new name.

1. To change the colour mapping using the table, double-click a row in the table.

The Add Colour dialog box is displayed, showing the selected colour and its pixel value.

2. Type a new number in the *Value* field, or select a different colour and click **OK**.

If you change the value, the position of the slide is updated. If you change the colour, the new colour is displayed in the colour bar.

3. Alternately, you can move the slider to a different position on the colour bar.

As the slider changes position, both values fields for that colour are updated in the table.The histogram is also updated on the fly to show the new colour value.

4. Save the colour map with a new name.

Options

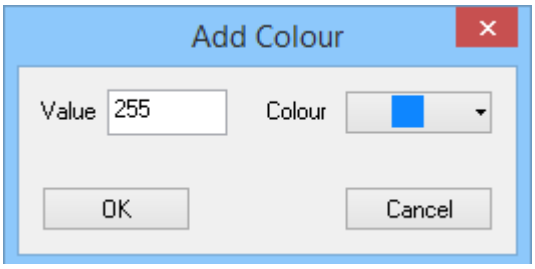
The dialog box includes commands that enable you to add and delete colours from an existing map file, to reverse the application of the colour mapping and to blend one colour into the next in the Display.

Add Colour

You can add or remove colours from an existing map, or create a new colour map.

1. Click **Add Colour** or click directly on the slide bar.

The Add Colour dialog box is displayed.



The number in the *Value* field shows the pixel value of the displayed colour.

2. Select a colour from the colour palette (or click **Custom Colour** to create a colour from the standard Windows colour picker), and click **OK**.

The selected colour is displayed in the dialog box.

3. Repeat the process to insert more colours.

As you select more colours, the colour values and the depths are displayed in a table. Each colour also has a slider control associated with it.

4. Move the slider to adjust the pixel value of that colour.

The *Value* and *Depth* data in the box adjusts as you move the sliders.

If you want to remove a colour,

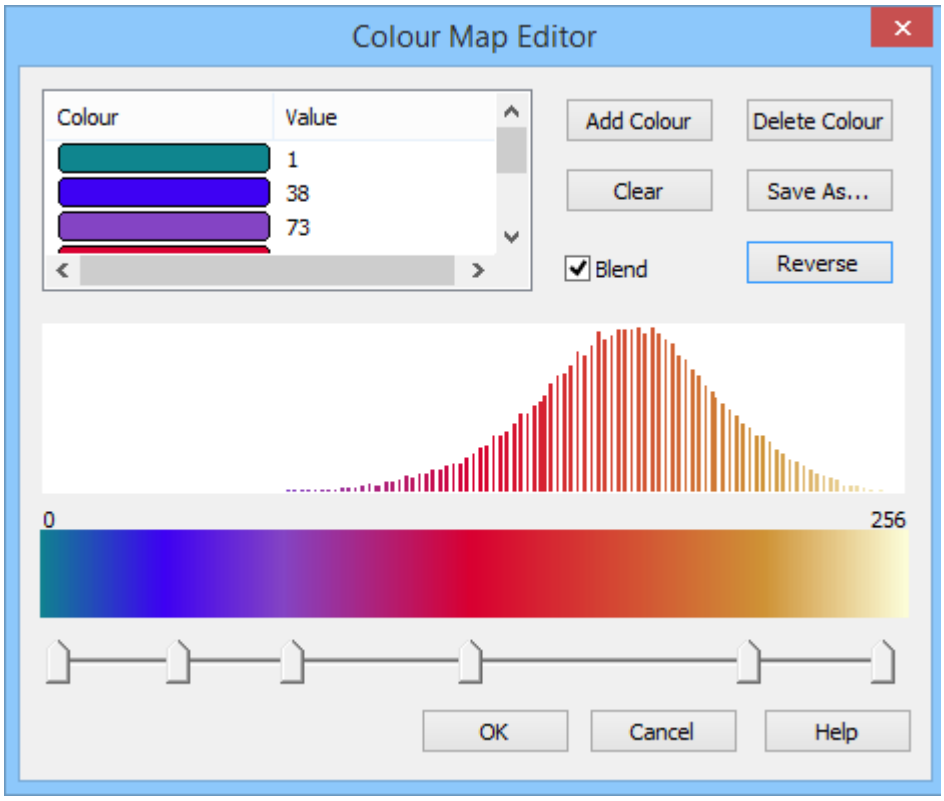
5. Click the colour value and click **Delete Colour**.
6. To remove all colours, click **Clear**.

Reverse colours

To apply colour mapping from maximum to minimum values instead of from minimum to maximum,

7. Click **Reverse**.

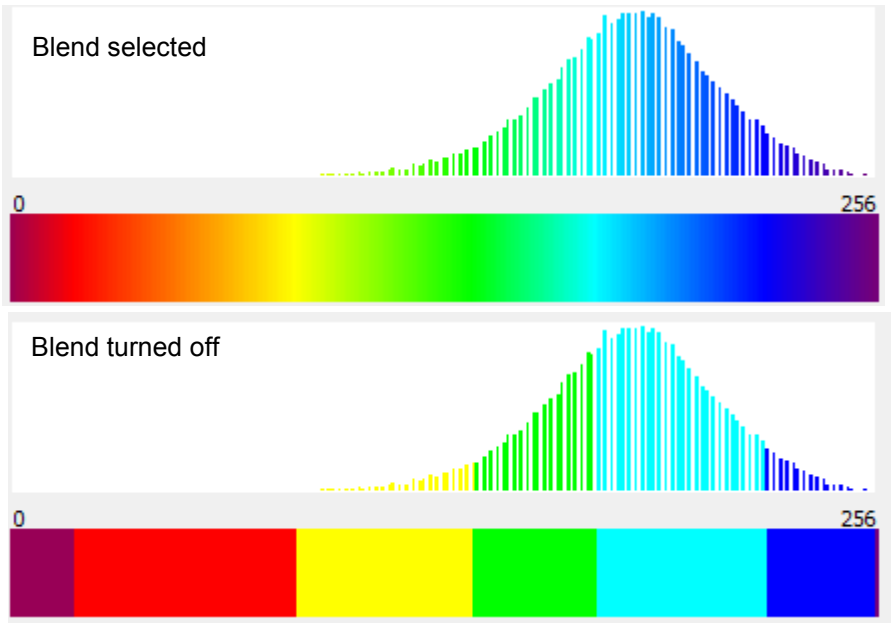
The image below shows the reverse mapping for the colour map displayed above.



Blend

To blend the colours into graduations of change from one colour to another

8. Select the *Blend* check box.



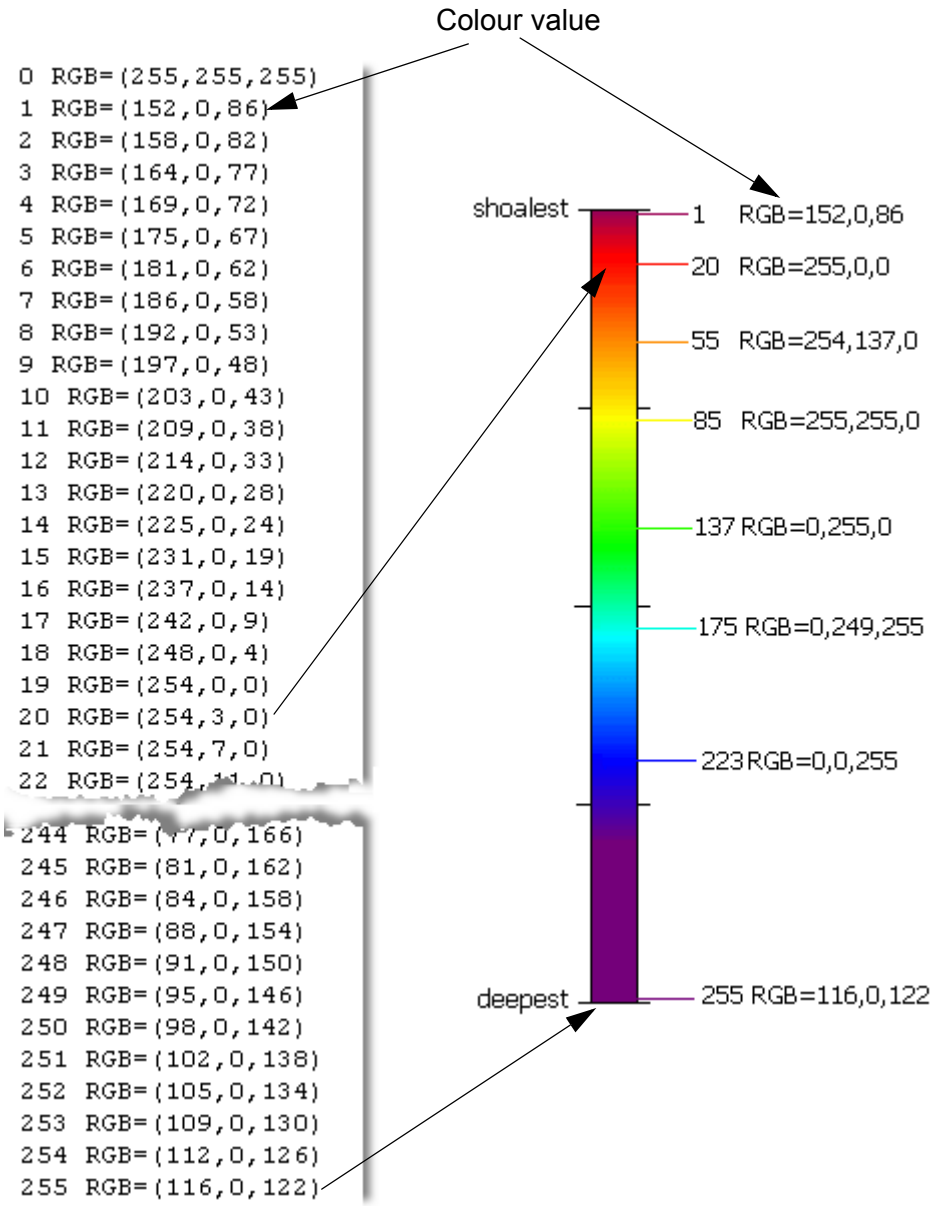
When you have completed the changes to your colour map,

9. Click Save As to save the colour map with a new name.

The Save As dialog box is displayed.

10. Type a file name for the colour map. All colour maps have a *.cma extension and the directory is always ..\ Hips\System.
11. Click **Save** to save the colour map to the directory.

Colour map file (*.cma)



Colour Range Editor

An alternative to colour mapping in HIPS and SIPS is to apply a colour range. The Colour Range Editor dialog box allows you to modify or create new colour range files.

To open the Colour Range Editor:

1. Select a layer of a gridded surface or a mosaic in the Layers window.
2. In the Properties window, select Colour Range from the *Colour Type* drop-down list.

If colour range files have been created, the first colour range file in the drop-down list will be automatically selected, and displayed in the *Colour File* field.

If no colour range files have been created for this layer, the <New...> command is displayed.

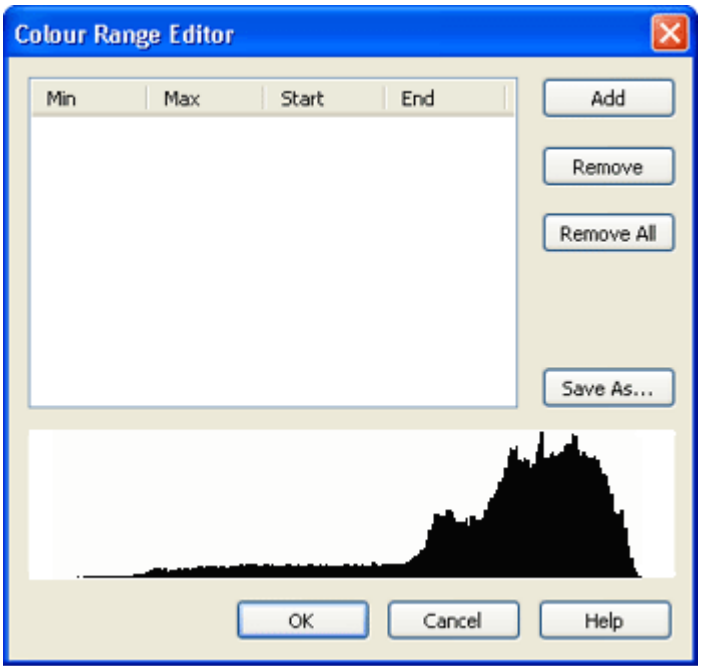
To edit an existing file displayed in the field:

1. Right-click in the *Colour File* field and select Edit from the menu.

To create a new colour file:

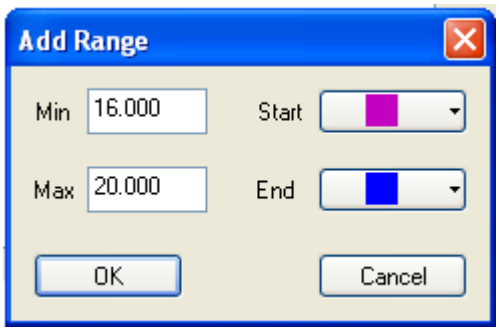
2. Select <New...> from the *Colour File* drop-down list.

The Colour Range Editor opens and displays a one-colour histogram of the values in the selected attribute layer.



1. To add a colour range, click **Add**.

The Add Range dialog box is displayed.



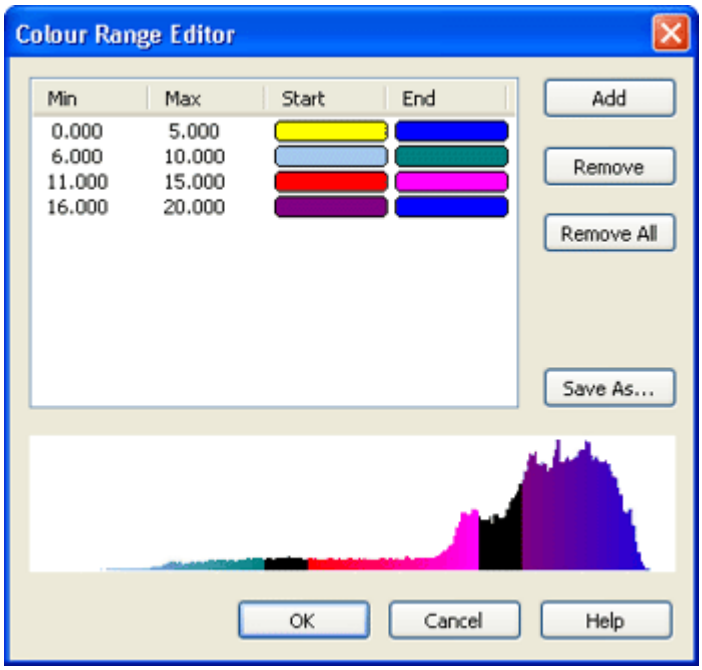
2. Type minimum and maximum values for the new range in the *Min* and *Max* fields.

The General fields of the Properties window display the minimum and maximum values occurring in the selected surface, so you can take these into consideration when determining appropriate ranges.

3. Select a colour from the colour picker to represent the minimum and maximum values for the new range.
   - Alternatively you can create a custom colour using the standard Windows colour palette.
4. Click **OK**.

The new range is listed in the table at the top of the Colour Range Editor. The data histogram falling within the new range will be coloured appropriately.

5. Repeat until you have created sufficient colour ranges to satisfactorily represent the data in the layer.



The bottom part of the dialog box now shows the histogram with the horizontal axis representing the colour range used in the image and vertical axis representing the distribution of data.

6. To edit a range, select it and double-click to open the Add Colour dialog box.
7. To remove a single colour range, select the range and click **Remove**.
8. To clear all colour ranges, click **Remove All**.
9. To save an edited file with a new name, click **Save As** to open the Save As dialog box.
10. Click **OK** to close the Editor. You swill be prompted to save the file.

The saved file will be applied to the selected surface layer.

2

Command Listing

See also "Shortcuts using a keyboard" on page 80 for lists of keyboard shortcuts and digitizing tools.

Alphabetically by Command Name

A - B - C - D - E - F - G - H - I - K - L - M - N - O - P - Q - R - S -T- U - V - Z

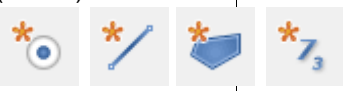
Command	Toolbar	Menu	Function
2D View 	Subset Editor	Tools > Editors > Subset	Open (or close) display of Subset Editor 2D View window.
3D Flight Path	—	View	Playback controls: Record, Play, Pause, Stop Flight path files: Load, Save and Export to Video
3D View 	View	View	Open (or close) the 3D view in the Display window.
3D View (Subset Editor) 	Subset Editor	Tools > Editors > Subset	Open (or close) the display of Subset Editor 3D View window.
3D View (Swath Editor) 	Swath Editor	Tools > Editors > Swath	Open (or close) display of 3D View window.
A			
Accept 	Status Edit	Edit > Status Flag	Flag data as Accepted so that it is included in processing.
About CARIS HIPS and SIPS	—	Help	Display program information, version number, and copyright.
Accept Hypothesis 	Subset Editor	Tools > Editors > Subset	Revert a hypothesis back to Accepted status.
Accept Line	—	Edit > Track Lines	Revert the status of a rejected line
Accept Node 	Subset Editor	Tools > Editors > Subset	Return all hypotheses associated with the selected rejected node back to accepted status.
Across Track 	Water Column Data	—	Opens “across-track” water column view in Swath Editor.

Command	Toolbar	Menu	Function
Add Depth	—	Tools > Editors > Single Beam	Add a new sounding by supplying time and depth.
Add Inner Rings (to Area)	—	Edit > Areas	Add an area object on top of a larger area object, in the form of a hole.
Add Labels (to contour layer)	—	Process > Products >Contours	Label contour lines with their associated depth values.
Add Line Contact 	Side Scan Editor	Tools > Editors >Side Scan > Contacts	Digitize line segments to represent a line contact.
Add (line) to mosaic		Tools > Mosaics	Add selected line(s) to a mosaic.
Add (line) to surface		Tools > Surfaces > Add to	Add selected line(s) to a surface.
Add Navigation Sources 	Vessel Editor	Vessel Editor > Edit	Open Add Navigation Sources dialog box and select from available sources.
Add Point Contact 	Side Scan Editor	Tools > Editors > Side Scan > Contacts	Insert a contact with the information in the Side Scan Editor Properties.
Add Profile 	SVP Editor	SVP Editor > Edit	Add a profile section to the SVP file.
Add selection to Additional Bathymetry	—	Right-click on the across track or along track window when water column data is selected.	Add bathymetry in selected water column data to project. Data is displayed in Additional Bathymetry layers.
Add Tide 	Tide Editor > Standard	Tide Editor > Edit	Add tide data to a tide file.
Add to Barcheck	—	Tools > Editors >Single Beam	Generate an SVP file based on measured depths against actual depths.
Add to Surface 	Process	Tools > Surfaces > Add To	Add new track lines to an existing surface without the need to regenerate the surface.
Add to Mosaic		Tools > Mosaics > Add To	Add line to mosaic
Amplitude 	Swath Editor	Tools > Editors > Swath	Display amplitude data.

Command	Toolbar	Menu	Function
Along track 	Water Column Data	—	Opens “along-track” water column view in Swath Editor.
Apply Attitude Filters 	HIPS Data Filters	Tools > HIPS Data Filters	Applies the filters set in the Attitude tab of the Set Filters dialog box.
Apply Bathymetry Filters 	HIPS Data Filters	Tools > HIPS Data Filters	Applies the Critical, TPU Values, Swath/Sweep, and Single Beam filter values as set in the Set Filters dialog box.
Apply Edit to >Both, >Port, > Starboard	Status Edit	Edit > Status Flag	Apply selected status to port data, starboard data or both.
Apply Smoothing		Process	Select an *.hff filter file to apply smoothing to selected line(s).
ASCII Info File		Tools > Editors	Open the ASCII Info File Editor to create and edit *.info files.
Attitude Editor 	Tools	Tools > Attitude	Open the Attitude Editor (a line must be selected).
Auto Analyze Sediment 	Process	Process > Compute	Select to run a sediment analysis on all selected lines.
Auto Cursor Mode 	Status Edit	Edit > Status Flag	Turn Auto Cursor mode on/off (combines Select with Accept/Reject/ Query etc. functions into a single function).
Automatically Digitize Altitude 	Side Scan Editor	Tools > Editors >Side Scan	Use automatic tool to digitize between water column and seabed to trace first bottom return.
B			
Batch Processor 	Tools	Tools	Open the Batch Processor to automate processing task on multiple track lines.
Beam Pattern  (Create)	Beam Pattern :	Process > Beam Pattern Also on right-click menu in the side scan View.	Create a beam pattern file using SIPS backscatter, GeoCoder or SIPS side scan engine.

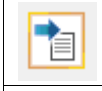
Command	Toolbar	Menu	Function
Bottom Detections 	Water Column Editor		Toggles display of sea floor soundings on top of across-track imagery in Swath Editor.
Boundary Polygon (Filter)	—	Tools > HIPS Data Filter	Use a polygon from a data layer to filter data.
C			
Cancel Draw 	View	View	Stop a display from being drawn in the Display window (only active while an image is being drawn).
Cascade	—	Window	Arrange windows so they overlap and all title bars are visible.
Catalogue Editor 	—	Tools > Editors >	View and customize objects and attributes
Centre on Coordinate 	—	View > Centre On	Opens the Coordinate Entry dialog box and centres the Display on the coordinates entered.
Centre on Selection 	—	View > Centre On	Redraw display to centre on and zoom into the selected data in the Display window.
Centre on Superselection 	—	View > Centre On	Redraw display to centre on and zoom into to superselected data in the Display window.
Change Depths	—	Tools > Editors > Single Beam	Change the depth value for a selected sounding.
Change Projection 	View	View	Change the coordinate reference system (contains projection) of the display from currently set coordinate reference system.
Change Scale 	—	View	Change the display scale.
Classify Image	—	Tools > Mosaics > Right-click on a mosaic parent layer.	Generate a colour table to colour-code a histogram with the selected colours to represent return signal intensities in the displayed mosaic.
Classify Lines	—	Edit > Track Lines >	Set or change a classification flag for a track line to distinguish between line types.

Command	Toolbar	Menu	Function
Clear Altitude 	Side Scan Editor	Tools > Editors > Side Scan > Altitude	Remove altitude data.
Clear (Hypothesis Nomination) 	Subset Editor	Tools > Editors > Subset	Remove the “Nominated” status of an alternative hypothesis during hypothesis editing.
Clear Selection 	Selection	Select	De-select any selected lines or features in the display and in the Selection window.
Close, Close All  	Standard	File	Close all open data layers
Combine Surfaces	—	Tools > Surfaces	Join two or more surfaces to make one surface.
Complete 	Subset Editor	Tools > Subset Editor	Set cleaning status of tiles to show the extent of data cleaning.
(Compute) GPS Tide	—	Process > Compute	Calculate vertical correction based on recorded GPS ellipsoid height instead of using normal tide observations.
Compute Layer	—	Tools > Layers	Add a new layer to a surface using existing attributes, logical operators and numeric values in an equation.
(Compute) Separation Model	—	Process > Compute	Generate a separation model based on inputs from tide and other vessel dynamics.
Compute Statistics	—	Tools > Surfaces	Compute surface statistics.
(Compute)Total Propagated Uncertainty 	Process	Process > Compute	Compute TPU for selected lines.
Conversion Wizard 	Tools	File > Import	Launches Conversion Wizard.
Copy 	Main tool bar in some editors, such as Vessel Editor and Batch Processor	Edit > Track Lines in HIPS and SIPS. Also on some right-click menus, and Edit menu in some editors.	Copy and paste lines from one layer to another in the Project window.

Command	Toolbar	Menu	Function
Copy Feature > Class Copy Feature > Geometry	—	Create > Copy Feature	Create a new feature by copying the class or geometry of a superselected feature.
Copy Position	—	—	Right-click in the Display window and copy the position under the cursor to a text editor.
(Create a Mosaic) New Mosaic 	Process	Tools > Mosaics	Create mosaic from one or more selected lines using SIPS Side Scan, SIPS Backscatter or GeoCoder process engines.
(Create) Beam Pattern 	Beam Pattern	Process > Beam Pattern Also on right-click menu in the side scan View.	Create a beam pattern file using SIPS backscatter, GeoCoder or SIPS side scan engine.
(Create) Layer By	Filters	Create > Layer By Also on right-click in S57 background layer in the Layers window.	Create a layer by attribute value, feature acronym FOID, feature type, unique FOIDs, Rule Wizard or Rule file.
(Create) New Feature 	Feature Creation	Create	Create point, line, area or soundings features
(Create) New Feature Layer 	Feature Creation	Create	Create a layer to which features such as contours and soundings can be added.
(Create) Contours 	Tools	Tools > Contouring	Create contours
Create New Group	—	Right-click on a surface parent layer.	Group surfaces together to apply the same properties.
Create Profile 	Tools	Tools > Profile	Create a new Profile layer by setting options and drawing the profile line across a surface.
Critical Sounding Detection	—	Tools	Automatically finds and designates shoal or deep soundings in the source HIPS data for the surface specified.
Customize (Toolbars)	—	View > Toolbars	Set which toolbars will be visible, alter the appearance and size of toolbar buttons, and create customized toolbars.

Command	Toolbar	Menu	Function
Cut 	Main tool bar in some editors, such as Vessel Editor and Batch Processor	Edit > Track Lines Edit > Features Also on some right-click menus, and Edit menu in some editors.	(HIPS and SIPS) Cut and paste lines from one layer to another in the Project window. (Vessel Editor/Batch Processor) Cut and paste entries from one section to another.
Cut and Remove (Features)		Edit > Features	Cut and remove features intersecting and underlying a superselected line or area
Cut Terrain			
D			
Delete Selection/ Superselection	—	Edit	Delete selected line(s) from the project window, or from a feature layer or hob file.
Designate 	Status Edit	Edit > Status Flag	Manually flag significant soundings.
Detailed Line Query	—	Process > Report	Generate a report on selected line data and display in the Report window.
Difference Surfaces 	—	Tools > Surfaces	Create a surface showing the differences in attribute values between surfaces
Digitize New Boundary Polygon		Tools > Bounding Polygon Also on pop-up menu for bounding polygon layer.	Manually digitize the polygon which encompasses a selected surface.
Display filter 	View	View	Display or hide soundings that have been set with Rejected, Designated, Examined or Outstanding status flags. (Default is to display all except the Rejected data.)
Divide (lines)	Advanced Editing	Edit > Lines	Split a line at an existing vertex to create two new line features
E			
(Edit) Both 	Edit	Edit > Status Flag > Apply Edit to	Apply editing to both port and starboard data.
Edit Feature / All Features	Feature Creation	Edit	Edit the geometry of a feature. Multiple features sharing the same geometry can be edited at the same time using the Edit All command.

Command	Toolbar	Menu	Function
Edit Mosaic	—	Right-click on mosaic in Layers window ans select Edit from pop-up menu.	Change display of mosaic layers using Properties controls. Edit option must be enabled during mosaic creation.
Edit Selected Bounding Polygon	—	Tools > Bounding Polygon Also on pop-up menu for bounding polygon layer.	Edit individual vertices or the entire selected polygon.
Edit Position 	SVP Editor > Standard	SVP Editor > Edit	Add new SVP Entry (Geographic Coordinates optional) into a SVP file.
(Edit) Port Only 	Edit	Edit > Status Flag > Apply Edit to	Apply editing only to port side data.
(Edit) Starboard Only 	Edit	Edit > Status Flag > Apply Edit to	Apply editing only to starboard side data.
Empty Recycle Bin	—	Edit > Track Lines > Recycle Bin	Permanently removes deleted lines from the project folder.
Examined 	Edit	Edit > Status Flag	Flag a questionable sounding as having been examined and verified.
Exit	—	File	Closes HIPS and SIPS.
(Export) Selection to S-57	—	File > Export	Export selected contour and sounding features to an S-57 file.
Export Raster Product	—	File > Export	Export a raster surface and its metadata. Also use to create custom templates for raster export.
(Export) Selection to	—	File > Export	Save selected lines or features to ASCII, DXF, CARIS map (DES), WKT, GML, KML, HOB, S-57 or Shapefile format.
(Export) Surface to ASCII	—	File > Export	Export surface attributes to ASCII text file.
(Export) Surface to Point Cloud	—	File Export	Export surface to a point cloud.
(Export) Surface to HTF	—	File > Export	Export a selected surface to a Hydrographic Transfer Format file.
(Export) Surface Metadata	—	File > Export	Save surface meta data to an XML file.
(Export) View	—	File > Export	Save the current display to GeoTiFF, EPS, PDF and other formats.

Command	Toolbar	Menu	Function
Export to Video	—	View > 3D Flight Path	Save a recorded flight as WMV or AVI format.
Export Wizard  now called (Export) HIPS and SIPS Data	Tools	File > Export >	Open Export Wizard to export data products to various formats
F			
Filters (set) 	Tools > HIPS Data Filters	Tools > HIPS Data Filters > Settings	Open the Set Filters dialog box to set filter parameters for Attitude, Critical, Single Beam, Swath/Sweep and TPU filtering.
Filter 1 Screen 	HIPS Data Filters	Tools > HIPS Data Filters >Apply	Apply filter only to the swaths that are currently visible in the Plan View of the Swath Editor.
Filter to End of LIne 	HIPS Data Filters	Tools > HIPS Data Filters >Apply	Apply filters to the track line currently open in the Swath Editor, from the first swath currently visible in the Plan view to the end of the line.
Filter by Boundary Polygon	—	Tools > HIPS Data Filter > Boundary Polygon	Use a polygon from a data layer to filter data.
Filter Surface	—	Tools > HIPS Data Filters > Surface	Apply filter to a selected surface.
Finalize	—	Tools >Surfaces >	Generate a surface ready for export or processing such as contours.
Find 	Status Edit	Edit	Search for a sounding(s) by beam and/or profile number.
Find and Designate 	Status Edit	Edit > Status Flag	Automatically flag the shoalest sounding in a group of selected soundings.
Full Screen	—	View	Extend the Display window to the full extent of your screen. Use F11 to toggle between default and full screen view.
G			
Generalize	—	Tools > Surfaces	Generalize a surface
Generic Data Parser 	Tools	File > Import	Launches Generic Data Parser.
H			

Command	Toolbar	Menu	Function
Help topics 	Standard	Help	Open the Help file for the current application. (Also opens from F1 key.)
Hide window	—	Window > Other windows Also on right-click menu in certain docked windows.	Select a window with check mark to remove the window from the interface.
Highlight Alternative Depths 	Lidar	Edit > Lidar	Highlight soundings that contain alternative depth values.
I			
Import	—	File	Launches Conversion Wizard or Generic Data Parser
Import Selected Objects	—	Tools > Import Selected Objects	Import a selection or superselection of feature objects into an existing feature layer or hob file
Incomplete 	Subset Editor	Tools > Subset Editor	Set status of tiles to show where cleaning has not been started.
Interpolate Selection (Side Scan)	—	Tools > Editors > Side Scan >Altitude	Automatically digitize altitude by interpolating between values at the start and end of a selection of pings.
Interpolate Surface	—	Tools > Surfaces	Remove gaps in a surface using interpolation.
Intersect (Edges)		Edit > Edges	Intersect edges in selected lines.
K			
Keep Detected 	Lidar	Edit > Lidar	Retain the detected depth value instead of an alternative depth value.
L			
Licensed Components	—	Tools	Check licence status of HIPS and SIPS components.
Line QC Report		Process > Report	Opens the QC Report wizard
Line Report		Process > Report	Save selected line data to a delimited text file.
(Load) Beam Pattern 	Beam Pattern	Process > Beam Pattern	Load a saved beam pattern file.

Command	Toolbar	Menu	Function
(Load) Delta Draft	—	Process > Load	Load delta draft to apply to soundings during Merge (overrides dynamic draft data (from the vessel file).
Load from File	—	View > 3D Flight Path	Open a saved flight to play in the 3D View.
Load Subset 	Subset Editor	Tools > Editors > Subset	Generate a subset of your data to appear in the 2D and 3D View in the Editor.
(Load) Tide 	Process	Process > Load	Load tide data for selected lines.
Lock Subset 	Subset Editor	Tools > Editors > Subset	Lock the subset area so it cannot be moved or re-sized.
M			
Manually Digitize Altitude 	Side Scan Editor	Tools > Editors > Side Scan > Altitude	Manually digitize first bottom return.
Measure Distance and Angle 	Tools	Tools	Calculate the distance and angle between two points in the Display window. (Use Backspace to delete line segments.)
Measure Distance (SS) 	Side Scan Editor	Tools > Editors > Side Scan	Measure distance between two points when data is viewed in processed mode in Side Scan Editor.
Measure Shadow (SS) 	Side Scan Editor	Tools > Editors > Side Scan	Measure the height of an object by measuring its shadow in processed mode of Side Scan Editor.
Merge 	Process	Process	Apply Merge process to selected lines.
Merge (Areas)	Advanced Editing	Edit > Areas	Merge two or more selected areas into a single new area feature.
Merge Contours	—	Edit > Contours	Merge selected contour into a single contour feature.
Merge (Edges)	—	Edit > Edges	Merge the edges within selected line or area features into one continuous edge per line feature.

Command	Toolbar	Menu	Function
Merge (Lines) from Selection	Advanced Editing	Edit > Lines	Merge two or more line features into a new, single, continuous line feature
More (Column settings)	—	Right-click on the column header in the Selection window.	Toggle display of data columns in the Selection window..
Mosaic (New)	Process	Tools > Mosaics > New	Create a mosaic from lines selected in the Display window, using either SIPS backscatter, GeoCoder or SIPS side scan engine.
Move Contact 	Side Scan Editor	Tools > Editors >Side Scan > Contacts	Reposition a contact.
N			
Navigation (Editor) 	Tools	Tools > Editors	Open Navigation Editor (a line must be selected).
(New) Archive	—	File > New	Save a project and its related data in a ZIP format using Archive properties.
New Feature Layer 	Feature Creation	Create	Create a layer to which features such as contours and soundings can be added.
New Graph	—	Right-click on data in the Selection window.	Create a graph from selected data.
New Layout	—	Window > Layouts	Save a customized layout to a named file so it can be reapplied at later date.
New Mosaic 	Process	Tools > Mosaics >New	Create a mosaic from lines selected in the Display window, using either SIPS backscatter, GeoCoder or SIPS side scan engine.
(New) Project		File > New	Create a new project.
(New) Subset Tiles	—	File > New	Create a tile layer to track subset cleaning status.
New Surface 	Process	Tools > Surfaces >New	Create a surface: Swath Angle, Uncertainty, CUBE or Shoalest Depth True Position.
New View / Extent		View >Zoom/Pan History	Name and save the current view.
Next Line/Previous Line 	Select	Select > Track Line	Select the next or previous available data line.

Command	Toolbar	Menu	Function
Nominate (hypotheses) 	Subset Editor	Tools > Editors > Subset	Select an alternative depth hypothesis to use instead of the one proposed by disambiguation.
O			
Object Import Utility 	—	File > Import	Use custom-built scripts to import features
Offset Beam Pattern 	Beam Pattern	Process > Beam Pattern	Adjust the beam pattern to the observed data, using the Beam Pattern View graph.
Open 	Standard	File	Display a file in a supported format in the Display window, or in editors.
Open ECW Service	—	File> Open URL	Open an Enhanced Compressed Wavelet file or JPEG 2000 file as background data.
Open Onboard Service	—	File> Open URL > Onboard Service	Connect to Onboard service.
Open Project 	Standard	File	Open an existing project.
Open Session 	Standard	File	Open a previously saved HIPS and SIPS session file (*.wrk).
Open URL	—	File> Open URL	Connect to • Web Map service, • Tile service, • Web Coverage service, or • sea floor information system site.
Open Via Source Plug in	—	File	Open external sources of data using an available plug-in.
Open Views	—	View > Zoom/Pan History	Select and open a saved extent view.
Open/Close Sediment Analysis Graph 	Tools	—	Display the graph or close an open graph.

Command	Toolbar	Menu	Function
Open/Close Signal Display Window 	Side Scan Editor	Tools > Editors >Side Scan > Signal Display Window	Open (or close) the Signal Display window.
Options	—	Tools	Set options for tools and GUI display in HIPS and SIPS and its editors.
Outstanding 	Status Edit	Edit > Status Flag	Flag a sounding as requiring further examination.
Overview 	View	View Also on right-click menu in Display	Restore the contents of the Display window to the extent of data.
Overview Window Settings		View	Set which data layers will display in the Overview window.
P			
Pan	—	View > Pan	Select Up, Down, Left or Right to move the display by the value set in the Pan Factor field of the Tools > Options > General window.
Partially Complete 	Subset Editor	Tools > Subset Editor	Set the status of tiles to show where cleaning has been started, but not completed.
Paste 	Standard	Edit	Paste lines from one Day to another Day, or Days from one Vessel to another, or Vessels from one Project to another in the Project window.
Pause 	3D Display Tools panel	View > 3D Flight Path >	Temporarily halt the playback of a recorded flight.
Plan 	Swath Editor	Tools > Swath Editor	Open (or close) display of Plan View.
Play 	3D Display Tools panel	View > 3D Flight Path >	Play back a recorded flight.
Playback Controls 	Side Scan Editor	Tools >Editors >Side Scan > Play back Controls	Controls to automatically navigate along a track line.
Port Beams (view swath) 	Swath Editor	Tools > Editors > Swath	Display just the port swath data in Swath Editor windows.

Command	Toolbar	Menu	Function
Port and Starboard Beams (view swath) 	Swath Editor	Tools > Editors > Swath	View both port and starboard swath data in Swath Editor windows.
Port on Top 	Water Column Data	—	Displays imagery data from port head on top of starboard head data in Water Column Across-track view (in Swath Editor).
Position Cursor 	Coordinates	—	Moves cursor to the position in the Display set in the Coordinates Entry dialog box.
Primary 	Single Beam	Tools > Editors > Single Beam	Designate as the data to be processed further, in case of dual frequency data. (Primary is default).
Product Surface (Generalize)	—	Tools > Surfaces	Generalize a product surface from a selected surface.
Purge Rejected Contacts	—	Tools > Side Scan Editor > Contacts	Delete a rejected contact form the selected line
Q			
(Create) QC Report now called Line QC	—	Process > Report	Open the QC Report Wizard to statistically compare soundings recorded from check lines against selected attribute values from a surface in the same survey area.
Query 	Status Edit	Edit	Displays record details (in the Selection window) for data selected in the interactive editors.
Query Line	—	Edit	In Attitude and Navigation Editors, displays all data for the selected line.
R			
Raw/Processed	—	Tools > Editors > Side Scan	Toggle the view of data between raw data and processed. Also on pop-up in waterfall view.
Rear view 	Swath Editor	Tools > Swath Editor	Open (or close) display of Rear View
Rebuild Boundary Automatically	—	Tools > Bounding Polygon Also on pop-up menu for bounding polygon layer.	Regenerate the bounding polygon od a selected surface.

Command	Toolbar	Menu	Function
Recompute Contact Positions		Process > Compute	Update the geographic positions of contacts after towfish navigation has been recomputed for a track line or lines.
Recompute Surface 	Process	Tools> Surfaces	Regenerate an updated surface.
(Recompute) Towfish Navigation	—	Process > Compute	Compute towfish navigation from ship's navigation (using horizontal distance and direction from the ship's towpoint location to the towfish).
Record 	3D Display Tools panel	View >3D Flight Path	Start recording a fly-through of your 3D display.
Refraction Editor (Open)	—	Tools > Editors > Swath	Open Refraction Editor.
Refresh 	View	View	Redraw the data display.
(Regenerate) Critical Soundings	—	Right-click on the Critical Soundings layer in the Layers window.	Updates the Critical Sounding layer after editing.
Register	—	Tools	Add geo-referencing to TIFF images and vector layers. This is accomplished by relating points on an image or vector layer to corresponding ground locations
Reject 	Edit	Edit > Status Flag	Change the status of a sounding to remove it from further processing.
Reject —Break Interpolation 	Edit	Edit > Status Flag	Reject data and remove from processing, leaving a break in the data.
Reject —with Interpolation 	Edit	Edit > Status Flag	Reject selected data, but interpolate across the data during further processing.
Reject by Disabling Sounding 	Lidar	Edit > Lidar	Remove sounding from Merge and post- processing operations.

Command	Toolbar	Menu	Function
Reject (Hypotheses) 	Subset Editor	Tools > Editors > Subset	Remove data from further processing.
Reject Line	—	Edit > Track Lines	Remove an entire track line from processing
Reject Nodes 	Subset Editor	Tools > Editors > Subset	Remove from further processing, all hypotheses associated with selected node.
Reject Swaths 	Status Edit	Edit > Status Flag	Reject all soundings in a selected swath.
Remove from mosaic	—	Tools > Mosaics	Remove selected line(s) from mosaic.
Remove from surface 	Process	Tools > Surfaces > Remove from	Remove selected survey line(s) from a surface.
Remove Profile 	Tools	Tools > Profile > Remove	Remove profile lines from a layer.
Remove SV Profile	SVP Editor	SVP Editor	Remove selected sound velocity profile from the SVP file.
Remove Redundant Vertices	—	Edit > Edges	Remove duplicate point features (vertices) from edges in a layer
Remove Selected	—	Right-click in Selection window.	Remove a selected row(s) from the table of queried data displayed in the Selection window.
Removed Selected Boundary Polygon	—	Tools > Bounding Polygon Also on pop-up menu for bounding polygon layer.	Remove an existing bounding polygon.
Remove selection from Additional Bathymetry	—	Right-click on the across track or along track window when water column data is selected.	Remove selected water column data from Additional Bathymetry layers in Swath Editor.
Remove Tide 	Tide Editor > Standard	Tide Editor > Edit	Remove a tide entry from the Tide file.
Rename (line)	—	Edit > Track Lines	Change the name of a selected line

Command	Toolbar	Menu	Function
Repeat New Feature 	Feature Creation	Create	Create a second feature that uses the attributes of a feature just created.
Replace (areas)	—	Edit > Areas	Create a single new area from multiple existing area features.
Replace Tiny Contours	—	Edit > Contours	Modify tiny contours or “isolations”.
Restart Cleaning	—	Edit	Undoes cleaning/editing done to line data and reverts the data status to “Accepted” from “Rejected”.
Reset Default Window Layout	—	Window > Layouts	Return the HIPS and SIPS windows, menus and toolbars to their default positions.
Reverse Direction	Advanced Editing	Edit > Lines	Change the direction of a line without changing its path.
Restore Recycle Bin	—	Edit > Track Lines > Recycle Bin	Restore the contents of the Recycle bin to project.
Rule File	Filters	Create > Layer by	Create a layer using the filter specifications saved in a rule file.
Rule Wizard	Filters	Create > Layer by	The wizard uses filters to create custom selection options for creating layers.
Run 	Batch Processor	Batch Processor > Tools	Execute process using selected settings.
S			
Save, Save All 	Standard	File	Save editing changes to data.
Save Image is now called Export View	—	File > Export > View	Save the contents of the Display window (at current zoom) to a GeoTiff, PDF or other formats.
Save Session	—	File	Save your current session.
Save Session As	—	File	Save a new session, or save an existing session with a new name and/or location.
Save to File	—	View > 3D Flight Path	Save a recorded flight to XML format.
Secondary 	Single Beam	Tools > Editors > Single Beam	Designate as the data to be processed further, in case of dual frequency data. (Primary is set as default).

Command	Toolbar	Menu	Function
Sediment Analysis 	Process	Process > Compute	Run a sediment analysis on a line.
Sediment Analysis Editor 	—	Tools > Editors	Edit the open sediment analysis data.
Sediment Class 	Beam Pattern	Process > Beam Pattern	Using a ground sample, set the grain size in the Set Sediment Class dialog box to update the newly created beam pattern correction file.
Select All 	Selection	Select	Select all features in the active layer.
Select All in Display 	Selection	Select	Select all features in the active layer that are visible in the current extent of the Display window.
Select By Circle 	Selection	Select	Use the tool to draw a circle around the area you want to select.
Select by Filter	—	Select	Filter by Attribute Value, Feature Acronym, FOID, or Type, or using Rule Wizard or a rule file.
Select by Lasso 	Selection	Select	Use the lasso to draw an outline around the area you want to select
Select by Range 	Selection	Select	Draw a rectangle to encompass the features you want to select
Select Contact 	Side Scan Editor	Tools > Editors > Side Scan > Contacts	Select point or line contacts in Side Scan Editor waterfall view.
Select Features	—	Select	Select features that are: • Inside selected Areas • Intersecting selected areas • within a superselection range • within a coordinate range
Select (side scan data) 	Side Scan Editor	Tools > Editors > Side Scan	Select data within the waterfall view of Side Scan Editor.

Command	Toolbar	Menu	Function
Select Water Column Data 	Water Column Editor	—	Enables the selection of water column data in Swath Editor.
Sounding Selection	—	Tools	Select shoal or deep soundings from a surface and save to a feature layer.
Set Filters  now called Settings	HIPS Data Filter	Tools > HIPS Data Filters > Settings	Open the Set Filters dialog box to set filter parameters for Attitude, Critical, Single Beam, Swath/Sweep and TPU filtering. (Applied using Tools > HIPS Data Filters > Apply)
Set Offset (Beam Pattern)	Beam Pattern	Process > Beam Pattern	
Shortcut Keys	—	View > toolbars > Customize > Keyboard	Set and modify keyboard shortcuts for HIPS and SIPS commands.
Side Scan Editor 	Tools	Tools > Editors > Side Scan	Open Side Scan Editor (a line must be selected).
Side view 	Swath Editor	Tools > Editors > Swath	Open the Swath Editor Side View window.
Single Beam Editor 	Tools	Tools > Editors > Single Beam	Launch Single Beam Editor. (A single beam survey line must be selected.)
Smooth Contours	—	Edit > Contours	Smooth contour lines with tightly curved or angular line segments.
Sort > By Name Sort > By Time	—	Right-click on a layer in the Project window.	Sort all the child layers of the selected layer.
Sound Velocity Correction (Apply) 	Process	Process	Apply sound velocity correction to selected lines.
Starboard Beams (view swath 	Swath Editor	Tools > Editors > Swath	Display only starboard swath data in the Swath Editor windows.
Status Bar	—	View	Toggle display of Status Bar at the bottom of the HIPS and SIPS window.
Stop	—	View > 3D Flight Path >	Stop the recording a fly-through of your 3D display.

Command	Toolbar	Menu	Function
Subset Editor 	Tools	Tools > Editors > Subset	Open Subset Editor.
Subset Filter 	Subset Editor	Tools > Editors > Subset > Subset Filter	Apply filter to a loaded data.
Subset Tiles	—	File > New	Create a tile layer to track subset cleaning status.
Surface Filter 	—	Tools > HIPS Data Filters > Surface	Apply filter to a surface open in HIPS.
Surface Filter (subset of a reference surface) 	Subset Editor	Tools > Editors > Subset > Filter	Apply filter to child layers of a loaded Reference Surface.
(Surface) QC Report	—	Tools > Surfaces	Generate a report listing significant data gaps within a surface as well as conformity to the S-44 standard.
SVP Editor 	Tools	Tools > Editors > Sound Velocity Profiles	Open the SVP Editor to create, view or edit a profile to apply in Sound Velocity Correction.
Swap to Alternative 	Lidar	Edit > Lidar	Apply an alternative depth in a superselected sounding to the detected depth.
Swath Editor 	Tools	Tools > Editors> Swath	Open Swath Editor (a line must be selected).
T			
Tide Editor 	Tools	Tools > Editors > Tide	Launch Tide Editor to edit or create a tide file.
Toolbars	—	View	Set which toolbars are displayed
U			
Undo 	Standard	Edit	Reverse the effect of an edit in Swath, Subset, Navigation, Attitude, Side Scan, and Single Beam Editors.
Ungroup Soundings		Tools > Ungroup Soundings	Ungroup all soundings or a selection

Command	Toolbar	Menu	Function
Update Backscatter	—	Process	Remove any backscatter samples associated with Rejected soundings.
Update Coverage	—	Right-click on a surface in the Layers window.	Recompute the *Coverage* property for a surface.
Use Coordinate System	—	Right-click on a layer in the Layers window.	Apply the coordinate system of the selected layer to the project data in the Display window.
V			
Vessel Editor 	Tools	Tools> Editors	Launch Vessel Editor to create or edit HIPS vessel files.
View all Alternative Depths 	Lidar	Edit > Lidar	Refresh the display so that alternative depths for soundings with a Quality 1 flag are shown.
View Beam Pattern 	Beam Pattern	Process > Beam Pattern	See the graph of the open beam pattern.
(View) Rejected Flag Types	—	View	Set the type of data to be displayed when the Display Filter command is active.
View Selection Mean 	Side Scan Editor	Tools > Editors >Side Scan > Signal Display Window	Display the mean of intensity values for a selected range of pings in the Signal Display window.
View Single Ping 	Side Scan Editor	Tools > Editors >Side Scan > Signal Display Window	View signal intensity for a single ping in the Signal Display window.
View Waveform 	Lidar	Edit > Lidar	Display waveform data for a superselected sounding.
Vertical Reference System (editor)	—	Tools > Editors	Assign or change the reference system for the vertical datum.
W			
Window (open/close)		Window> Other Windows Also on right-click menu in certain docked windows	Select window by name to show it in its default position or hide it from the interface.

Command	Toolbar	Menu	Function
Z			
Zoom Area 	View	View > Zoom	Draw a rectangular area in the Display window with the mouse and magnify the contents.
Zoom Area (Side Scan) 	—	Right-click in Side Scan View window	Draw a rectangular area in the Side Scan View with the mouse and magnify the contents.
Zoom /Pan Reverse, Forward 	View	View > Zoom/Pan History	Move back to previous view or forward to next in series created by zooming in and out.
Zoom In 	View	View > Zoom	Magnify the contents of the Display window by the Zoom Factor set in Tools > Options > General window.
Zoom In (Side Scan) 	—	Right-click in Side Scan View window	Magnify the contents of the Side Scan View (waterfall view) by the Zoom Factor set in Tools > Options > General window.
Zoom Out 	View	View > Zoom	Reduce the display by the Zoom Factor set in Tools > Options > General window.
Zoom Out (Side Scan) 	—	Right-click in Side Scan View window	Reduce the contents of the Side Scan View (waterfall view) by the Zoom Factor set in Tools > Options > General window.
Zoom to Map	—	Right-click on a layer in the Layers window	Return the display of data to its original position and magnification.

Water Column Editor Toolbar

Command	Function
Display Across Track 	Opens “across-track” water column view in Swath Editor.
Display Along track 	Opens “along-track” water column view in Swath Editor.
Bottom Detections 	Toggles display of sea floor soundings on top of across-track imagery in Swath Editor.
Head 1 data 	Displays imagery data from port head on top of starboard head data in Water Column Across-track view (in Swath Editor).
Head 2 data 	Displays imagery data from starboard head on top of port head data in the Water Column Across-track view (in Swath Editor).
	Controls to automatically navigate through the water column.
Select Water Column Data 	Enables the selection of water column data in Swath Editor.

Commands on Pop-up Menus

These commands are only found on menus that appear when you right-click on a layer.

Command	Pop-up menu	Function
Add selection to Additional Bathymetry	Right-click on the across track or along window when Water column data is selected.	Add bathymetry in selected water column data to project. Data is displayed in Additional Bathymetry layers.
Cut Terrain	Right-click the image layer in the Layers window, while surface is open in 3D window.	Cut an area defined by the bounding polygon of a surface, so that the surface area is visible within a background image.
Create New Group	Right-click on a surface parent layer.	Group surfaces together to apply the same properties.
More (Column Settings)	Right-click on the column header in the Selection window.	Use list to toggle display of data columns.
New Graph	Right-click on data in Selection tab.	Create a graph of data selected in the Selection tab.
Regenerate Critical Soundings	Right-click on the Critical Soundings layer in the Layers window.	Updates the Critical Sounding layer after editing.
Remove (selected)	Right-click on selection in Selection window.	Remove the selected row(s) from the selected data displayed in the Selection window.
Remove Others	Right-click on selection in Selection window.	Remove all rows except the selected row(s) from the data displayed in the Selection window.
Remove selection from Additional Bathymetry	Right-click on the across track or along window when Water column data is selected.	Remove selected water column data from Additional Bathymetry layers in Swath Editor.
Reset Columns	Right-click on the column header in the Selection window.	Restore the default order of columns in the window.
Sort (by Time / by Name)	Right-click on a layer in the Project window.	Sort all the child layers of the selected layer.
Update Coverage	Right-click on a surface in the Layers window.	Recompute the Coverage property for the surface.
Use Coordinate System	Right-click on a layer in the Layers window.	Apply the coordinate system of the selected layer (e.g,. background data) to the project data in the Display.
Zoom to Map	Right-click on a layer in the Layers window.	Returns the display of data to its original position and magnification.

2

Keyboard Shortcuts

List of key combinations that can be used to apply certain commands and functions.

Shortcuts using a keyboard

Keyboard shortcuts can be used to perform a task that would otherwise be done with the mouse. Shortcuts can be single keys or combinations.

You can customize existing shortcuts, or create a new shortcut for a menu command that does not possess one, using the Customize Toolbars command from the View menu. See "Create Keyboard Shortcuts" on page 31 for more information.

"Navigation Shortcuts in Display Windows" on page 80

"Shortcut Keys for Editing" on page 81

"Shortcuts listed by function" on page 83

"Keyboard Shortcuts in 3D Display Window" on page 85

Navigation Shortcuts in Display Windows

Key combinations that can be used to view and navigate through data displayed in HIPS and SIPS or in one of the editors.

Key or key combination	Related command	Comment
CTRL+1	Tools > Editors > Single Beam > Primary	Selecting a frequency return in dual frequency data
CTRL+2	Tools > Editors > Single Beam > Secondary	
CTRL + End		Move to the end of a line in an editor (last time stamp)
CTRL + Home		Move to the start of a line in an editor (earliest time stamp).
CTRL+DOWN	View > Zoom > In	
CTRL+SPACE	Back	For moving along the line in an editor.
CTRL+UP	View > Zoom > Out	
F10	View > Zoom > Custom	
F5	View > Refresh	
F9	View > Overview	
Page Down	Back	For moving along the line in an editor
Page Up	Forward	For moving along the line in an editor
SPACE	Forward	For moving along the line in an editor
Up arrow / Down Arrow		Move ping by ping forward or back along line.

Shortcut Keys for Editing

Key or key combination	Related command	Comment
A	Edit> Status Flag> Accept	
ALT+F4	File > Exit HIPS and SIPS	
B	Edit > Status Flag > Reject - Break Interpolation	Used in Navigation and Attitude Editors
C	Select > Close Lasso	
CTRL+1	Tools > Editors > Single Beam > Primary	Selecting a frequency return in dual frequency data
CTRL+2	Tools > Editors > Single Beam > Secondary	
CTRL+A	Select > All	
CTRL+C	Edit > Copy	
CTRL+D	Tools > Swath Editor > de Trend	
CTRL+DOWN	View > Zoom > In	
CTRL + End		For moving to the end of a line in an editor (last time stamp)
CTRL+F	Edit > Find	For finding data in the editors
CTRL+F4	File > Close Project	
CTRL + Home		For moving to the start of a line in an editor (earliest time stamp).
CTRL+N	File > New	Create a new file
CTRL+O	File > Open Project	
CTRL+S	File > Save	
CTRL + SHIFT + S	File > Save ALL	
CTRL+SPACE	Back	For moving along the line in an editor.
CTRL+UP	View > Zoom > Out	
CTRL+V	Edit > Paste	
CTRL+X	Edit > Cut	
CTRL+Z	Edit > Undo	
D	Edit > Status Flag > Designated	Only for depth data
DELETE	Edit > Delete	
E	Edit > Status Flag > Examined	Only for depth data
F	Edit > Status Flag > Find Designated	Only for depth data
F1	Help > Help Topics	
F10	View > Zoom > Custom	
F5	View > Refresh	

Key or key combination	Related command	Comment
F9	View > Overview	
L	Tools > Subset Editor > Lock	
O	Edit > Status Flag > Outstanding	Only for depth data
Page Down	Back	For moving along the line in an editor
Page Up	Forward	For moving along the line in an editor
Q	Edit> Query	
R	Edit > Status Flag > Reject	Only for depth data
S	Edit > Status Flag > Reject Swaths	Only for depth data
SPACE	Forward	For moving along the line in an editor
W	Edit > Status Flag > Reject - With Interpolation	Used in Navigation and Attitude Editors

For keyboard shortcuts to navigate the 3D Display, see "NAVIGATE THE 3D DISPLAY" in the Reference Guide.

Shortcuts listed by function

Function or command	Key or key combination	Comment
Edit > Copy	CTRL+C	
Edit > Cut	CTRL+X	
Edit > Delete	DELETE	
Edit > Find	CTRL+F	For moving along the line in an editor
Edit > Paste	CTRL+V	
Edit > Status Flag > Designated	D	Only for depth data
Edit > Status Flag > Examined	E	
Edit > Status Flag > Find Designated	F	
Edit > Status Flag > Outstanding	O	
Edit > Status Flag > Reject	R	
Edit > Status Flag > Reject - Break Interpolation	B	For use in Navigation and Attitude Editors
Edit > Status Flag > Reject - With Interpolation	W	
Edit > Status Flag > Reject Swaths	S	Only for depth data
Edit > Undo	CTRL+Z	
Edit > Query	Q	
Edit > Status Flag > Accept	A	
End	CTRL+END	Move to one end of a line in an editor
File > Close Project	CTRL+F4	
File > Exit	ALT+F4	
File > New Project	CTRL+N	
File > Open Project	CTRL+O	
File > Save	CTRL+S	
Go back	CTRL+SPACE or Page Down	For moving along the line in an editor
Go forward	Page Up or [SPACE]	For moving along the line in an editor
Help > Help Topics	F1	
Home	CTRL+HOME	Move to one end of a line in an editor
Select > All	CTRL+A	
Select > Close Lasso	C	

Function or command	Key or key combination	Comment
Tools > Single Beam Editor > Primary	CTRL+1	Selecting a frequency return in dual frequency data
Tools > Single Beam Editor > Secondary	CTRL+2	Selecting a frequency return in dual frequency data
Tools > Subset Editor > Lock	L	
Tools > Swath Editor > de Trend	CTRL+D	
View > Overview	F9	
View > Refresh	F5	
View > Zoom > Custom	F10	
View > Zoom > In	CTRL+DOWN	
View > Zoom > Out	CTRL+UP	

Keyboard Shortcuts in 3D Display Window

Navigating in the 3D Display Window:

Terrain Flyer navigation controls

Mouse Button	Cursor position	Key	Action (view)
—	Centre	—	None.
Left	Up	W	Pan forward in a straight line (horizontal to grid).
	Down	S	Pan backward in a straight line (horizontal to grid).
	Left	←	Rotate left.
	Right	→	Rotate right.
Right	Up	↑	Tilt back (viewing angle goes up).
	Down	↓	Tilt forward (viewing angle goes down).
Left+Right	Up	R	Pan up in a straight line (vertical to grid).
	Down	F	Pan down in a straight line (vertical to grid).
	Left	A	Pan left in a straight line (horizontal to grid).
	Right	D	Pan right in a straight line (horizontal to grid).

First Person navigation controls

Mouse Button	Cursor position	Key	Action (view)
—	Centre	—	None.
Left	Up	↑	Tilt back (viewing angle goes up).
	Down	↓	Tilt forward (viewing angle goes down).
	Left	←	Rotate left.
	Right	→	Rotate right.
Right	Up	W	Pan forward in a straight line (horizontal to grid).
	Down	S	Pan backward in a straight line (horizontal to grid).
	Left	A	Pan left in a straight line (horizontal to grid).
	Right	D	Pan right in a straight line (horizontal to grid).
Left+Right	Up	R	Pan up in a straight line (vertical to grid).
	Down	F	Pan down in a straight line (vertical to grid).

Controls common to both modes:

Mouse Button	Cursor position	Key	Action (view)
Middle or Scroll Wheel	Up	—	Orbit up (above the grid).
	Down		Orbit down (below the grid).
	Left		Orbit right (drag cursor left).
	Right		Orbit left (drag cursor right).
Scroll Wheel (forward)	—	C	Zoom in
Scroll Wheel (reverse)	—	V	Zoom out

3

Batch Processor

Batch processing automates what could otherwise be labour-intensive or time-consuming processing by combining a number of tasks into a single batch file that can reopened and used on multiple track lines.

The batch processing function is available in all licensing levels of HIPS and SIPS, but the processing options available are determined by the processing functions contained with the license.

In this chapter...

Running Batch Processor

The workflow for Batch Processor is:

- select the processes you want to run,
- enter appropriate values and settings,
- save the HBP file
- use the Run command to apply the processes to your data.

Open Batch Processor

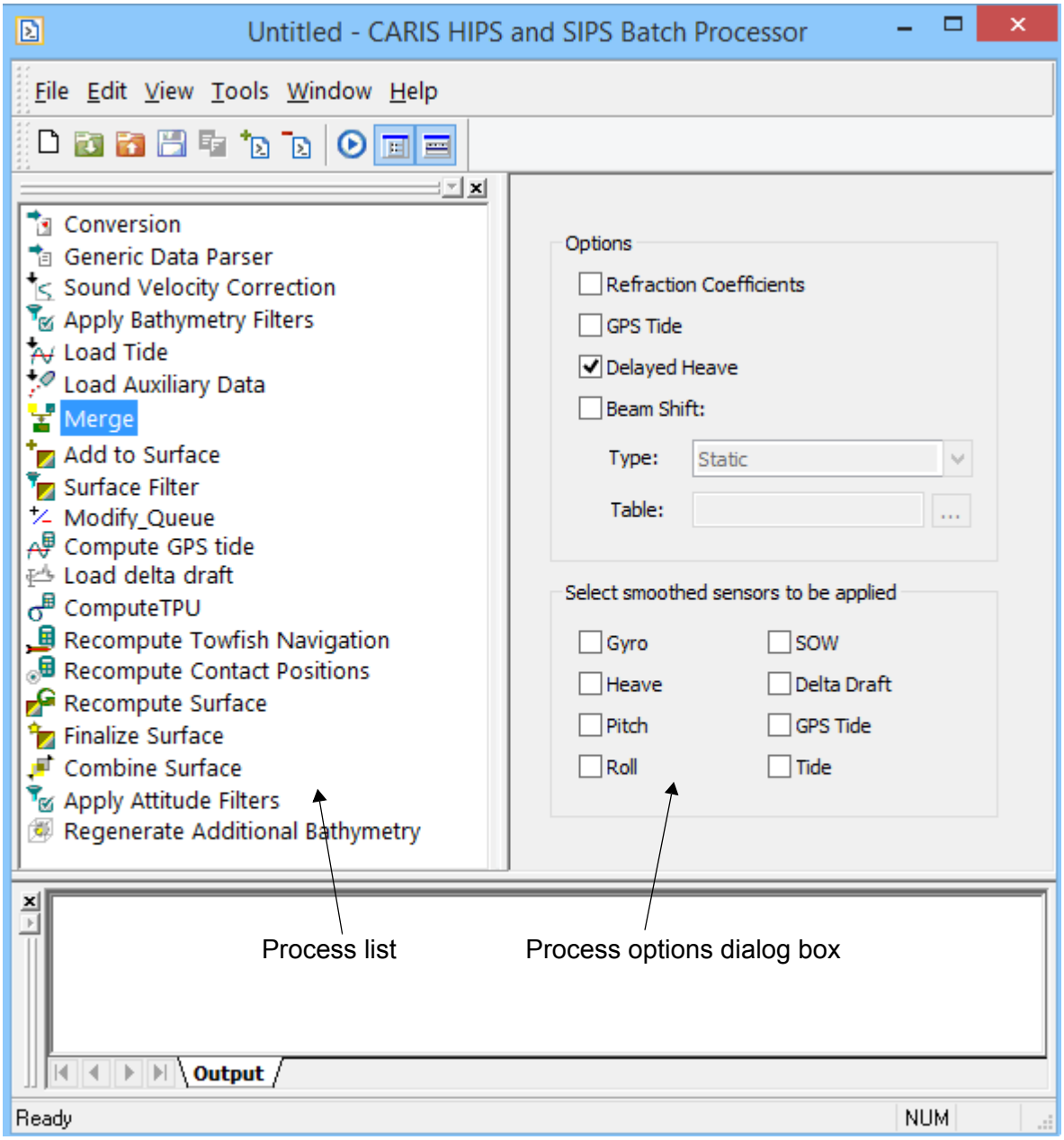
Batch Processor is a separate application that is opened from the HIPS and SIPS interface.

Menu	Tools > Batch Processor
Tool	

1. Select the Batch Processor command. (You do not have to have a project open in HIPS and SIPS.)

The Batch Processor is opened.

The following image shows Batch Processor with a complete list of tasks.



Batch Processor contains three windows.

- The Process List window contains the processes added to be run in this batch file. See "SET UP A PROCESS" ON PAGE 91.
- The window on the right displays the dialog box options associated with each selected process.
- The Output window at the bottom displays the results of the batch processing operation.

Batch Processing files

All processing options and settings entered into the batch processor are saved in a HIPS Batch Processing File (HBP) file. HBP files are in XML format and can be viewed in any text editor or XML-compliant browser. Batch processing files are saved in `..\Hips\Session` and can only be used in Batch Processor.

Create a New HBP File

When Batch Processor is first opened, it is ready to create a new HPB file. If a HPB file is already open and you select the New File command, any previously open file is closed, and the Processor is reset for the new file.

Menu	File > New
Tool	
Key	<Ctrl+N>

1. Select the New File command.

A new file is ready to be modified in Batch Processor.

Open an existing HBP File

1. In the Batch Processor interface, select the Open File command.

The Open dialog box is displayed.

Menu	File > Open
Tool	
Key	<Ctrl+O>

2. Select a file and click **Open**.

The file is displayed in Batch Processor.

Set up a Process

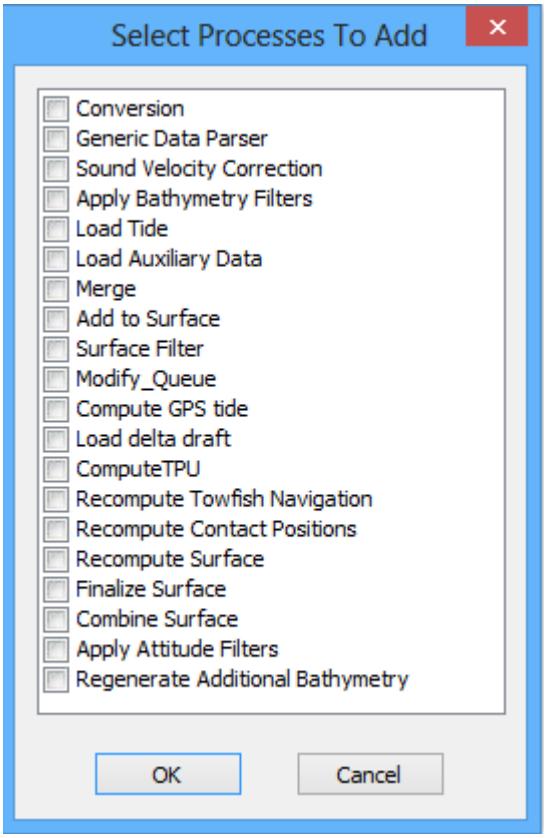
Processes run through Batch Processor must follow the HIPS and SIPS workflow. For example, Sound Velocity Correction must be applied before Merge, and Compute TPU after Merge. All the options set for each process is saved to the current HBP file.

To add a process to your process list:

Menu	Tools > Add Process
Tool	

1. Select the Add Process command.

The Select Processes to Add dialog box is displayed.



2. Select the check boxes for the processes you want to run.
3. Click **OK**.

The selected processes are now listed in the *Process List* window.

To change the order in the Process list, select and drag a process to a new location, keeping in mind that processes must be applied in the same order as the HIPS and SIPS workflow.

To give a process a different name:

Menu	Tools > Rename Process
Pop-up	Rename Process

4. Select the Rename Process command.
5. Type a new name for the process.

To remove a task from the *Process List:*

Menu	Tools > Remove Process
Tool	
Pop-up	Remove Process

6. Highlight the task and select a Remove Process command.

Process Data

Once all the options are set for the processes you wish to run, and you have placed the processes which must be applied before Merge above Merge in the list,

Menu	Tools > Run
Tool	

1. Select the Run command.

When the Run command is selected, you are prompted to save the batch processor file if you have not done so already.

2. Save the Batch Process file.

The results of the Run process are displayed in the Output window.

Save/Save As

To save a HBP file for the first time or save an existing file under a new name:

Menu	File > Save/Save As
Tool	
Key	<Ctrl+S>

1. Select a Save command.

All files are saved to …\Hips\Session.

4

Generic Data Parser

The Generic Data Parser launches in its own interface and is used to convert data such as roll, tide, heave etc., from ASCII files into HIPS format.

The parser is also used to create configuration files that can be used for automatic conversion through the Batch Processor.

In this chapter...

Introduction

The Generic Data Parser can convert data from almost any single beam or dual frequency ASCII file into HIPS format.

The Parser enables users to add or replace any sensor data (other than swath and sweep bathymetry and side scan imagery) in an existing project. For example, if high-precision positions were obtained from a source other than the original raw data files converted into HIPS, this data could be converted to HIPS format with the Parser and then loaded into an existing project to replace the original navigation data.

Data files to be parsed must be in ASCII format and contain a time stamp for every line.

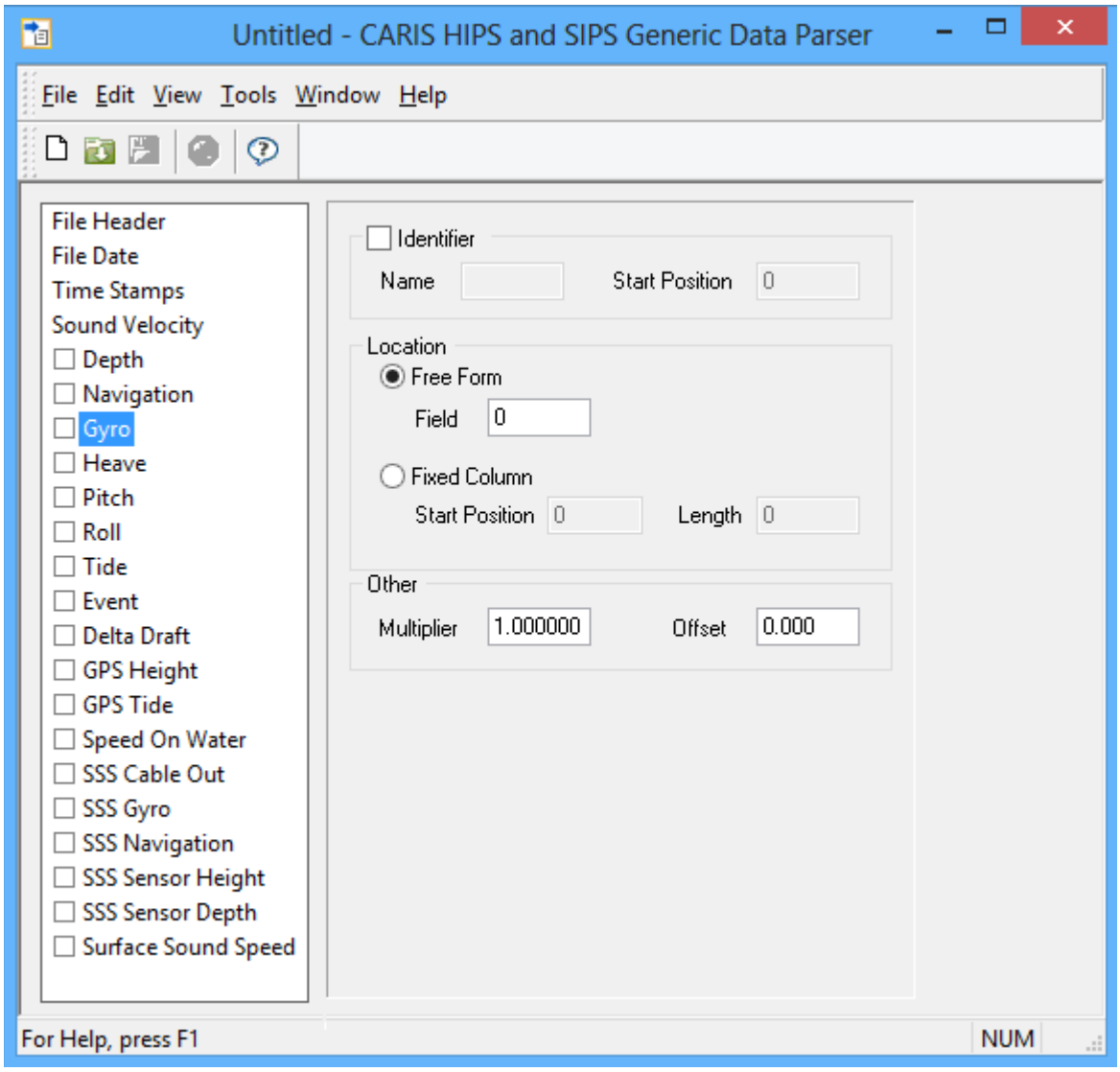
The Generic Data Parser is a separate program launched from the main HIPS and SIPS interface.

Menu	Import > Generic Data Parser
Tool	

To use the Generic Data Parser:

1. Select the Generic Data Parser command.

The Parser is displayed.



To open raw data to be converted with the parser,

1. Select Open Raw Data from the File menu.
2. Browse to select the *.raw or *.txt data file you want to convert.

The Raw Data window will open to display the data. This window can be sized and repositioned to the top, bottom, right or left sides of the interface

Data Parsing Components

The parser must be told where each piece of information is located in the ASCII text file. This set of parameters is stored in a configuration file that can be saved, retrieved or modified at any time.

These configuration files are stored in the …\Hips\Session folder and have a *.par extension.

The location of each type of data in the text file is determined using either the free form or fixed column method. In the raw data file the data fields are separated by delimiters, and lines of data are differentiated by identifiers.

Free Form

The free form method is used when data items (separated by delimiters) have fields of varying lengths. In this case, you specify a field number to show where a data item is located in the text file. The field numbering starts at one (1) and is counted from the first character following one or more delimiters.

For example, in the input string 301.12, 45, 5.66 — field number three (3) indicates the start of string 5.66.

The following characters are used as delimiters by the parser:

- tab
- space
- single quote (‘)
- vertical bar (|)
- comma (,)
- semicolon (;)

These delimiters are replaced with spaces when the parser reads the file.

Quotation marks can be used to offset a text string, for example, “312, 45, 5.66” is treated a single string field (regardless of any characters or spaces inside the string).

Fixed Column

This method specifies the absolute location of a data item in the text file in terms of starting column position and field length. The location starts at one (1). This method is used when the location of data items does not change and where there is no obvious separation between fields. You must supply the length of the field when using the fixed form method.

Identifier

When data items are stored in separate text lines, the program must differentiate between types of input. This is done with an identifier, which is a short text string whose location is specified as an absolute value. If an identifier is specified for a data item, the input line is tested for the item’s presence to make sure that it can be extracted.

For example, some depth data lines in a Hypack data file start with the string EC2. In this case, you specify the identifier as EC2 at the location one (1). You can include spaces and other

symbols in the identifier, as long as the symbols are not classified as belonging to any of the delimiters.

The use of identifiers is optional for any data item. In this case, the program extracts the data item on all input text lines.

Multiplier/Offset

Once a value has been extracted from the input text line, additional operations may be needed to transform it to its final value.

This may be necessary because:

- The value is stored with an implied decimal point (for example 1/100th of a second).
- The value is stored in a different unit (for example, decimal radians instead of degrees).
- The sign of the value is opposite of what HIPS uses.
- The value is stored with an implied offset.

You may specify additional mathematical operations in terms of a Multiplier and an Offset. The actual formula used is:

```
final value = (extracted value x Multiplier) +
Offset
```

Pseudo Time

To use the Generic Data Parser to convert files, the files must be in ASCII format and must contain time stamps. If there are no time stamps the Parser will provide them to your configuration.

The pseudo time stamp is a user-determined time sequence that overrides the Data Parser's time stamp requirement that each record have a time stamp. This enables data to be imported into HIPS and SIPS without having to insert artificially generated time stamps in order to satisfy the Parser requirement.

Instead, you can use a pseudo time stamp, by specifying an initial start date and time as well as the increment value to attach to each record.

By default, the time is set to midnight at the current date, but this can be changed. An increment value attaches a new time to each record. This time increment cannot be zero or a negative value.

Make sure that the pseudo time stamps for different types of data are compatible.

If you are using this feature, the Time Stamps panel information must still be completed, but the pseudo time stamp will override this information.

Configuration File

The configuration file is a text that contains the settings for converting data through the Generic Data Parser. All configuration files have a PAR extension.

"Open a Configuration File" on page 98

"New Configuration Files" on page 99

"Save a Configuration File" on page 99

Open a Configuration File

You can open an existing configuration file for editing and then convert text files with the Generic Data Parser wizard.

Menu	File > Open
Tool	
Key	<Ctrl+O>

1. Select the Open File command.

The Open dialog box is displayed.

2. Select the configuration file you want to open.
3. Click **Open**.

The configuration file is now ready for editing or for proceeding directly to convert raw data files.

The data types included in the current configuration are shown by a check mark.

4. Optional: Select a data type and modify any parameters, as needed (see "Data Types" on page 102).
5. Optional: Select or clear a data type by clicking the check box to include or exclude data types during conversion.

New Configuration Files

You can select data types and enter values for a new configuration file.

Menu	File > New
Key	<Ctrl+N>

1. Select the New File command.
2. Select a data type and enter values for the parameters.

You must complete each section before selecting the next data type.

Menu	Edit > Clear Sensor
Pop-up	Clear Sensor

3. To reset any changes to the data, select the Clear Sensor command.
4. Select the check box to include the associated data during conversion.
5. Repeat Step 2 and Step 3 until all necessary data types have been added to the new configuration file.
6. Select a Save/Save As command.

The Save As dialog box is displayed.

7. Type a name for the configuration file and select a directory for the file.
8. Click **Save**.

Save a Configuration File

9. When finished, select the Save or Save As commands or start the conversion wizard (see "GENERIC DATA PARSER WIZARD" ON PAGE 108).

If you selected the Save or Save As commands, then Save As dialog box is displayed.

Menu	File > Save
Tool	
Key	<Ctrl+S>

10. Enter a name for the file and select a location to save it.
11. Click a Save command.

Raw Data Files

You can open the raw data file and find the exact column positions of the data you want parsed.

Menu	File > Open Raw Data

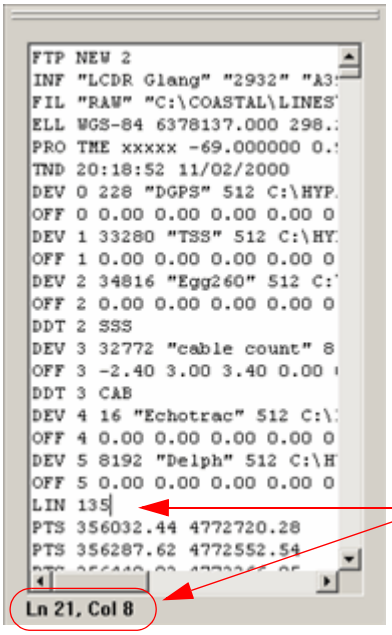
1. Select the Open Raw Data command.

The Open dialog box is displayed.

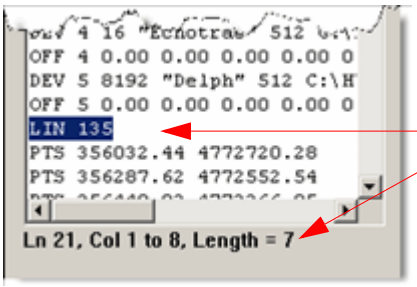
2. Select a text file and click **Open**.

The file is opened in the Editor.

When you click the cursor in the raw data file, the cursor location (and thus the column position) is displayed at the bottom of the window frame.



If you select a section of the file so it is highlighted, the length (including characters and spaces) of the highlighted area is also shown.



3. Select a data type from the list so the associated parameter fields are displayed in the parser.
4. Select the appropriate area in the text file by either placing the cursor in the file or highlighting a section of it.

5. Enter the raw data file information in the parameters area (see “Data Types” on page 102).
6. Continue with Steps 3 to 5 until all information has been collected for the configuration file.

Close files

Menu	File > Close Raw Data

7. To close files without saving information, select the Close Raw Data command.

Data Types

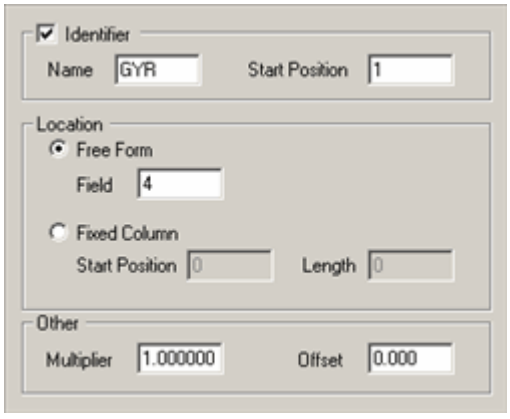
The data types are listed on the left side of the interface.

If the check box beside a data type is selected, then that data is present in the raw data file, and available for conversion. Each data type has a set of parameters that are displayed when it is selected. These parameters determine what parts of the text file are parsed for the configuration file.

To view the parameters:

1. Select a data type so it is highlighted.

The parameters for the highlighted data type are displayed in the Parser. This example shows gyro data.



2. Enter data as needed.

When the text file is parsed, the data types that are checked will be included in the conversion. If you do not want to include a type of data in the conversion, clear the check box.

Clear Sensor

Menu	Edit > Reset Selected Sensor

3. To remove changed parameters from a data item, select the Reset Selected Sensor command.

The parameters are reset to the default positions.

You must complete all the fields in each section before selecting another data type.

File Header

This section indicates the number of lines in the header. These lines are skipped when the text file is parsed. The default value is zero.

1. Type the number of lines used for the file header.

File Date

1. Select either a line number or IDENTIFIER so the file data can located.
   - If you selected line number, type the number in the text box provided.
   - If you selected identifier, type a text string for the identifier in the *Name* field and the location on the line where the date begins.
2. Define the location of the date values within the field.
   - If the length of the year field is two (2), then the converter automatically assigns the year a value between 1951 and 2050.
   - If the length of the day field is three (3), the converter assumes the extracted value represents a Julian date.

Time Stamp

Each line must contain a time stamp. The various components in the time stamp are specified in terms of absolute positions in relation to the start of the time stamp string.

1. Select the location of the time stamp as a FIXED COLUMN or FREE FORM position.
2. Include year/month/day information:
   - Select the *Yes* check box so the year/month/day fields are enabled.
   - Type a position for the time stamp and the length of the year parameter.
3. To add hour and minute, select the appropriate check boxes and type the position and length information.
4. Enter the start and length values for the seconds parameters.

Times are referenced to the file date. If no file date is entered, then times are referenced to midnight on the date of the Day folder to which you are converting the data.

5. Enter any MULTIPLIER/OFFSET values.

Sound Velocity

You can enter a sound velocity value directly or parse it from the input file. When converting single beam depth data, the sound velocity value can be used to recover the raw travel time from the recorded depths. This raw travel time can then be used to perform full sound velocity corrections on the data during post processing.

1. Select the position for the parser to start reading data by selecting either the *Line Number* or IDENTIFIER option.
2. Enter a line number to start reading the sound velocity data, or enter an identifier and start position for the data.
3. Select the location of the SVP data as a FIXED COLUMN or FREE FORM position.
4. Enter the relevant free form or column position.
5. Enter any MULTIPLIER/OFFSET values.
6. Type a default sound velocity value if you want to enter the sound velocity value directly.

Depth

For each depth, indicate the location of the sounding data and whether any additional operations are needed.

1. Select the IDENTIFIER check box if the information is parsed from a specific line in the text file.
2. Type the name of the identifier and the start position for reading the depth data.
3. Select the dual frequency check box if the text file contains secondary single beam data that must also be converted.

The primary and secondary tabs contain identical fields. Enter data in one or both sections, as needed.

4. Select either FREE FORM or FIXED COLUMN.
   - If *Free Form*, enter the field number where the data is located.
   - If *Fixed Column*, enter the start and length of data in the text file.
5. Enter any MULTIPLIER/OFFSET values, as needed.
6. Select the *Compute Raw Travel Time* check box, if you want to calculate the raw travel time from the sonar to the seabed.
7. Select the PSEUDO TIME check box.
8. Type a *Start* date and type an *Increment* value (in seconds).

Navigation

The converter supports reading of both ground and geographic coordinates. For geographic Latitude and Longitude values, negative values are supported as well as E/W and N/S tags.

1. Select the IDENTIFIER check box if a text string is used to identify navigation data in the text file.
2. Enter the identifier and start position for the identifier.
3. Select the type of coordinates used: geographic or ground.

The content of tabs below this section is determined by type of coordinates selected.

- If *Geographic* is selected, the Latitude and Longitude tabs are displayed.
- If *Ground* is selected, the North and East tabs are displayed.

4. Complete the following fields for the Latitude/Longitude or the North/East tabs:
   - *Free Form*: The free form method used to locate navigation data.
   - *Field*: The field where the data is located, if you selected the FREE FORM option.
   - *Fixed Column*: The fixed position method used to locate data.
   - *Position*: The absolute location of the latitude or longitude data if you selected the FIXED COLUMN option.
   - *Degrees*: These fields contain the start of the coordinate field, the length of the field and any multiplier and offset values.

- *Min*: This check box enables the *Start, Length,* MULTIPLIER/OFFSET fields when selected (geographic coordinates only).
- *Sec*: This check box enables the Start, Length, MULTIPLIER/OFFSET fields when selected (geographic coordinates only).
- *Tags*: A hemisphere tag (N/S/E/W) is parsed with the data when this option is checked.
- *Position*: Position of the tag in the text file.

5. [Optional] Select the PSEUDO TIME check box.
6. Type a *Start* date and type an *Increment* value (in seconds).

Attitude/Navigation/Tide

This section includes the following data types:

- Gyro
- Heave
- Pitch
- Roll
- Tide
- GPS Height
- GPS Tide
- Speed on Water
- SSS Cable Out
- SSS Gyro
- SSS Navigation

All the fields in these sections are identical.

1. Select the *Identifier* check box, if the data is going to be associated with an IDENTIFIER.
2. Enter an identifier and start position for the data.
3. Select the location of the data as a FIXED COLUMN or FREE FORM position.
4. Enter the relevant free form or column position.
5. Enter any MULTIPLIER/OFFSET values.

Event

Event marks are sometimes generated automatically by the logging system to indicate that a certain amount of time has elapsed, or a certain distance has been travelled. The event marks can be displayed in the Single Beam Editor. In HIPS, event mark records consist of one or more unique event numbers

and textual comments. In this dialog box, you must specify where to look for the event mark number within the data record.

1. Select the *Identifier* check box, if the data is going to be associated with an IDENTIFIER.
2. Enter an identifier and start position for the data.
3. Select the location of the data as a FIXED COLUMN or FREE FORM position.
4. Enter the relevant free form or column position.
5. If the Events marks contain a textual description, check the *Comments* check box.
6. Type the *Start Position* of the comments in the text file.
7. Type the *Length* of the comment.
8. Select the *Time Stamp* check box to include the time stamp that is included with the event. If this option is not checked, the time stamp parsed from the file is used.

Generic Data Parser Wizard

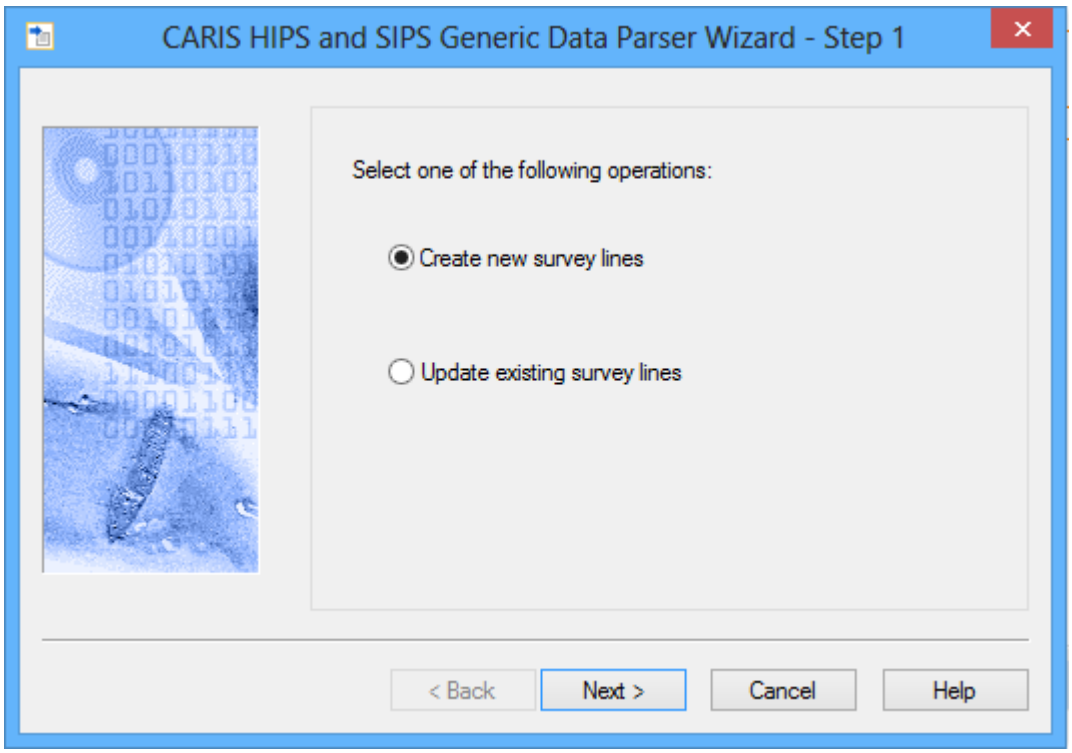
The Generic Data Parser Wizard converts data to HIPS format using the configuration you have set or loaded from a GDP (*.par) file.

Open the wizard

Menu	Tools > Run
Tool	

1. Open a configuration file in the Parser.
2. Select the Run command.

The GDP Wizard - Step 1 dialog box is displayed.

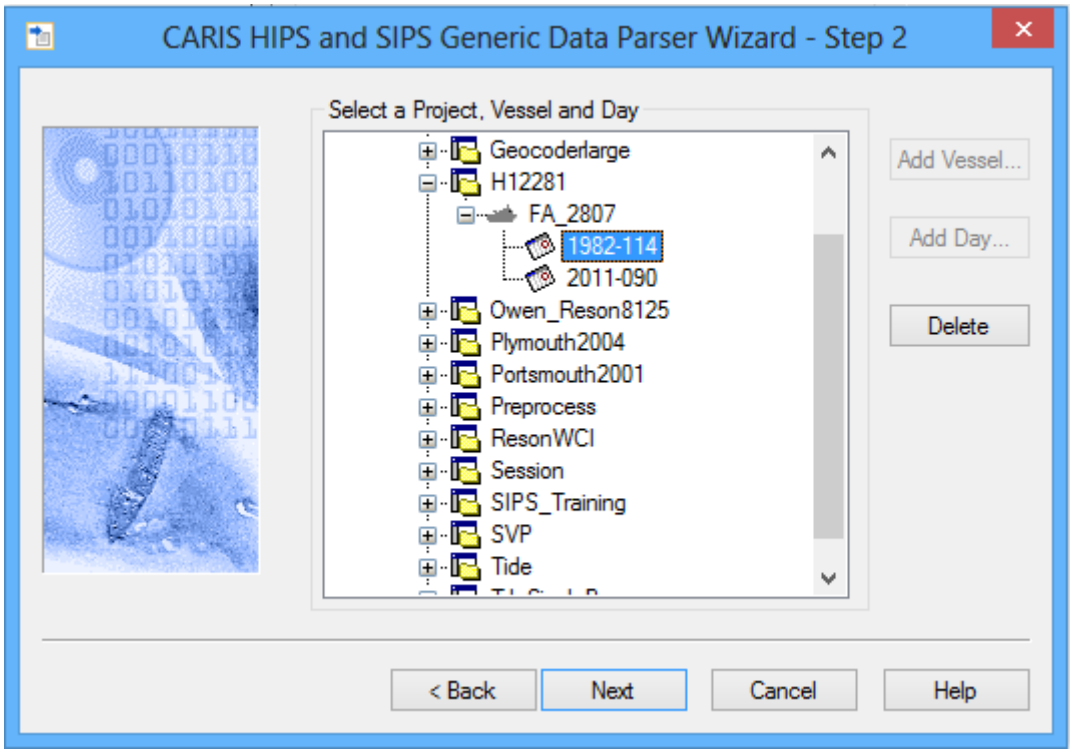


Data can be converted into new or existing lines.

3. Select either:
   - Create new survey lines.
   - Update existing survey lines.
4. Click **Next**.

Step2

The GDP Wizard - Step 2 dialog box is displayed.



Use this dialog box to select the project to which the converted data will be saved.

If you are updating *existing* survey lines:

1. Expand the file tree and select the destination Project folder.
2. Click **Next**.

If you are creating *new* survey lines:

1. Select the Project directory and click **Add Vessel**.

The Available Vessels dialog box is displayed.

2. Select a vessel folder and click **OK**.

The new Vessel folder is displayed in the selected project directory.

3. To add a day folder, select the Vessel folder and click **Add Day**.

The Calendar dialog box is displayed.

4. Select a year/month/day from the calendar, and click **OK**.

A Day folder with the selected date is now displayed in the Vessel folder.

5. Select the Day folder.
6. Click **Next**.

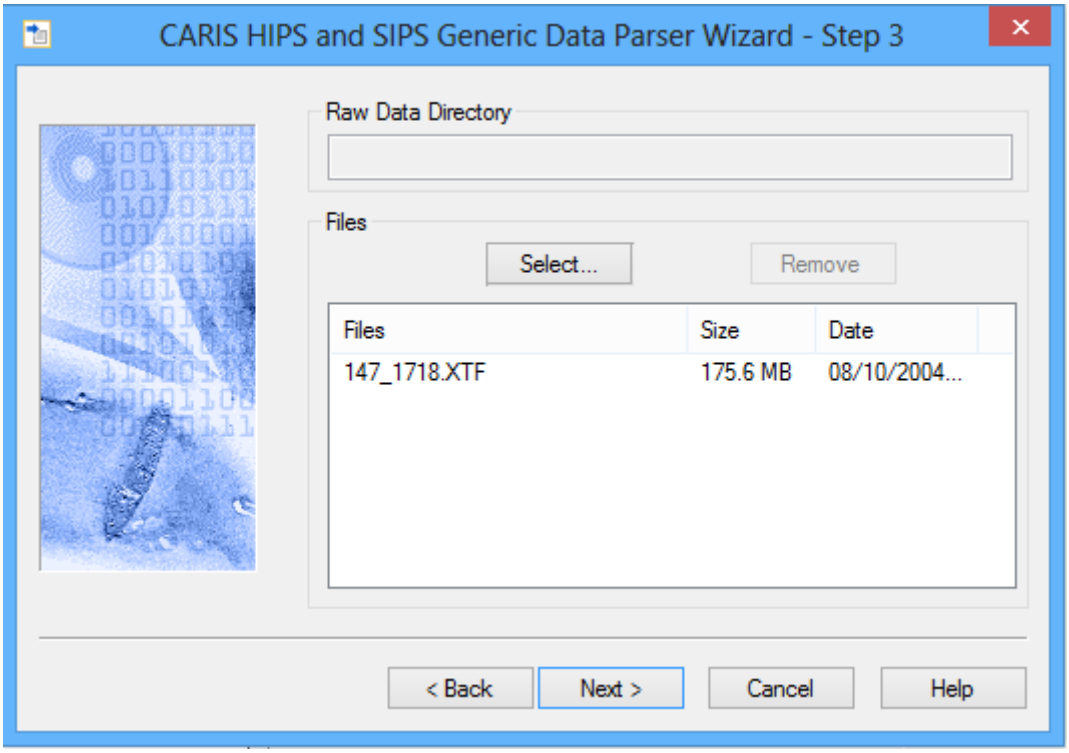
Delete empty folders

To remove an empty Day or Vessel folder from the P/V/D tree,

7. Select the folder and click **Delete**.

Step 3

The GDP Wizard - Step 3 dialog box is displayed.



In this dialog box you select the text files you want to convert.

1. If the file path in the *Raw Data Directory* box is correct, click **Select**.

The Select Files dialog box is displayed.

2. Double-click a folder to access the text files.

The files are displayed.

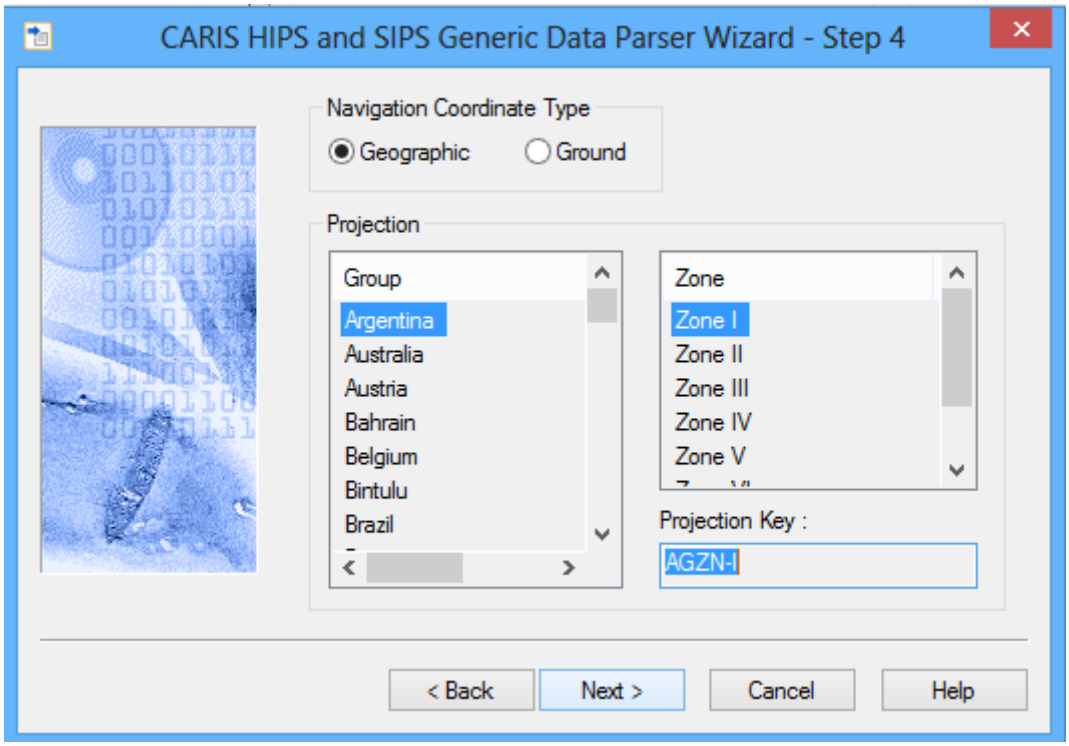
3. Select the files so they are highlighted.
4. Click **Open**.

The selected files are displayed in the wizard dialog box.

5. To remove files, select the files and click **Remove**.
6. Click **Next**.

Step 4

The GDP Wizard - Step 4 dialog box is displayed.



In this dialog box you must indicate the type of coordinate system that was used for the Navigation data during data logging.

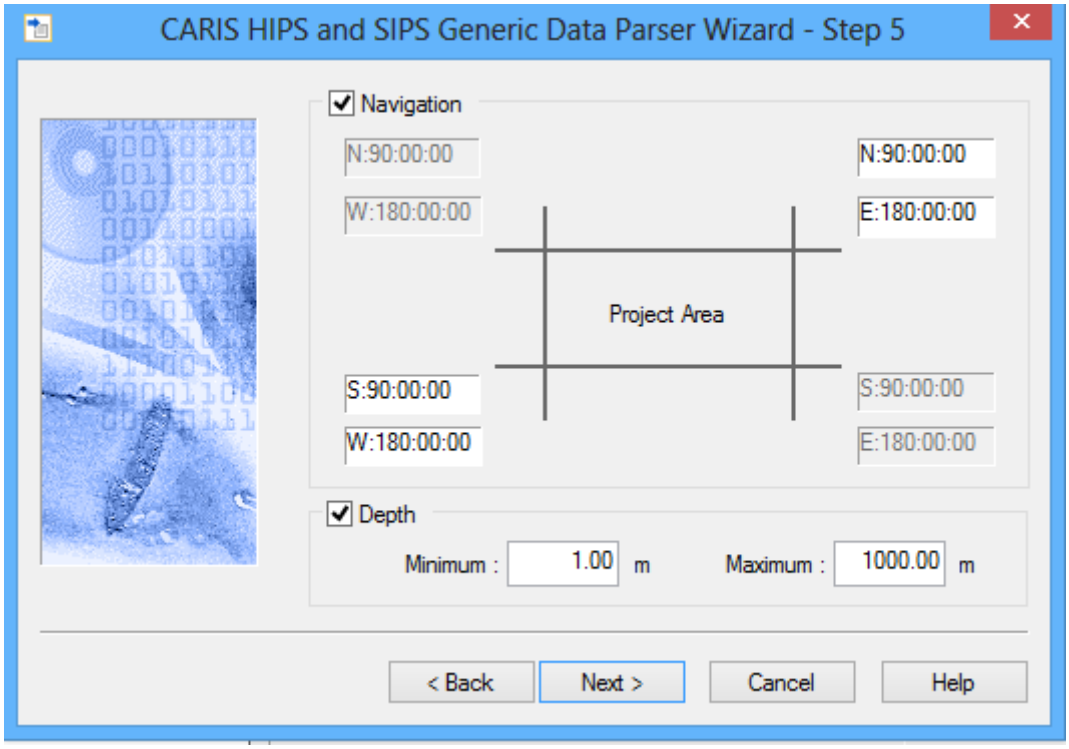
1. Select one of the following options:
   - *Geographic*: navigation data is recorded as latitude and longitude coordinates.
   - *Ground*: navigation data is recorded as eastings and northings.

If you select *Ground*, complete the following steps:

2. Select a projection group from the *Group* list.
3. Select a zone.
4. Click **Next**.

Step 5

The GDP Wizard- Step 5 dialog box is displayed.

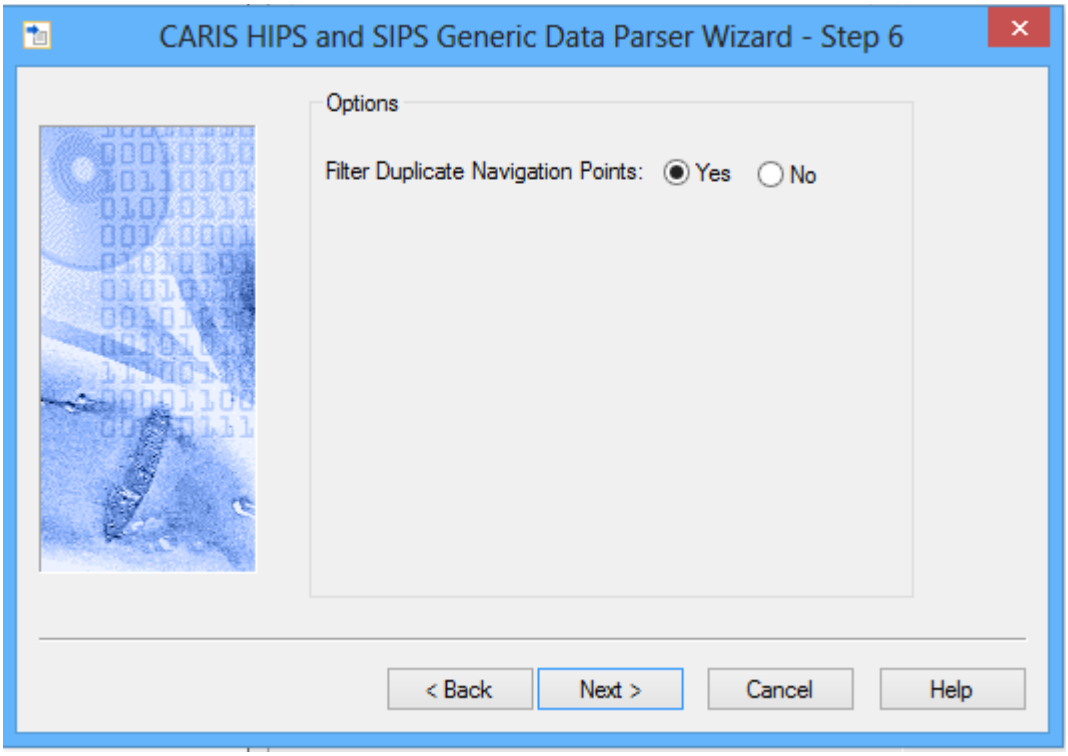


In this dialog box you can reject extremely large errors in the recorded navigation and depth data. Navigation and depth filters can be applied during conversion with the following steps:

1. Click the *Navigation* check box to enable the navigation filter.
2. Enter coordinates in the boxes to define the area:
3. Click the *Depth* check box to enable the depth filter.
4. Enter the minimum acceptable depth.
5. Enter a maximum acceptable depth.
6. Click **Next**.

Step 6

The GDP Wizard - Step 6 dialog box is displayed.

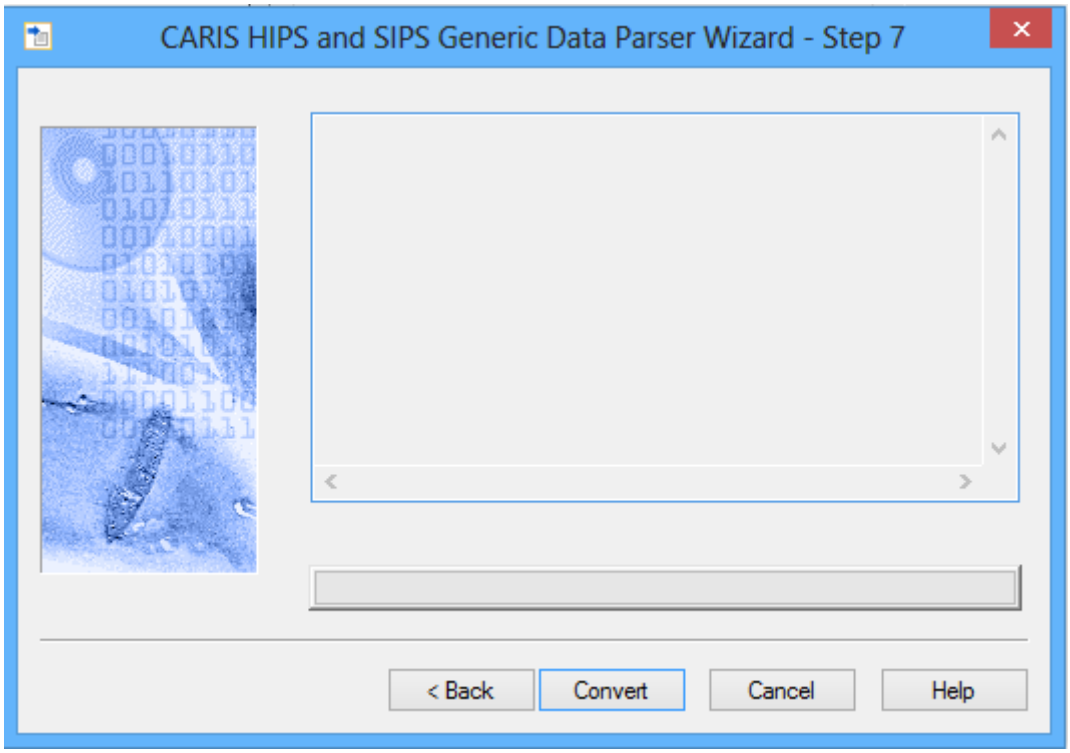


Duplicate navigation points are recorded when the vessel is stationary. The *Filter Duplicate Navigation Points* option gives you to option to remove the duplicate points during import or to include them in the HIPS file (therefore representing the vessel as stationary).

1. Select *Yes* or *No* to for the *Filter Duplicate Navigation Points* option.
2. Click **Next**.

Step 7

The GDP Wizard - Step 7 dialog box is displayed.



In this dialog box you convert the text data to HIPS/SIPS format.

1. Click the **Convert** button.

A progress indicator bar along the bottom of the box is activated as the files are converted, and when the process is finished, the dialog box displays the results.

The HIPS files are saved in the directory you selected at Step 2.

2. Click **Finish** to close the wizard, or click **Back** to return to the first dialog box of the wizard.

5

HIPS Utilities

In this chapter...

Catalogue Editor

The Catalogue Editor displays the feature objects and their attributes which are used in HIPS and SIPS.

These objects and attributes are listed in the default HIPS and SIPS Feature Catalogue, and are read-only system items. However, you can add new sides can contact objects to the list, and add and edit custom attributes for feature objects.

Catalogues are saved within the `*.hips` file, or as a `*.catalogue` file with no data. The `*.catalogue` file can be used as the HIPS and SIPS Features catalogue.

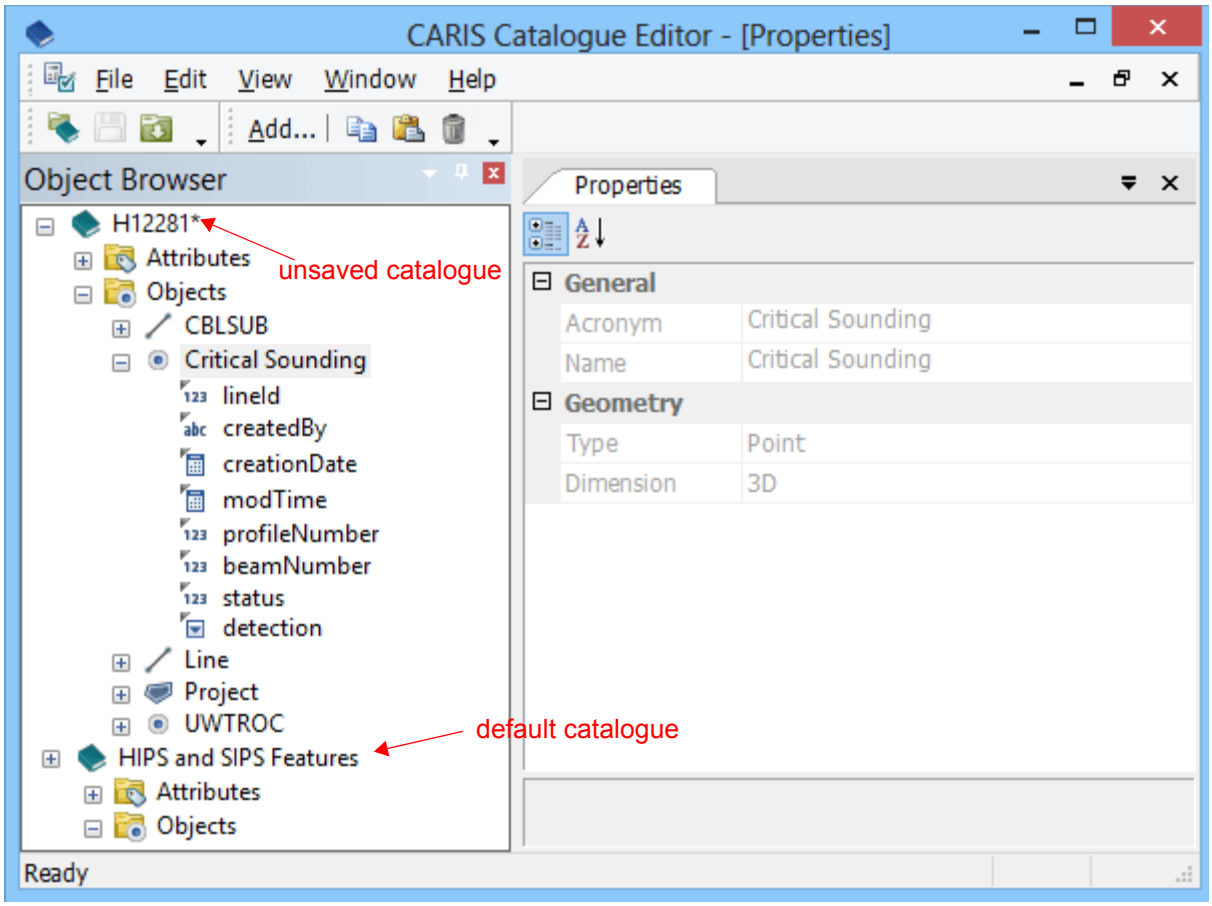
To open Catalogue Editor:

Menu	Tools > Editors > Catalogue Editor

1. Select a line in the open project.
2. Select the Catalogue Editor command.

In Catalogue Editor attributes and objects are displayed in the Object Browser window, and the properties of a selected object or attribute in the Properties window.

The top layer in the Object Browser displays the name of the file containing the currently open catalogue. The image below shows two open files: a `*.hips` file and the default catalogue.



Default Catalogue

If you open the Catalogue Editor without first selecting a line from a project, the default `*.catalogue` file called `HIPS and SIPS Features` is displayed.

The objects and attributes listed in the default `HIPS and SIPS Features` catalogue file are read-only system items and cannot be changed. However, you can add custom attributes to those objects, and add side scan objects to the catalogue, then add attributes to them.

This default catalogue is used when existing data (without a *.hips file) is opened in HIPS and SIPS and is upgraded to a *.hips file. It is also used for newly created projects.

Attributes added to the default catalogue will only be included in projects that are created or updated to a .hips file after the additions were made to the default catalogue.

Attribute Properties

Only the properties for user-customized attributes can be edited in Catalogue Editor. Properties of *system* attributes cannot be changed.

Field name	Description
Type	Either: • Integer: A numeric value, for example, “1”. • Float: A numeric value that uses a decimal point, e.g. 1.0. • String: A combination of characters (including numbers) to describe an attribute. • Enumeration: A numeric value used to represent a list value. Only one enumerated value can be assigned to an attribute • List: A list of values. More than one value can be assigned to an attribute. • Raster: An external image file that can be assigned to an attribute. • Date: A data value usually recorded as YYYYMMDD
Acronym	Either a short form of the name for a system or a custom attribute.
Name	In plain language, the name of the attribute, e.g., “category of cable” for CATCBL.
Description	A short description of the attribute.
Expected Values	In Enum and List types, fields which give the name and the numeric equivalent of an expected value, e.g., for CATCBL, expected values are power line, mooring cable etc.

Object Properties

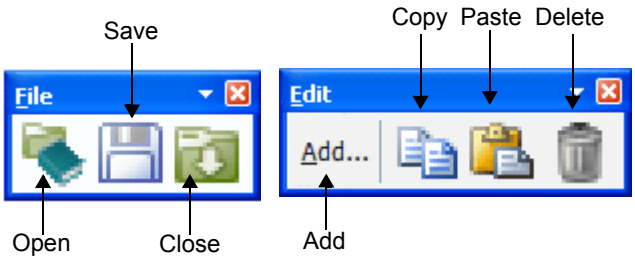
You can only edit the properties for user-customized objects added to Catalogue Editor. Properties for system objects cannot be edited.

Field name	Description
General	
Acronym	A short form of the name for a system object or custom object added by user.
Name	In plain language, the name of the object, e.g., “cable, submarine” for CBLSUB.
Geometry	
Type	Objects can be either Point, Line or Area type.
Dimension	Objects are either • 2D - Points have no associated Z value • 2.5 D - All points comprising each object share the same Z value. • 3D - Each point in an object has its own Z value (future development)

Edit the Catalogue

There are two Catalogue Editor toolbars containing tools to edit the open catalogue.

The File toolbar contains commands to Open, Save and Close catalogues, e.g., `*.catalogue` or `*.hips` files.



The Edit toolbar contains tools to Add, Copy, Paste and Delete attribute and object features in the editor.

Use the Add command:

- to add an attribute to the list of available Attributes.
- to add an object to the list of Objects.
- to assign an attribute to a specific object.

These commands can also be activated from the Menu bar.

When a .hips file is opened in Catalogue Editor using File > Open, any attributes and objects added to the catalogue will only be added to that existing project.

This is also true when the file is opened by selecting a line in HIPS and then opening Catalogue Editor.

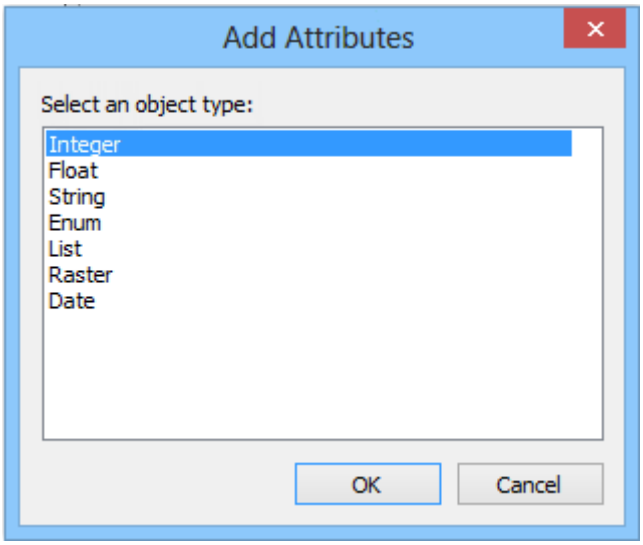
Add an Attribute

Menu	Edit > Add
Tool	Add...
Pop-up	Add

To add an attribute to the list of available attributes:

1. Select the Attributes layer in the Object browser.
2. Select an Add command.

The Add Attributes dialog box is displayed.



3. From the dialog box list, select the type of attribute you want to add: Integer, Float, String, Enumeration, List, Raster or Date. (See "ATTRIBUTE PROPERTIES" ON PAGE 117.)
4. Click **OK**.

A new attribute is added, listed as "New Attribute".

5. Select the attribute you added to view the relevant fields in the Properties window.
6. In the *Acronym* field, type an acronym for the attribute or click **Browse** and type the acronym in the Acronym dialog box.
7. Click **OK.**

The new object in the Object Browser will now display the acronym set in the properties.

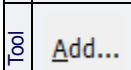
8. In the *Name* field, type a name or click **Browse** and type a name in the Name dialog box.
9. Click **OK**, and the name is displayed in the property field.
10. In the *Description* field, add descriptive text.
11. Save the file. (You will also be prompted to Save when you exit Catalogue Editor.)

Add an Object

In HIPS and SIPS new sidescan contact types of objects can be added to the catalogue.

To add an object:

1. Select the Objects layer in the Object browser.
2. Select the Add Object command.

Menu	Edit > Add
Tool	
Pop-up	Add

A “New Object” feature is added to the object layers in the Object Browser.

3. Select the New Object you added to see the relevant fields in the Properties window.
4. In the *Acronym* field, type an acronym.
5. Or click **Browse**, type the acronym in the Acronym dialog box, click **OK**.

The new object in the Object Browser will now display the acronym set in the properties.

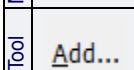
6. In the *Name* field, type a name.
7. Or click **Browse**, type the acronym in the Name dialog box, click **OK**.
8. Select the type of object (Point, Line or Area) from the drop-down list.
9. Select a dimension from the drop-down list.
10. Save the file. (You will also be prompted to Save when you exit Catalogue Editor.)

There are many attributes that must exist for new side scan objects you add. The easiest way to make a new object complete with required attributes is to copy and paste an existing one.

Attributes required include: lineId, createdBy, creationDate, modTime, modifiedByUser, minProfileNumber, maxProfileNumber, minDistance, maxDistance, rejectedContact, images, profilePosition, prefix, remarks, imageHeight, imageWidth, targetWidth, targetHeight, and targetLength.

Add an Object Attribute

To add an attribute to an object selected in the Object Browser:

Menu	Edit > Add
Tool	
Pop-up	Add

1. Select an object from the Object list.
2. Select the Add command.

The Add Object attribute dialog box is displayed.

3. Select one or more attributes to add.
4. To search a long list, use the Search window to find a specific attribute.
5. Click **OK**.

These attributes are listed below the selected object in the Object Browser, and will be displayed in the Attributes window in the main HIPS and SIPS application.

Each of the attributes added to an Object have two editable fields:

- Mandatory: Default value is “False”. If set to “True”, then a value should be entered for that attribute in the Attributes window.

- Read-Only: set to “True” to ensure that the value entered for the attribute cannot be cannot be changed in the Attributes window. Set to “False” by default.

  This can be useful for attributes used in Critical Sounding Detection, to set values that cannot then be changed in HIPS and SIPS directly.

6. Save the file. (You will also be prompted to Save when you exit Catalogue Editor.)

Copy and Paste

You can copy and paste from one catalogue to another. For example, by opening the default HIPS and SIPS Features catalogue and then opening the catalogue or the *.hips file for a project.

There are many attributes that must exist for new side scan objects. The easiest way to make a new object complete with required attributes is to copy and paste an existing one.

For example, to add a modified version of the PIPSOL object:

1. Select PIPSOL in the Objects list.
2. Click **Copy**.
3. Select the Objects layer in the list.
4. Click **Paste**.

A new object called PIPSOL(2) is added to the list. The number “2” is appended to the object acronym, since copies cannot have the same acronym as the original.

You can edit the acronym of the copy. However, if you need specific symbolization for your modified attribute or object, you must use an S-57 acronym to ensure that features such as contacts are symbolized correctly.

The copy will include all the attributes of the original object, however, some of the attributes may no longer be mandatory.

5. Expand the layers under PIPSOL(2) in the Objects list to view all the attributes.

Delete

The read-only objects and attributes listed in the default `HIPS and SIPS Features` catalogue file cannot be deleted.

Custom attributes and objects you add to a catalogue can be deleted using the Delete command.

You will be prompted to confirm that you want to delete a feature.

The attributes and their values that are applied to a specific feature, for example, a contact or critical sounding, can be viewed in the Attributes window, by selecting the feature in HIPS.

Command line utilities

Command-line utilities in HIPS and SIPS are run at the command prompt. To run one of these commands:

1. Click **Start** and select the Run command.
2. In the Run dialog box, type `cmd`.
3. Click **OK** to open a command prompt window.

You can then use these commands:

"DUMP" ON PAGE 124

"PRINTF" ON PAGE 129

"REFRACT" ON PAGE 130

"HIPSBATCHENGINE.EXE" ON PAGE 132

When running utilities (`dump` and `printf` functions) directly from the command line, use the full path to the utility to ensure it is pointing to the installed location, (in quotes) for example:

`"C:\Program Files\CARIS\HIPS\ver\Bin\dumpxtf".`

Dump

Dump programs write binary raw data files to text. By default the output is displayed in the command-line window. Alternatively they can be sent to a text file, and read in a text editor.

The available dump utilities are listed in the `C:\Program Files\CARIS\HIPS\ver\Bin directory,` and are run from the command line window, with the following syntax:

```
> \dumpABC <filename.ABC> >
[output_textfileABC.txt]
```

For example, to dump an xtf data to a text file:

1. Click **Start** and select Run.
2. Type `cmd` and click **OK** to open a command prompt window.
3. Change directories to the Pre-process folder where the xtf data is stored. (e.g., C:\CARIS\HIPS\8.1\Preprocess\XTF)
4. Type the following:

```
C:\CARIS\HIPS\ver\Preprocess\XTF\> "C:\Program
Files\CARIS\HIPS\ver\Bin\dumpxtf" linenumber.xtf
> linenumber.txt
```

where `linenumber.xtf` identifies the line and `linenumber.txt` is the name of the output file.

This will create a text file of the raw xtf data in the same folder as the raw xtf file. Alternatively you can specify a path to a different output folder.

Available Dump Commands

Utility	Format: command <mandatory> [optional parameter]	
dump7k	dump7k <Reson_7k_file> [-nodata] [-imagery]	-nodata displays record headers only -imagery will stop display of the contents of the 7057 (calibration backscatter imagery) datagrams
dump81X	dump81X <81X_filename> <packet number: [0=all]>	If packet number = 0, then all records are displayed. If not, then a single record matching the specified number is displayed.
dump83P	dump83P <Imagenex_filename_83P/83M> [-nodata]	-nodata displays record headers only
dumpASD	dumpASD <ASD_filename> [-nodata] [-noSS]	-nodata displays record headers only. -noSS turns off display of the side scan data stored in the binary portion of the records.
dumpBRF	dumpBRF <BMT_BRF_file> [-nodata] [-overview]	-nodata displays record headers only -overview displays soundings data as a matrix, with "X" marking the spots where valid data exists
dumpCMAX	dumpCMAX <cmax_file_name>	(no optional parameters)
dumpCoda	dumpCODA <CODA_filename>	(no optional parameters)
dumpea400	dumpea400 < EA400_file_name> [-nodata] [-gdp]	-nodata displays record headers only -gdp outputs the navigation and single beam data in a format that can be easily imported into HIPS using the Generic Data Parser.
dumpeiva	dumpeiva <EIVA_SBD_file> [-nodata] {-noSS>	-nodata displays record headers only -noSS turns off display of the side scan data stored in the binary portion of the records (only if the EIVA data contains Atlas ASD records).
dumpelac	dumpelac <ELAC_file_name>	(no optional parameters)
dumpem	dumpem <EM_file_name> [-nodata]	-nodata displays record headers only
dumpfau	dumpfau <file_name>	(no optional parameters)
dumpfuruno	dumpfuruno <filename>	(no optional parameters)
dumpG99	dumpG99 <BIN_file_name> [-data] (displays summary information, geographic extent, number of rows and columns of a NGS Geoid gridded.bin file)	-data displays all contents (BIN file can contain a lot of data.)
dumpgsf	dumpGSF <GSF_fileName> [-nodata]	-nodata displays record headers only
dumpHawkEye	dumpHawkEye <HawkEye_bin_file>	(no optional parameters)
dumphs2	dumpHS2 <Hypack_HS2_filename>	(no optional parameters)
dumphypackbin	dumphypackbin <bin_file>	(no optional parameters)
dumpJSF	dumpJSF <Edgetech_JSF_file> [-nodata]	-nodata displays record headers only
dumpklein	dumpklein <filename>	(no optional parameters)

Utility	Format: command <mandatory> [optional parameter]	
dumplas	dumplas <LAS_filename> [-xyz]	-xyz displays only the XYZ data, with no other information presented
dumpMidas	dumpMidas <midas_file>	(no optional parameters)
dumpmstiff	dumpmstiff <MSTIFF_filename>	(no optional parameters)
dumpnp1	dumpnp1 <Teledyne_TDY_filename> -nodata	-nodata displays record headers only
dumpomg	dumpomg <OMG_Swathed_filename>	(no optional parameters)
dumpPDS	dumpPDS <PDS_filename> [-skip] [-nodata] [-nav] [-head] [-mru] [-multi] [-echo] [-oldAPI]	-skip disables the display of Lead in/out data, which is data not normally considered part of normal survey operation. -nodata displays record headers only. -nav displays navigation data only. -head displays heading data only. -mru displays motion data only. -multi displays multibeam data only. -echo displays single beam data only. -oldAPI displays data using the earlier API provided by Reson.
dumpProc	dumpProc <PROC_filename.extension> [-nodata] Displays only the data associated with the file extention.	-nodata displays record headers only Include extention in filename to dump specific data to ASCII. .depth: to include depth data. If this is specified, then position history data (from the .pos file) is displayed also. .attitude: to include heave/pitch/roll data. .heading: gyro heading data .rtkheight: RTK height data .para : parameters for the transducer and positioning system .pos: positioning data .sfsvp: sound velocity profile data
dumpqmips	dumpqmips <QMIPS_file_name>	(no optional parameters)
dumpRAW	dumpRAW <Navitronics_RAW_filename> [-nodata]	-nodata displays record headers only
dumprdf	dumprdf <rdf_file_name> [-data]	-data displays bathymetric data. All other kinds of data is always displayed.
dumpsas	dumpsas <sas_file> [-nodata]	-nodata displays record headers only
dumpsb	dumpsb <Seabeam_filename>	(no optional parameters)
dumpsdf	dumpsdf <SDF_filename> [-bathy]	-bathy displays bathymetric data.
dumpsegy	dumpsegy <SEGY_filename>	(no optional parameters)
dumpsf	dumpsf <SeaFalcon_filename>	(no optional parameters)

Utility	Format: command <mandatory> [optional parameter]	
dumpshoals	format: dumpshoals <shoals_file_name> [time_stamp] (displays the contents of Shoals files: OUT - The original Shoals data file. The flight line (.FL) file must be present for the data to be decoded. HOF - The output file for a Shoals 1000T system. INH - The waveform file for a Shoals 1000T system. TOF - Topo output file.) This utility also displays the contents of a HIPS .HWI file, (an indexed file generated by the Shoals converter in order to quickly associate a HIPS sounding with the associated Shoals output data or the waveform data).	time_stamp: if set • for HOF data, only the specific record that corresponds to the set time stamp (a 64-bit integer number) is displayed. • for INH data, the corresponding waveform data is displayed, and can be input to a spreadsheet and graphed
dumpsio	dumpsio <filename>	(no optional parameters)
dumpSurf	dumpsurf <filename> [-nodata] This utility displays contents of an Atlas Surf file (V3) in ASCII text.	-nodata displays record headers only
dumpSXP	dumpSXP <SwathPlus_SXP_filename> [-nodata]	-nodata displays record headers only
dumpSXR	dumpSXR <SXR_filename/SXI_filename> [-data] [-filter]	[-data] Displays detailed sonar data [-filter] Used in conjunction with -data to apply filtering to the data
dumptgt	dumptgt <TGT_filename> [-tif] (displays the contents of an Isis .con or .tgt file)	-tif generates a TIFF file containing the bitmap imagery stored within the .con/.tgt file.
dumptrueHeave	dumpTrueHeave <TrueHeave_filename> [-summary]	-summary displays summary data only (first/last TrueHeave time)
dumpUnisips	dumpUnisips <Unisips_filename>	(no optional parameters)
dumpXSE	dumpXSE <elac_xse_file_name> [-nodata]	-nodata displays record headers only
dumpXTF	dumpXTF <XTF_filename> [-nodata] [-nosnippets] (will display R2Sonic snippet records if present	-nodata displays record headers only -nosnippets - turns off the display of R2Sonic

Printf

Printf commands such as `printfNav` or `printfProcessed` can be useful for writing binary HDCS data to text files to trouble-shoot processing issues. By default the output is displayed in the command-line window. Alternatively it can be sent to a text file.

The available commands are located in the `C:\Program Files\CARIS\HIPS\`*`version`*`\Bin` directory. Use the full path to the utility to ensure printf is pointing to the installed location.
.

Run from the command prompt using the following syntax:

```
C:\Program Files\CARIS\HIPS\9.0\Bin\printfABC <path to
line data folder> > [output file.txt] [/n]
```

where:

`printfABC` is a specific printf command (see the list below),

a path to the data folder must be specified,

an output text file may be specified,

output can be displayed in an unformatted listing, using the optional `/n` parameter.

As an example, to print a Processed Depth file to a text file:

1. Click **Start** and select the Run command.
2. In the Run dialog box, type cmd.
3. Click **OK** to open a command prompt window.
4. Print the Processed depth file to a text file using the full path to the folder containing the data.

In this example, the command

```
printfProcessed C:\CARIS\HIPS\8.1\H_Data\Fundy47\Egret\2008-
307\024-1949 > 024-1949.txt
```

would create a text file of the Processed Depths for the line 024-1949 to the output file named 024-1949.txt.

Available Printf commands:

```
printfDraft
printfEM
printfGPSHeight
printfGPSTide
printfGyro
printfHeave
printfNav
printfObserved
printfPitch
printfProcessed
printfRange
printfRMS
```

```
printfRoll
printfSideScan
printfSonarError
printfSOW
printfSSP
printfSSS
printfSSSCableOut
printfSSSGyro
printfSSSNav
printfSSSProcessed
printfSSSSensorDepth
printfSSSSensorHeight
printfTide
printfTPU
printfTrueHeave
```

Other utilities

Refract

This utility processes one or more HIPS lines, and generates a refraction coefficient file (refCoefficients) for each line in its line directory. The resulting coefficient values can then be used to correct refraction artifacts when the data is merged in HIPS.

Format:

```
refract <lineDirectory> <#profiles>
```

The parameter #profiles generates a refraction entry by grouping profiles together. The number of profiles must be at least 1.

The following criteria must be met in order for this tool to work effectively:

1) The data should be as clean as possible. Noisy data will interfere with the computations.

2) The data should be from a relatively flat sea floor. A sloping sea floor is acceptable.

3) The vessel file must be set up accurately.

splitMB41

This utility divides SeaBeam MB41 raw data files that cross the dateline or have a large lat/long span. It takes each .mb41 file in <directory> and slices it into one or two pieces. The newly generated files are written to the same directory.

Format:

```
splitMB41  <directory> <longitude_boundary>
<longitude_buffer>
```

The output .mb41 files have names that are derived from the input file name (for example, file_1.mb41, file_2.mb41, etc).

The file with the _1.mb41 extension contains data which is up to 180 degrees clockwise from the boundary specified. (For

example, if boundary is set at180 degrees, then the _1 file contains data from 0.0E - 180.0E).

The file with the _2.mb41 extension contains data from the other 180 degrees. If either of these files contains no data, it is deleted.

Parameters are:

- directory: the directory where the source .mb41 files are located.
- longitude_boundary: The longitude (in degrees) where the split happens.
- longitude_buffer: The buffer (in degrees) on either side of the boundary within which data will not be output.

create TPU

This utility is used to load TPU values into lines using a simple mapping table based on depth. For each sounding that is read in, a Vertical TPU and Horizontal TPU value is interpolated from the entries in the user-defined mapping table.

Format:

```
createTPU <list_file_name> <tpe_file_name> [proc|obs]
```

where

`list_file_name` is the name of the file containing the list of lines to be updated. Each line in the file must be in the format:

DataDirectory Project [Vessel] [Day] [Line]

Vessel, Day and Line can be optional and will cause the program to use all lines within the specified folder (recursive).

`tpe_file_name` is the name of the file containing the TPU mapping values. Each line must have the format:

Depth VertTPU HorizTPU

The optional parameters `proc` and `obs` specify whether processed depths or observed depths are used in the process.

All units are expected to be in metres, and the TPU values are treated as confidence intervals.

printSBET

This is a dump utility for SBET files, for which the command is print, not dump.

Format:

printSBET <Inputfile> <Outputfile>

`Inputfile` can specify more than one file, and can use the format PATH*.*.

HIPSbatchengine.exe

The HIPS batch engine utility can apply HIPS and SIPS processes to large amounts of data. It is run from the command prompt. The utility must have a list of the processes to be applied and the source data to which the processes are applied. Optionally, a text log of the process outcomes can be generated.

Format:

```
hipsbatchEngine.exe -p <ProcessListFile> -s
<SourceFile> -l [LogConfigFile]
```

where:

The `ProcessListFile` is the input process script to be executed. It is an XML formatted file that contains the HIPS and SIPS processes to be executed by the batch engine. The script can be created by the Batch Processor. See "Batch Processing files" on page 90.

The `SourceFile` is the input sources (data) that are supplied to the processes. `SourceFile` is an XML formatted file that points to the "source" data to be used during the process execution. There are different formats that can be used for this file, depending on the processes being executed.

For line-based processes such as Merge, SVC, Load Tide, etc., the `SourceFile` would point to the location of HIPS track lines. See "Source File XML Example: Track lines" on page 133 for an example.

For conversion processes, the `SourceFile` points to the raw data files, as well as to the output Day directory. See "Source File XML Example: Convert Raw Data" on page 135 for an example.

You can also have the `SourceFile` point to both kinds of data. See "Source File XML Example: Combined" on page 137 for an example.

The `LogConfigFile` is the name for the log configuration file. If this optional parameter is omitted, messages concerning the processes are output to the console window. (See "Example LogFileConfig:" on page 139 for an example.)

Syntax example:

```
"C:\Program
Files\CARIS\HIPS\ver\Bin\hipsbatchengine.exe" -p
Conversion.hbp -s TrackLines.xml
```

Source File XML Example: Track lines

Description of the XML file (a sample text version follows):

```
<?xml version="1.0" encoding="UTF-8"?>
<HIPSBatchSources>
<-- Must be the first/root node.  Always this string. Identifies the
    content as a 'batch engine' source script. -->
  <SourceRegistry>
  <-- Always this string.  Identifies the source script as a 'registry'
      of sources. -->
    <TrackLines>
    <-- Source Key node.  Identifies these sources as HIPS tracklines. -->
      <Source_1>
      <-- The first source for this key.  -->
        <TrackLines>
        <-- The tracklines in this source entry will be within this node-->
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\Line1"/>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\Line2"/>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\Line3"/>
          <-- The name of the HIPS trackline.  Must be the full path to
              the line directory -->
        </TrackLines>
      </Source_1>
      <NumberOfSources value="1"/>
      <-- The number of separate source entries in the Source Key node. -->
    </TrackLines>
    <SourceTypes value="TrackLines;"/>
    <-- Semicolon separated list of Source Keys in the source registry. -->
  </SourceRegistry>
</HIPSBatchSources>
```

The following text can be copied and used as a template for your SourceFile.

Format:

```
<?xml version="1.0" encoding="UTF-8"?>
<HIPSBatchSources>
  <SourceRegistry>
    <TrackLines>
     <Source_1>
          <FileListSource>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\Line1"/>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\Line2"/>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\Line3"/>
          </FileListSource>
     </Source_1>
      <NumberOfSources value="1"/>
    </TrackLines>
    <SourceTypes value="TrackLines;"/>
  </SourceRegistry>
</HIPSBatchSources>
```

Source File XML Example: Convert Raw Data

The source file for the Conversion process requires special configuration. It must contain the input raw files and the output Day directory. (A text version follows the description below.)

```
<HIPSBatchSources>
<-- Must be the first/root node.  Always this string. Identifies the content
    as a 'batch engine' source script. -->
  <SourceRegistry>
  <-- Always this string.  Identifies the source script as a 'registry' of
      sources. -->
    <Conversion_RawFiles>
    <-- Source Key node.  Identifies these sources as the 'raw files' as
        input for conversion. -->
      <Source_1>
      <-- The first source for this key. -->
        <FileListSource>
        <-- The files for this source entry will be within this node -->
          <Entry value="d:\CARIS\Preprocess\Simrad\file1.all"/>
          <Entry value="d:\CARIS\Preprocess\Simrad\file2.all"/>
          <Entry value="d:\CARIS\Preprocess\Simrad\file3.all"/>
          <-- These must show the full path to the raw files to be used
              in conversion. -->
        </FileListSource>
      </Source_1>
      <NumberOfSources value="1"/>
      <-- The number of separate source entries in the Source Key node. -->
    </Conversion_RawFiles>
    <Conversion_ConvertDestination>
    <-- Source Key node.  Identifies these sources as the 'destination'
        for conversion. -->
      <Source_1>
      <-- The first source for this key. -->
        <FileListSource>
        <-- The files for this source entry will be within this node -->
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day"/>
          <-- The full path to the day directory for all sources to
              be converted. -->
        </FileListSource>
      </Source_1>
      <NumberOfSources value="1"/>
      <-- The number of separate source entries in the Source Key node. -->
    </Conversion_ConvertDestination>
    <SourceTypes value="Conversion RawFiles;Conversion ConvertDestination;"/>
    <-- Semicolon-separated list of Source Keys in the source registry. -->
  </SourceRegistry>
</HIPSBatchSources>
```

The following text can be copied and used as a template for your SourceFile. Following the text is a description of the XML file elements.

```
<HIPSBatchSources>
  <SourceRegistry>
    <Conversion_RawFiles>
      <Source_1>
        <FileListSource>
          <Entry value="d:\CARIS\Preprocess\folder\file1.all"/>
          <Entry value="d:\CARIS\Preprocess\folder\file2.all"/>
          <Entry value="d:\CARIS\Preprocess\folder\file3.all"/>
        </FileListSource>
      </Source_1>
      <NumberOfSources value="1"/>
    </Conversion_RawFiles>
    <Conversion_ConvertDestination>
      <Source_1>
        <FileListSource>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day"/>
        </FileListSource>
      </Source_1>
      <NumberOfSources value="1"/>
    </Conversion_ConvertDestination>
    <SourceTypes value="Conversion_RawFiles;Conversion_ConvertDestination;"/>
  </SourceRegistry>
</HIPSBatchSources>
```

Source File XML Example: Combined

This example shows a configuration for converting and identifying data to apply another process.

```
<?xml version="1.0" encoding="UTF-8"?>
<HIPSBatchSources>
  <SourceRegistry>
        <Conversion_ConvertDestination>
      <Source_1>
        <FileListSource>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day"/>
        </FileListSource>
      </Source_1>
      <NumberOfSources value="1"/>
    </Conversion_ConvertDestination>
        <Conversion_RawFiles>
      <Source_1>
        <FileListSource>
          <Entry value="d:\CARIS\Preprocess\Simrad\file1.all"/>
          <Entry value="d:\CARIS\Preprocess\Simrad\file2.all"/>
          <Entry value="d:\CARIS\Preprocess\Simrad\file3.all"/>
        </FileListSource>
      </Source_1>
      <NumberOfSources value="1"/>
    </Conversion_RawFiles>
    <TrackLines>
      <Source_1>
        <TrackLines>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\file1"/>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\file2"/>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\file3"/>
        </TrackLines>
      </Source_1>
      <NumberOfSources value="1"/>
    </TrackLines>
    <SourceTypes value="Conversion_RawFiles;Conversion_ConvertDestination;TrackLines;"/>
     <-- Combined Source Key contains all three keys. -->
  </SourceRegistry>
</HIPSBatchSources>
```

The following text can be copied and used as a template for your SourceFile.

```
<?xml version="1.0" encoding="UTF-8"?>
<HIPSBatchSources>
  <SourceRegistry>
<Conversion_ConvertDestination>
      <Source_1>
        <FileListSource>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day"/>
        </FileListSource>
      </Source_1>
      <NumberOfSources value="1"/>
    </Conversion_ConvertDestination>
<Conversion_RawFiles>
      <Source_1>
        <FileListSource>
          <Entry value="d:\CARIS\Preprocess\folder\file1.all"/>
          <Entry value="d:\CARIS\Preprocess\folder\file2.all"/>
          <Entry value="d:\CARIS\Preprocess\folder\file3.all"/>
        </FileListSource>
      </Source_1>
      <NumberOfSources value="1"/>
    </Conversion_RawFiles>
    <TrackLines>
      <Source_1>
        <TrackLines>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\file1"/>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\file2"/>
          <Entry value="d:\CARIS\HDCS_Data\Project\Vessel\Day\file3"/>
        </TrackLines>
      </Source_1>
      <NumberOfSources value="1"/>
    </TrackLines>
    <SourceTypes
value="Conversion_RawFiles;Conversion_ConvertDestination;TrackLines;"/>
  </SourceRegistry>
</HIPSBatchSources>
```

Example LogFileConfig:

The following configuration example illustrates how to send all output to a text file:

```
<?xml version="1.0" encoding="UTF-8"?>
<ReporterConfig>
  <ReporterType value="LogFile"/>
  <FileName value="d:\CARIS\batchLog.txt"/>
</ReporterConfig>
```

Configuration Report

The configuration report is a text file containing a list of program, environment and system resources used by HIPS and SIPS.

To create a configuration report:

1. Select Start > CARIS > Utilities > Configuration Reporter, from the Windows menu.

The CARIS Product Configuration Reporter is displayed. It contains a list of CARIS products already installed on your computer. This list is inactive until you select a path and name for the configuration report.

2. Type a file path and name for the configuration report file, or click **Browse** and select a file path and type a name.

The list of CARIS products is now active.

3. Select HIPS and SIPS (version number) from the list.
4. Click **Create** to create a report in the selected folder, or click **Email Report** to create the report and send it as an email attachment to CARIS support.

The Configuration Report contains the following information:

- list of program files with version info
- HIPS and SIPS environment settings
- CARIS kernel registry
- system information
- system and user's environment
- CARIS licensing report

LogFile

LogFile is a text file that is automatically created in the line directory for each line to record the operations that are applied to the line.

The LogFile can be useful when diagnosing any difficulties with processing as it contains the dates of various operations and the parameters and values applied.

The log of processes applied to the active line can also be seen in the Log Viewer window, activated from the Window menu. See "Log Viewer" on page 515.

Object Import Utility

The Object Import Utility enables you to use custom-built scripts to import features from a formatted text file, a shapefile, or a database. If the data is in a text or shapefile, the script parses the information from the file. If the information is in a database, the data is imported using Open Database Connectivity (ODBC).

If you are using an ODBC source, make sure you create the source (using the ODBC Data Source Administrator) before creating a new script. See the Windows® documentation for your operating system for more information on ODBC.

Note that win32 applications can only access win32 ODBC data sources, and x64 applications can only access x64 data sources, so you must make sure that you register the data source appropriately.

The data source for ODBC can either be a text file or a database. Using the ODBC text file driver, you can import and parse any text file. In both cases, the newly imported objects are based on S-57 feature classes and attributes.

Source data must be compatible with the regional settings on your computer to be imported correctly. For example, if your computer reads the decimal point as a period (".") then the source data must also use the period. If the source data uses a different character—for example, a comma (",")—then you must open the data in a text editor and change the decimal points to the character type used by your computer before importing the data.

Input data format

The text or database file must be in a specific format for feature objects to be imported correctly:

- The first record (row) defines the data fields in the records for each object in the file. This record is optional but is useful for identifying the data fields in the OIU.
- Subsequent records contain data corresponding to the data fields described in the first record, and all records must include the following:
  - positional information (as latitude/longitude or easting/northing coordinates)
  - unique identifier if you are importing lines or areas
- Each source file can contain only one object type, for example, lights, land areas, or coastlines.

Importing line or area data

When importing lines or areas, unique identifiers are used to identify the data points belonging to each individual line or area feature. In a series of records, the unique identifier is the same for each point in an individual line or area. When the unique identifier changes, the Object Import Utility (OIU) is

programmed to complete the previous line or area, and start the next line or area with the next unique identifier. An area is closed by entering the same coordinates in the last record as was entered for the first record of the area. The unique identifier is mapped to the CARIS_Key keyword during import.

The following shows two sample text files. The first contains lines to be imported with the OIU:

```
//LATITUDE, LONGITUDE, KEY, INFORMATION
43-04-39.164N, 70-42-12.762W, Pipeline023, This
is the start of the first line.
43-04-43.474N, 70-42-13.927W, Pipeline023,
43-04-46.461N, 70-42-14.625W, Pipeline023,
43-04-49.361N, 70-42-13.228W, Pipeline023,
43-04-51.623N, 70-42-13.169W, Pipeline023,
43-04-38.951N, 70-42-12.994W, Pipeline029, This
is the start of the second line.
43-04-39.847N, 70-42-18.410W, Pipeline029,
43-04-41.981N, 70-42-24.117W, Pipeline029,
43-04-45.095N, 70-42-29.475W, Pipeline029,
43-04-46.119N, 70-42-35.531W, Pipeline029,
43-04-47.015N, 70-42-39.462W, Pipeline029,
43-04-49.319N, 70-42-43.189W, Pipeline029,
```

The second sample contains one area to be imported:

```
//LAT_POS, LONG_POS, FEATURE_ID, COMMENTS
43-04-39.819N, 70-42-18.401W, RESARE918, This is
the first record of an area.
43-04-36.975N, 70-42-23.131W, RESARE918,
43-04-29.050N, 70-42-15.900W, RESARE918,
43-04-29.187N, 70-42-07.701W, RESARE918,
43-04-33.596N, 70-42-06.984W, RESARE918,
43-04-39.008N, 70-42-12.751W, RESARE918,
43-04-39.819N, 70-42-18.401W, RESARE918, This is
the last record of an area.
```

FOID

Feature Object ID (FOID) numbers are also used as identifiers for imported features. These numbers are applied to each individual feature as a whole and are unique to each feature. Identifier fields that are associated with the FOID keyword must be in the following format: CC XXXXXXXX YYYYY, where CC is the agency code, X is one to ten digits for the unique ID (does not have to be zero filled), and Y is one to five digits for the subdivision (does not have to be zero filled). For example, 1C 1234567890 12345, or 1C 123 1 are both valid.

Menu	Tools > Object Import Utility
Tool	

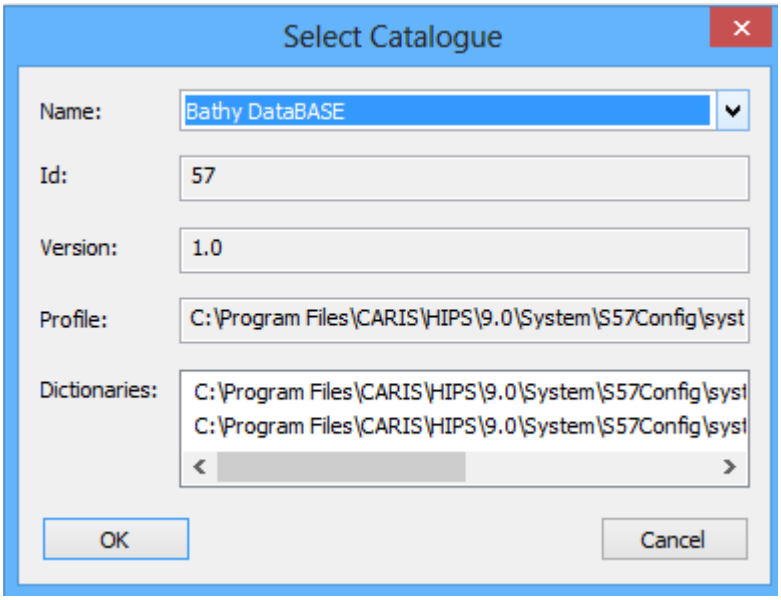
To import objects with the Object Import Utility:

1. Select the layer that the features will be imported into.

The feature profile of the selected layer controls the feature acronyms and attribute values that can be mapped.

2. Select the Object Import Utility command.

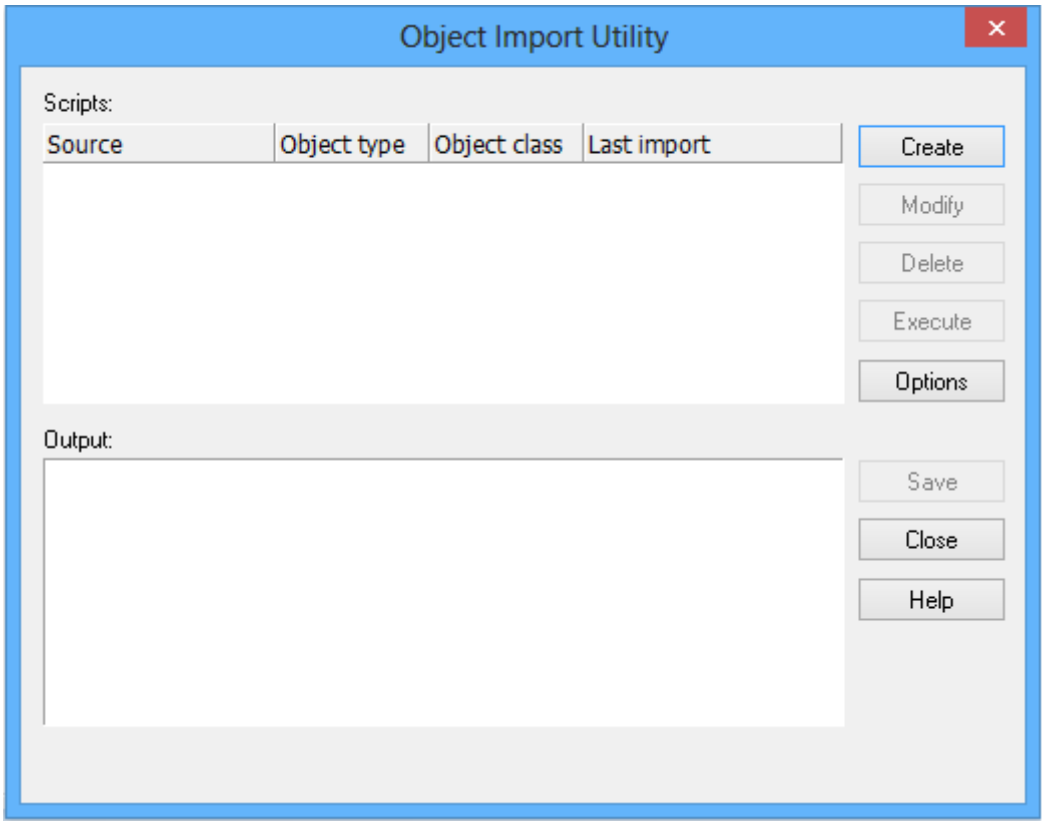
The Select Catalogue dialog box is displayed.



The catalogue's profile is used for mapping feature and attribute acronyms when creating a script to import objects.

3. Select the data type from the *Name* list and click **OK**.

The Object Import Utility dialog box is displayed.



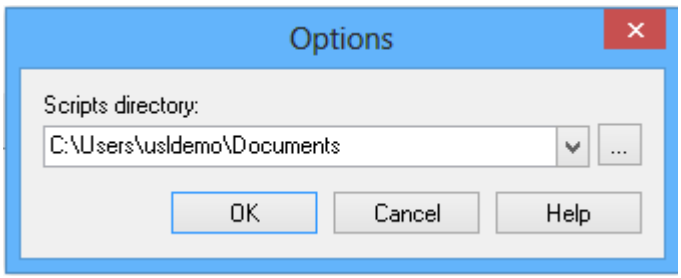
The Object Import Utility dialog box contains a list of any existing scripts. Each script is listed with the object type and object class (feature object acronym) for which it was created. Existing scripts can be modified, deleted or executed.

Object Import Utility Options

If scripts have been created, but are not displayed in the list, it is possible they were not stored in the default location and the application is unable to find them.

4. To change the default directory where scripts are stored, click **Options**.

The Options dialog box is displayed.



5. Type a new file path or click **Browse** (**...**) to select the new path.
6. Click **OK**.

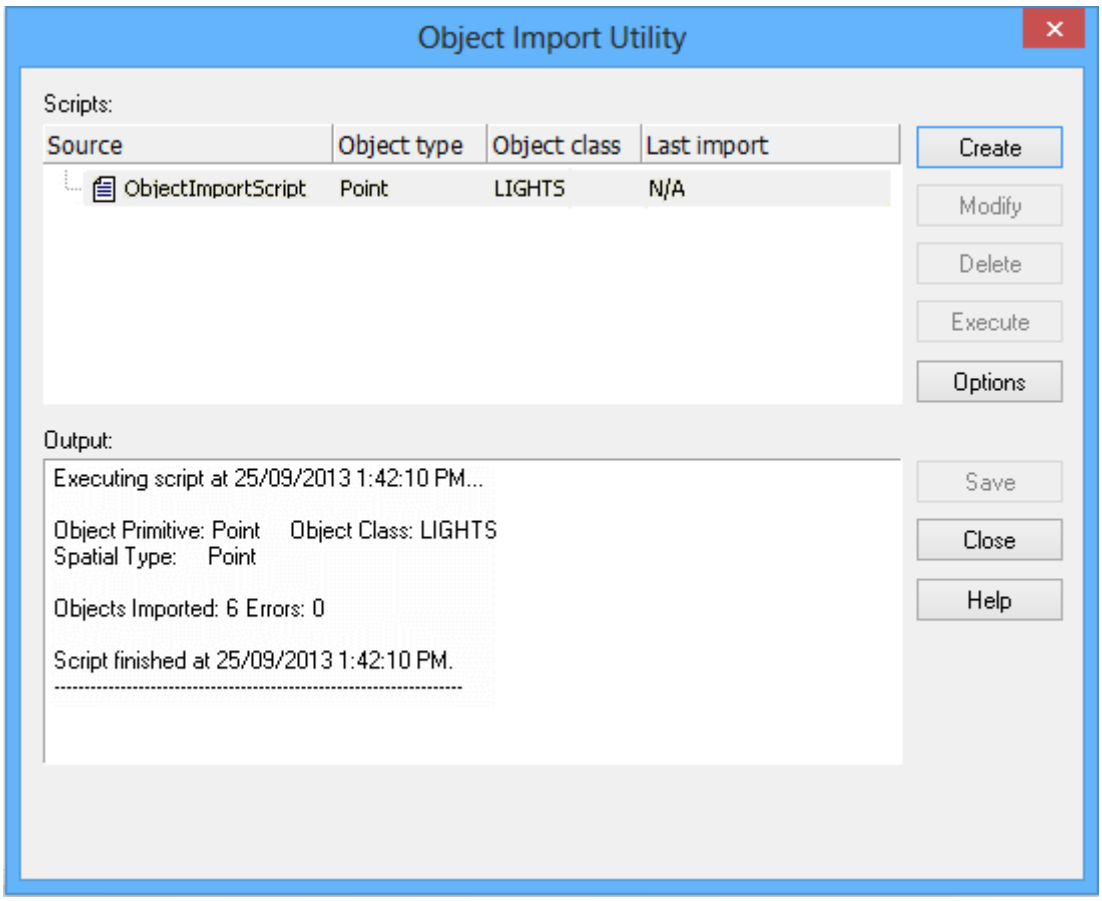
A new file path is selected for the scripts and the Options dialog box is closed. Any scripts in the selected location should be displayed.

If there are no scripts listed, the Create command can be used to create a script. See "CREATE A SCRIPT" ON PAGE 146 for information on creating or modifying a script. Once a script is created, it will be added to this list.

7. Once available, select a script in the list so it is highlighted.
8. Click **Execute**.

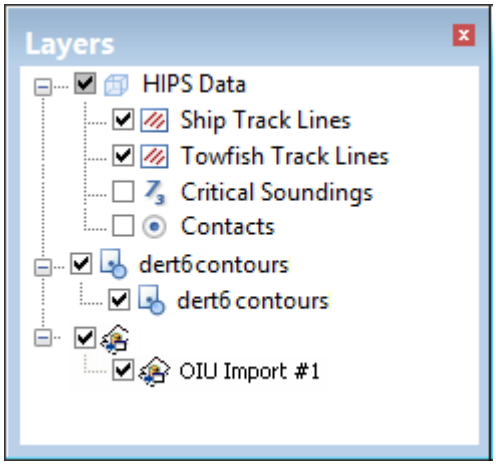
Parsing of the import script is started. The dialog box expands to display progress bars that show the rate of conversion.

Once complete, a new object (or objects) is added to the selected layer.



9. When finished, click **Close**.

The data has been added to a new layer in the Layers window.



This layer can be used to verify that the import was successful and all features were imported correctly. Using this layer ensures that invalid data is not imported into a clean chart or map.

Menu	View > Refresh
Tool	
Pop-up	Refresh (Display window)
Key	<F5>

10. **Refresh** the display to see the new objects.
11. Click the new layer to make it active.

You can now select, filter, zoom, etc. on these objects. To add the features to an existing dataset, select the features and use the Import Selected Objects command on the Tools menu.

Create a Script

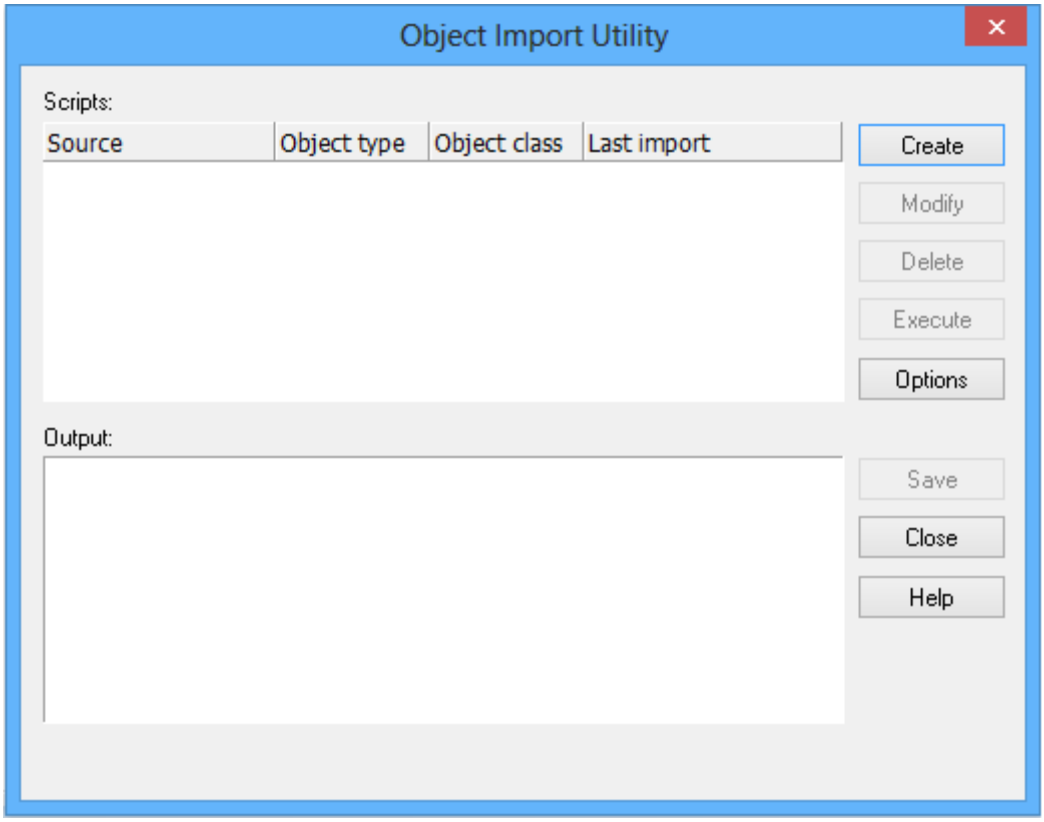
To use the Object Import Utility, you must have a script. If scripts have already been created, they will be accessible through the utility. If not, you will need to create a script. Scripts can be created for Text files, shapefiles and ODBC databases.

To create a script:

Menu	Tools > Object Import Utility
Tool	

1. Create or open a feature layer.
2. Select a feature layer in the Layers window.
3. Select the Object Import Utility command.

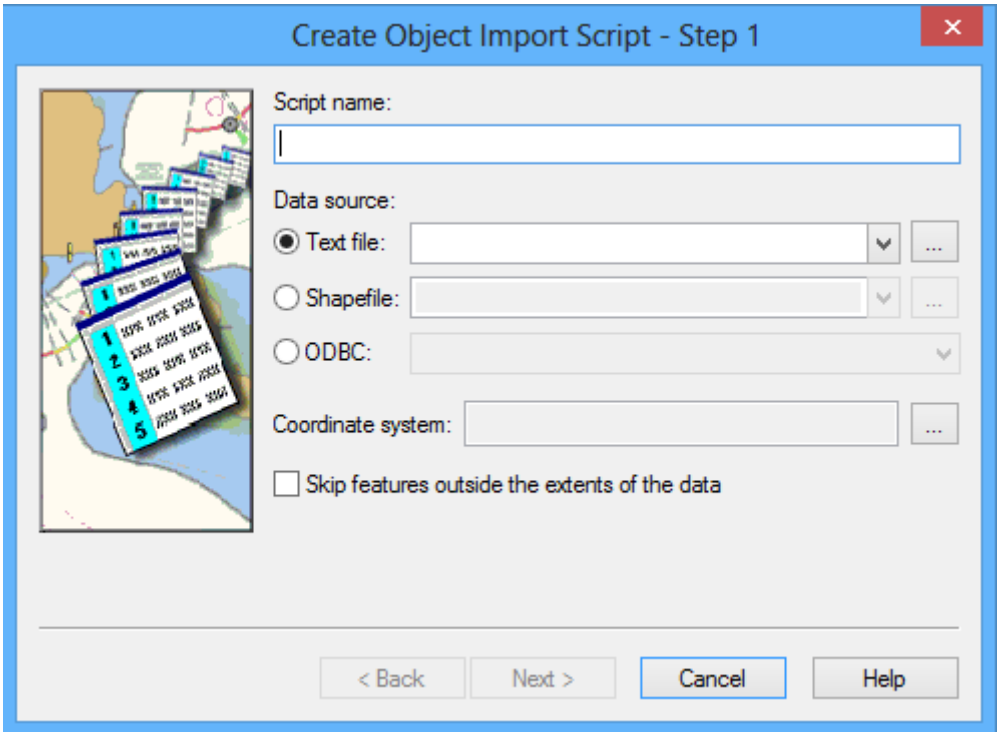
The Object Import Utility dialog box is displayed.



4. Click **Create**.

Create Script - Step 1

The Create Object Import Script - Step 1 dialog box is displayed.



5. Type a *Script name*.
6. Select the format of the *Data source* that will be used for the script: text file, shapefile or ODBC database.

Next, select the actual data source for the format selected, by:

- using the Browse button to navigate to the data source,
- typing the data source name and location in the field, or
- selecting a data source from the drop-down list.

The lists remember all data sources that were used previously in existing scripts for the selected format. If you have not created any scripts, this list will be blank. Once you complete a script, the selected data source will be added to the list.

If using the ODBC option, the sources available differ based on which installation you are using. The table below shows the types of ODBCs displayed for each platform.

Platform	32-bit System DSN	32-bit User DSN	64-bit System DSN	64-bit User DSN
32-bit	X	X		
64-bit		X	X	X

32-bit User DSNs are displayed in 64-bit BASE Editor, however, they are not supported in any 64-bit application, including 64-bit BASE Editor.

7. Select a data source using one of the available methods.

The *Coordinate system* field is used to identify the coordinate system of the source data. If the coordinate system selected is different from that of the application, it will be translated to the application's coordinates during import.

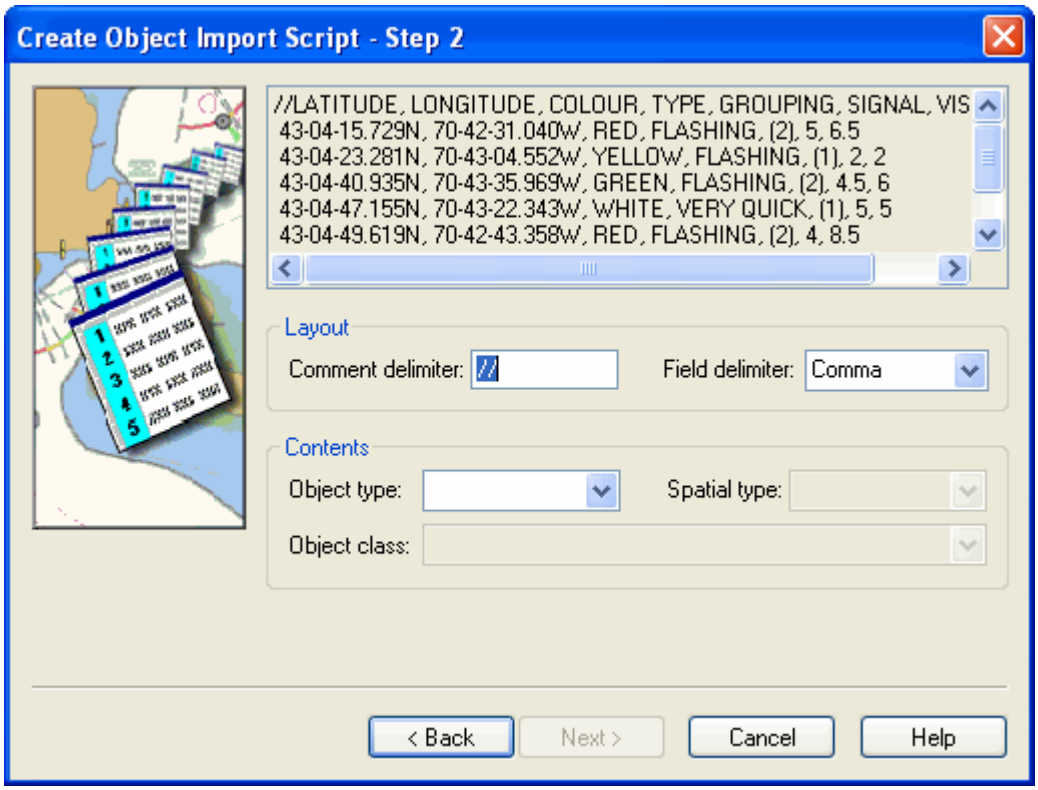
8. Click the *Coordinate system* Browse button (**...**) to launch the *Select Projection* dialog box and choose a coordinate system.
9. [Optional] Select the *Skip features outside the extents of the data* check box to not import features that fall outside the extents of the data on the selected layer.
10. Click **Next**.

The dialog box displayed next depends on the format of the selected source file.

- For a text file, go to "CREATE TEXT FILE SCRIPT" ON PAGE 150.
- For a Shapefile, go to "CREATE SHAPEFILE SCRIPT" ON PAGE 151.
- For a database, go to "CREATE DATABASE SCRIPT" ON PAGE 152.

Create Text File Script

The Create Object Import Script - Step 2 Text File dialog box is displayed.



The contents of the selected file are displayed in this dialog box. The contents cannot be modified here.

1. Enter data, as needed, in the following fields:

- *Comment delimiter*: Comment delimiters are special characters placed at the start of a text line so that the script ignores the line when parsing the file. For example, a text file that contains column headings to identify the data fields would have these characters at the start of the line. The default is //. Change the delimiter by typing one or more new characters in the field.
- *Field delimiter*: The field delimiter is a special character that separates the fields in the text file. The utility looks for this character when parsing the source file to determine where each value starts and stops. A comma is used by default, but any alpha-numeric or symbol character is supported. Change the field delimiter by selecting an option from the drop-down list, or by manually typing a single character in the field.

It is recommended that you view the contents of the source file to determine the separator character in use. Entering the wrong character in the script will cause the import to fail. A search and replace function can be used to quickly update the separator in the source file, if necessary.

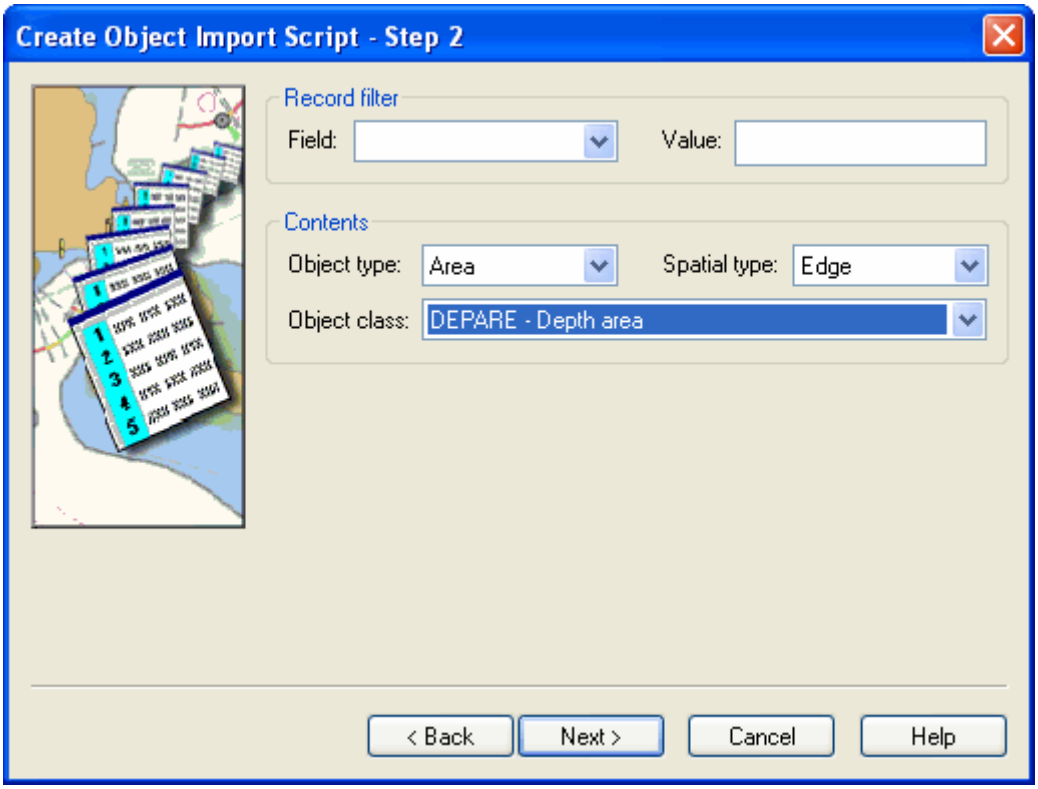
- *Object type*: The type of objects being imported (line, point, area, sounding). Select an object type from the list.
- *Spatial type*: The geometry type of the feature objects being imported. The options available in this field will change based on the selected *Object type*. For Point or Sounding objects, this field will default to either Point or Sounding, respectively. For Line and Area, the options include Edge, Geodesic and Loxodrome. Select an option from the drop-down list.
- *Object class*: The object acronym of the feature objects being imported. Select the object acronym of the source features.

2. Click **Next**.

Go to "CREATE SCRIPT - STEP 3" ON PAGE 154.

Create Shapefile Script

The Create Object Import Script - Step 2 Shapefile dialog box is displayed.



The *Record Filter* option imports only data matching the selected attribute and value. If you choose not to use this option, all data from the Shapefile is imported.

1. [Optional] To use the filter, select an attribute from the *Field* list.
2. [Optional] If using the filter, type a *Value* for the selected attribute.

The *Object Type* is the type of objects being imported (line, point, area, sounding). This setting will automatically be determined from the data in the Shapefile. If a feature in the file could be

either a line or an area feature, you will be given the option of choosing the type.

3. Select the feature type from the *Object Type* list.

The *Spatial type* field defines the geometry type to assign to the feature objects being imported. The options available in this field will change based on the selected *Object type*. For Point or Sounding objects, this field will default to either Point or Sounding, respectively. For Line and Area, the options include Edge, Geodesic and Loxodrome.

4. Select an option from the *Spatial type* drop-down list.

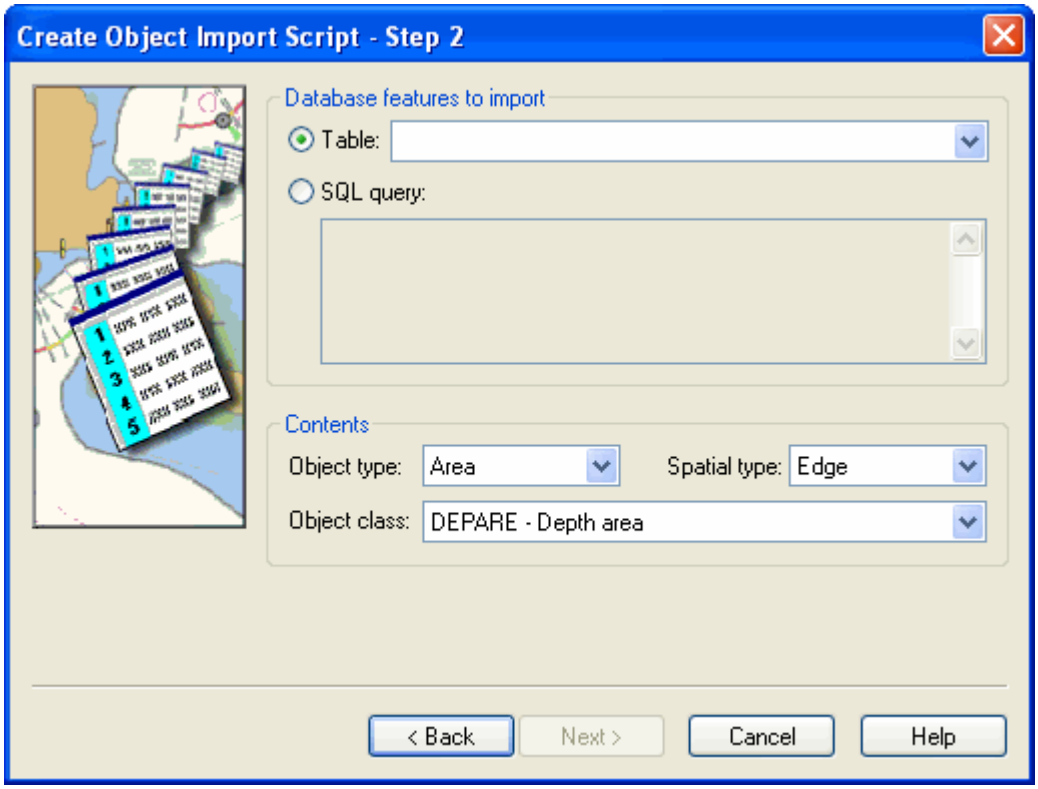
The *Object Class* is the object acronym of the feature objects being imported.

5. Select the *Object class* of the source features.
6. Click **Next**.

Go to "CREATE SCRIPT - STEP 3" ON PAGE 154.

Create Database Script

When the database option is selected, the Create Object Import Script - Step 2 Database dialog box is displayed.



There are two possible methods available to define which features to import from the ODBC:

- *Table*: Import data from a specific table space on the selected DSN database.

- *SQL query*: Restrict the data that is imported from the database connection using a SQL statement. Only data that matches the specified criteria will be imported.

1. Select an import method.
2. If you chose the *Table* option, select a table from the list.

   If you chose the *SQL query* option, type a valid SQL statement in the text area.

The *Object Type* is the type of objects being imported (line, point, area, sounding).

3. Select an *Object Type* from the list (line, point, area, sounding).

The *Spatial type* field defines the geometry type to assign to the feature objects being imported. The options available in this field will change based on the selected *Object type*. For point or sounding objects, this field will default to Point or Sounding, respectively. For Line and Area, the options include Edge, Geodesic and Loxodrome.

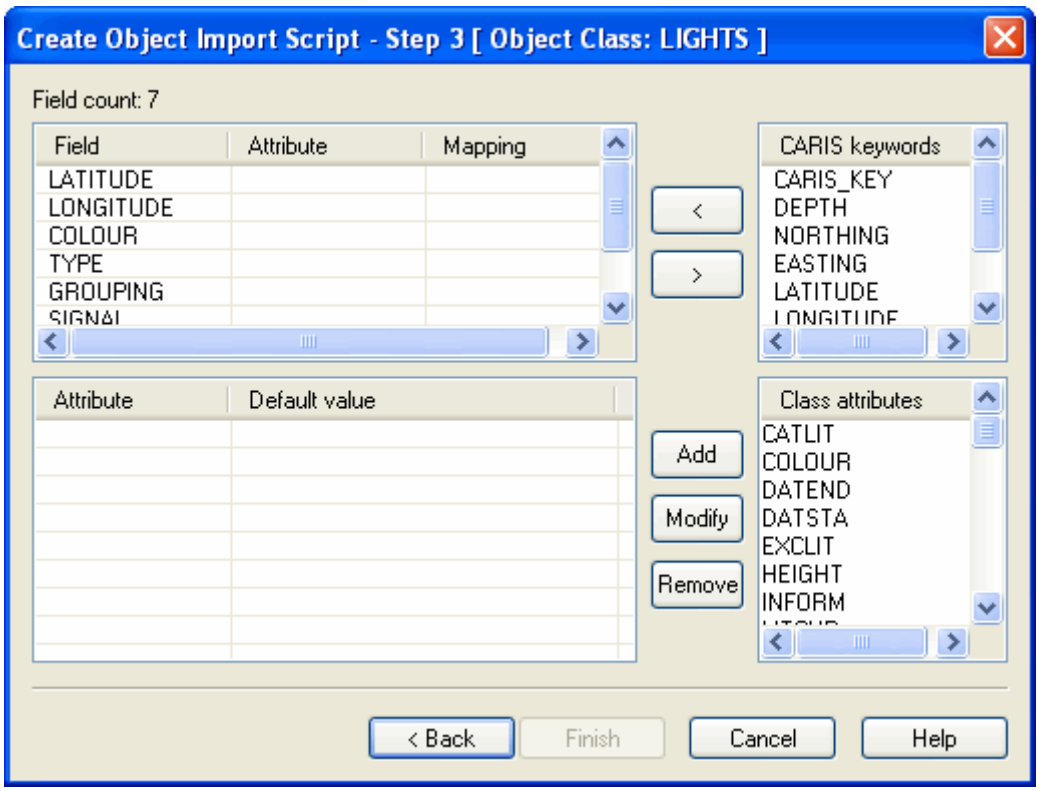
4. Select an option from the *Spatial type* drop-down list.

The *Object Class* is the object acronym of the feature objects being imported.

5. Select the exact type of *Object Class* to be created.
6. Click **Next**.

Create Script - Step 3

The Create Object Import Script - Step 3 dialog box is displayed. This dialog box maps attribute values to feature objects during import.



There are two tables available for mapping attributes to the imported features. The first, upper table maps attributes and values to the existing fields in the source file. The second, lower table can be used to add additional attributes not found in the source file.

Attributes are mapped to the source fields using the *CARIS Keywords* list and the *Class Attributes* list. The CARIS Keywords list always contains the same values. The Class Attributes list is controlled by the selected object class and contains only attributes available for the selected class. Items from both lists can be mapped to the fields in the upper table, whereas only the Class Attributes can be mapped in the lower table.

If the Class Attributes list contains acronyms in red, these items MUST be mapped either to an existing field or as a new attribute.

Mapping to the Existing Attributes

The *Field* column contains the data fields found in the source file. In order to populate these values for the imported features, they must be mapped to object and attribute acronyms recognized by the catalogues in the application. To perform this mapping, either *CARIS Keywords* or *Class Attributes* must be added to the relevant rows of the *Attribute* column for each source *Field*. Any field that you do not want mapped during the import should be left

blank in the tables. These attributes will not be included in the imported features.

If you are importing from an indexed file (such as a shapefile, or a text file containing multiple features), you must identify which rows of source data below to each individual feature. This can be accomplished by:

- adding a blank line between the groups of rows for each feature, or
- mapping the *CARIS_KEY* keyword to the index or key field in the source file.

1. To assign a *CARIS Keyword* or *Class Attribute* to a source field, highlight an item in the *Field* column and either:
   - double-click a value in the *Keyword or Attribute* list, or
   - highlight a value in the relevant list and click the left-arrow button.

The selected keyword or attribute is inserted in the *Attributes* column for the selected field.

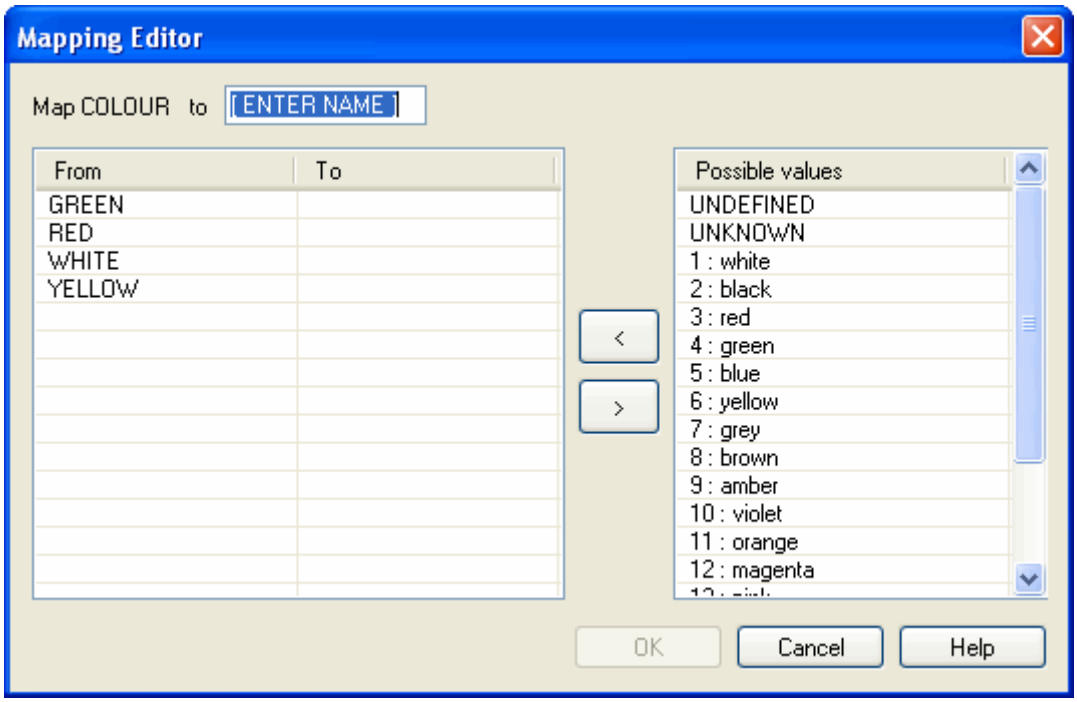
To remove an attribute value from the *Attribute* column, double-click the value; or, highlight it and click the right-arrow button.

The *Mapping* column can be used to assign new values to the feature attributes being imported from the source file. This might be done if the attribute values in the source file are in a different format than in HIPS and SIPS and therefore will not be recognized in the application.

For example, values may be stored in the source file as text, but need to be imported as either list-type or enumeration-type attributes, or a value is stored in feet and you need to convert it to metres.

2. Double-click in the *Mapping* column of the field for which you want to assign values.

The Mapping Editor dialog box is displayed.



This dialog box may differ depending on the type of attribute selected. See "MAPPING" ON PAGE 157 for information on using this dialog box.

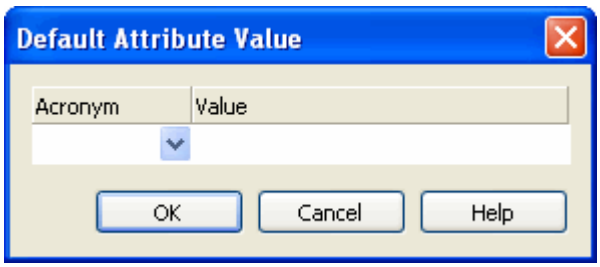
1. For textual values, assign a value to replace the value in the *From* list. For numerical values, enter an equation to apply to the values in the source file.
2. Click **OK**.

Mapping New Attributes

The *Class Attributes* list shows all of the attributes for the selected object class that can be assigned to features. Mandatory attributes for the object class are displayed in red.

3. Select an attribute acronym from the *Class Attributes* list.
4. Click **Add**.

The Default Attribute Value dialog box is displayed.



5. Select an attribute *Acronym* from the list.
6. Depending on the attribute selected, either select or enter a value in the *Value* field. This value will be assigned to the features on import.
7. Click **OK**.

The attribute acronym and the defined value are displayed in the *Attribute* and *Default Value* fields. The attribute is no longer displayed in the *Class Attributes* list. The *Modify* button can be used to change any of the values assigned here, if needed. Mapped attributes can also be removed using the *Remove* button.

The script is ready to be created.

8. Click **Finish**.

The script is created and the script name is displayed in the main Object Import Utility dialog box. The script can now be run to import the desired features.

Mapping

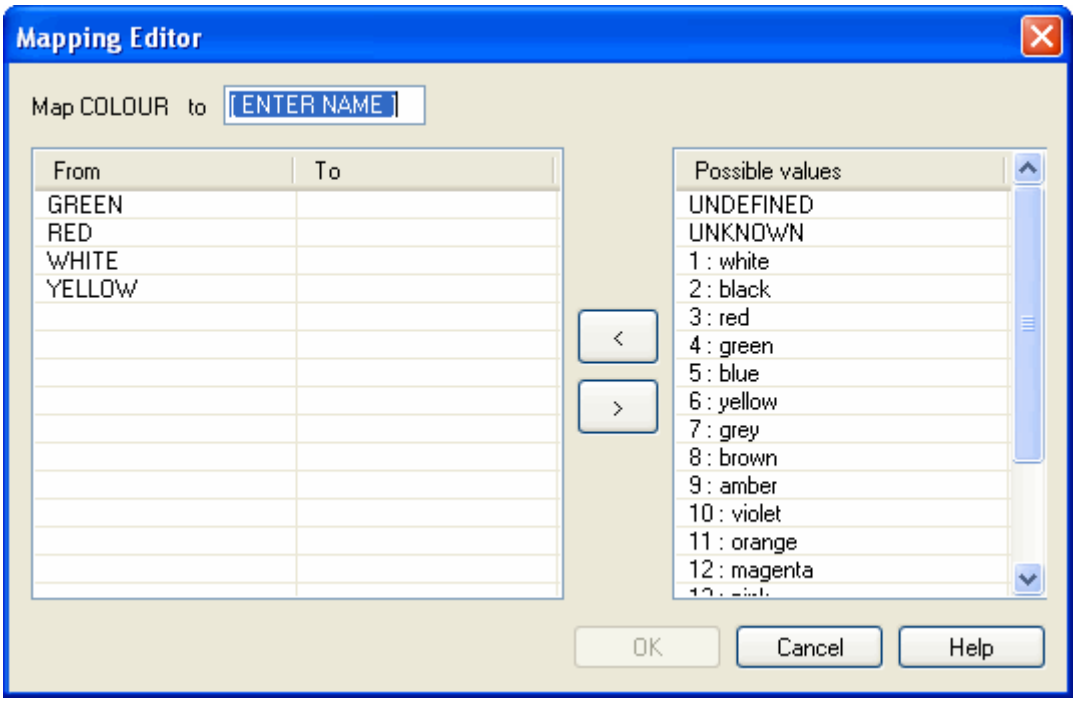
The Mapping column in step 3 of the Create Object Import Script wizard lets you create mapping rules to map the attribute values in a source file to values that will be recognized. For example, values may be stored in the source file as text, but need to be imported as either list-type or enumeration-type attributes; or, a value is stored in feet and you need to convert it to metres. When a script is completed, any mapping rules created will be saved as part of the script.

1. Double-click the *Mapping* column for a source field.

The Mapping Editor dialog box is displayed. The dialog box will contain different fields depending on the selected attribute.

Converting to List-Type Values

This version of the Mapping Editor dialog box is meant for mapping the textual values from the source file to list-type attribute values.



The *Name* field assigns a name to the mapping rule. It is recommended that the name reflect the attribute for which it was created for easy recognition.

2. Type a name for the mapping rule in the *Enter Name* field.
3. Select an attribute value in the *From* list on the left.
4. In the *Possible values* list, double-click the corresponding numerical value, or highlight the value and click the left-arrow button.

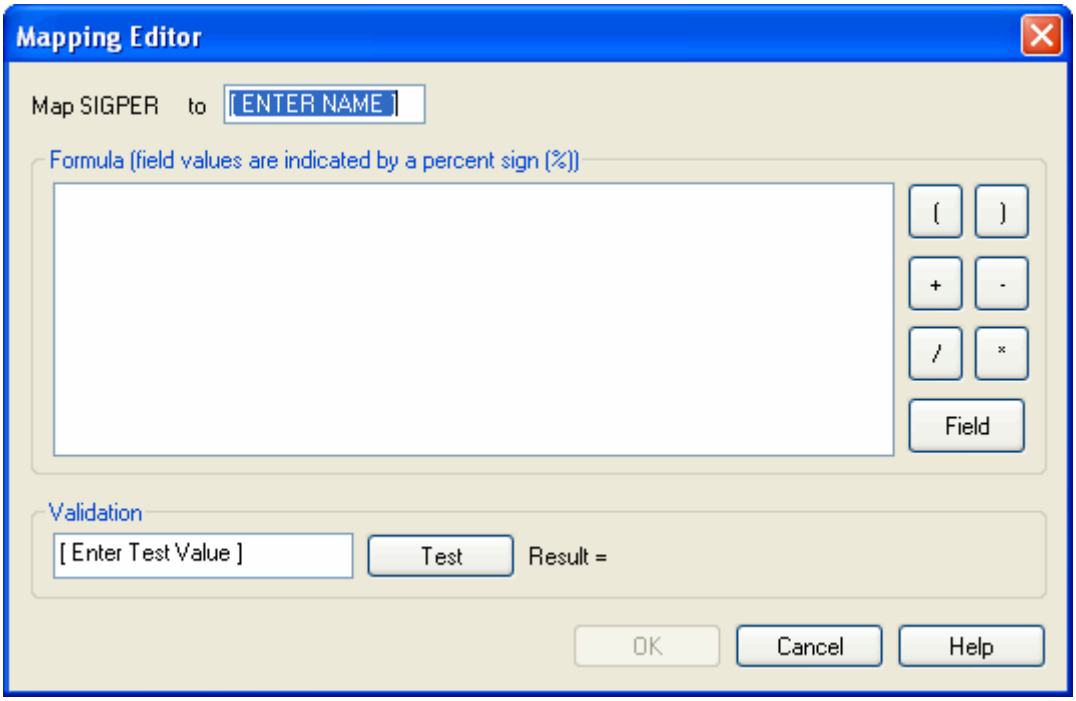
The value is moved to the *To* list for the selected value.

5. Repeat steps 3 and 4 for each value in the *From* list that requires mapping.
6. When all values have been mapped, click **OK**.

You will be returned to the Create Object Import Script wizard.

Perform Mathematical Calculations

This version of the Mapping Editor dialog box is meant for defining mathematical equations that will be applied to attribute values during import. For example, a multiplier may be applied to change the Z-axis convention to positive-down, or the vertical datum may need to be shifted.



1. Type a name for the mapping rule in the field provided at the top of the dialog box.
2. Type values in the area provided and click the operator buttons on the right side of the dialog box to insert mathematical operators. The field value is represented by the percent sign (%).

There is a precedence order for evaluating equations: parenthesis are evaluated first, followed by multiplication and division, followed by addition and subtraction. Make sure your equation is structured to represent the precedence order.

Once an equation is entered, it can be tested to ensure the correct results are generated.

3. Type a value in the *Test Value* field.
4. Click **Test**.

The result of the equation will be displayed in the *Result* field. If the expected result is given, the equation is complete. Otherwise, adjustments may be required.

5. Click **OK** to complete the mapping and return to the Create Object Import Script wizard.

The Mapping value is inserted into the dialog box.

6

Calibration

Calibration surveys are performed to allow adjustments of the survey data for parameters such as transducer error (pitch, roll and yaw), and navigation latency. These adjustments are saved in the HIPS Vessel File.

Calibration is performed by visually comparing the effects of various sensor offsets on a set of selected survey lines. This is done in Subset Editor.

In this chapter...

Overview

Calibration is done on a set of data specifically surveyed to allow for calculation of minor sensor deviations from established parameters. By running the vessel over known sea bottom topography, at different speeds and directions, correction factors can be derived for various devices on the ship. These corrections are written to the HIPS Vessel File (HVF) and are then used for the duration of the survey mission to ensure correct processing of data.

Calibration is performed in Subset Editor.

Calibration Workflow

A full calibration workflow entails:

- selecting surveyed test lines to use as calibration lines. (See "Defining subset area for calibration" on page 169.)
- creating a HIPS Vessel file for this calibration line data. (See "Create a New HVF" on page 31 of the User Guide.)
- creating a project for the calibration data. (See "New Project" on page 63 of the User Guide.)
- converting the raw calibration data to HIPS format. (See "Convert Data" on page 79 of the User Guide.)
- applying sound velocity correction to the calibration data (if sound velocity data was recorded for the calibration data.) (See "Sound Velocity Correction" on page 160 of the User Guide.)
- loading tide. (See "Load Tide" on page 170 of the User Guide.)
- applying Merge to the calibration data lines to produce geo-referenced processed depths (See "Apply Merge" on page 198 of the User Guide.)
- creating a surface to highlight the changes before and after calibration values are applied to the data. (See "Create a New Surface" on page 207 of the User Guide.)
- checking calibration lines using the Attitude and Navigation Editors (if edits are made Merge must be applied again).
- editing and /or filtering the lines in Swath Editor to remove large spikes and noisy data.
- using the HIPS Calibration tool in Subset Editor to determine navigation latency and transducer mounting offsets and to update the HVF "Calibration in Subset Editor" on page 163
- applying Merge again to calibrated lines

Calibration in Subset Editor

The calibration tools enable you to resolve navigation latency and transducer mounting offsets and update the HVF from within Subset Editor.

Most errors are detected by examining along track patterns. An exception is roll errors for which across track patterns are compared

The calibration process consists of comparing pairs of lines within a defined subset, rotating the subset parallel or perpendicular to the lines depending on sensor values being examined. The process is repeated for all sensors. (See "DEFINING SUBSET AREA FOR CALIBRATION" ON PAGE 169 for information on positioning the subset.)

An additional comparison can be done by creating a surface from the un-calibrated data, calibrating the data, and then creating a new surface to see and compare the effect of the calibration values.

Create a subset for calibration

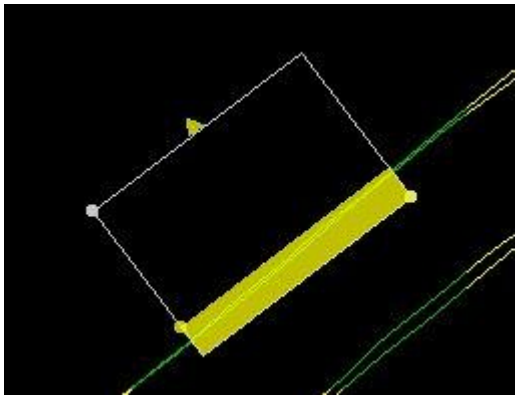
Determine which pair of lines to use for calibration. For example, to determine navigation time error, choose two coincident lines that have been run in the same direction, at different speeds.

1. Open Subset Editor.

Menu	Tools > Subset Editor
Tool	

2. In the Display window, draw the subset bounding box over a portion of the pair.

   For example, for calibrating navigation time error, rotate the subset so that the bounding box is parallel to the along-track direction.



   (See "OPEN SUBSET EDITOR AND LOAD DATA" ON PAGE 813 in the Editors Guide for information about creating and rotating the subset bounding box.)

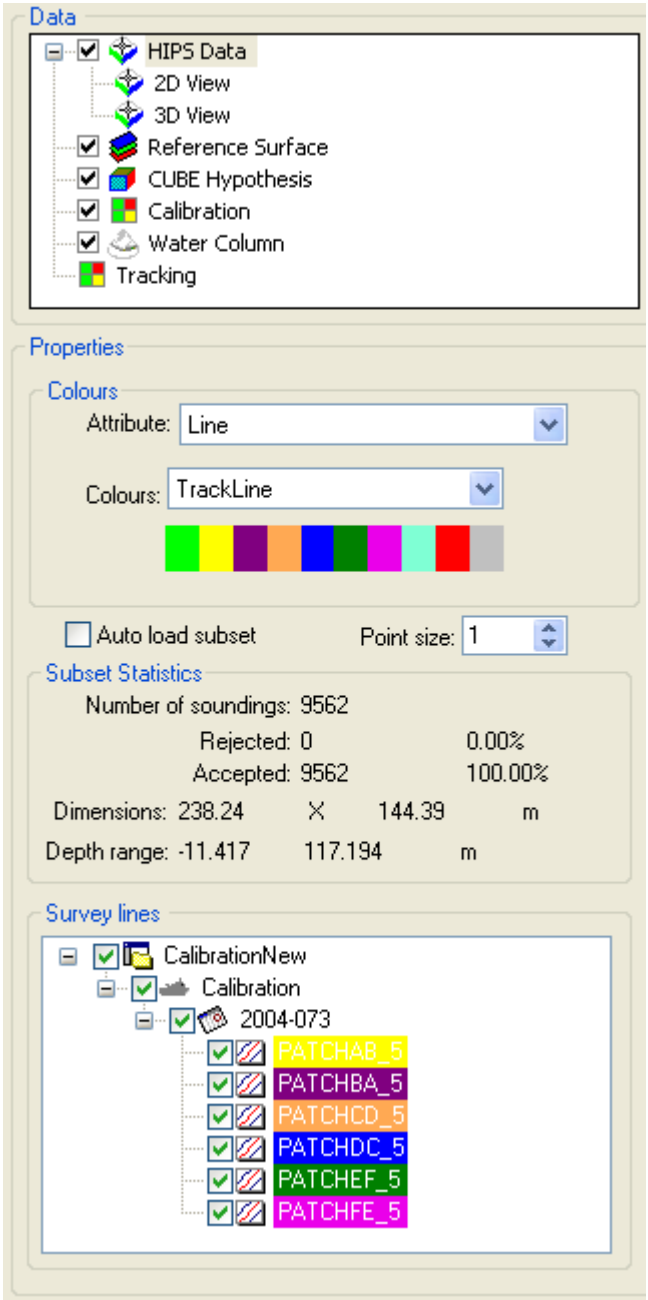
Menu	Tools > Subset Editor > Load
Tool	

3. Load the subset of these lines.

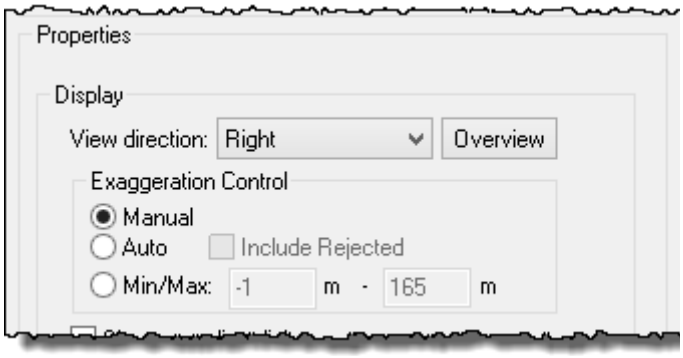
The subset of the data displayed in the 2D and 3D windows.

To easily distinguish between the lines being calibrated:

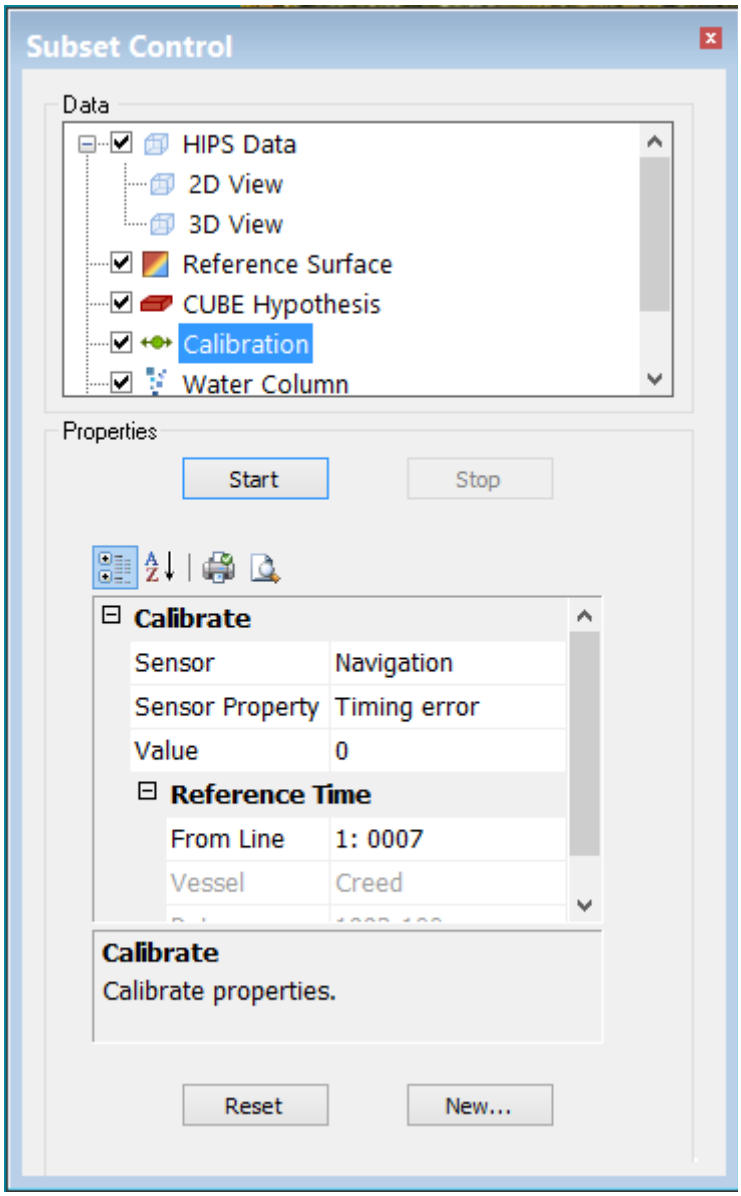
4. Select the HIPS data layer in the Subset Editor window.
5. Select Line from the *Attribute* list.
6. Set *Colours* to the *TrackLine* option.



7. Select the 2D View layer and set the *Display* option for *View direction to* Automatic, and the *Exaggeration Control* to Auto.



8.Select the Calibration control layer to view the calibration tools.

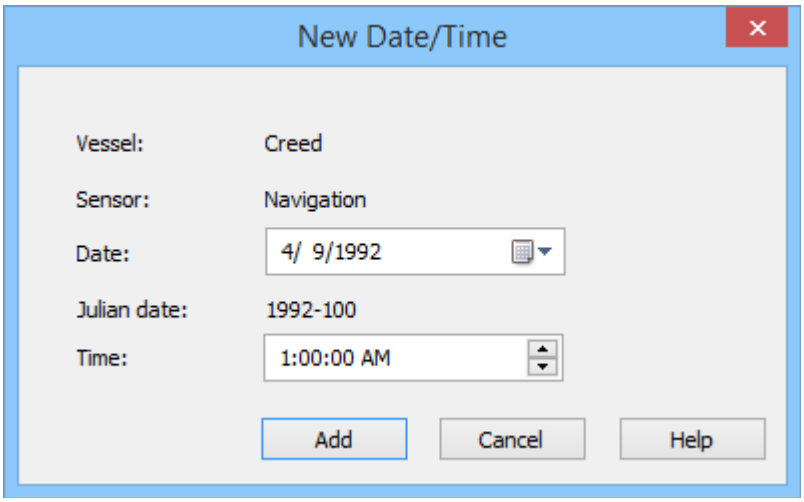


This will set both the 2D and 3D View into Calibration Mode.

Add a Sensor Date

Before running the actual calibration process, you can change or add a new sensor date/time entry to the HIPS Vessel file.

1. From the *Sensor* field, select the sensor to be calibrated, for example, Navigation.
2. Click **New**...to open the New Date/Time dialog box.



The vessel name and the name of the currently selected sensor are displayed. The *Date* field shows the date from the current Reference Time section.

3. Click the calendar in the *Date* field to set a different date.

The *Julian date* field will update to show the date you selected.

4. To update the time, either:
   - Click **Add** to increase the time value by one hour, or
   - Type a new time in the *Time* field.

Time value can also be set by selecting the hour, minute, second or AM/PM column and using either the scroll arrows in the field, or the keyboard arrow keys to adjust the value.

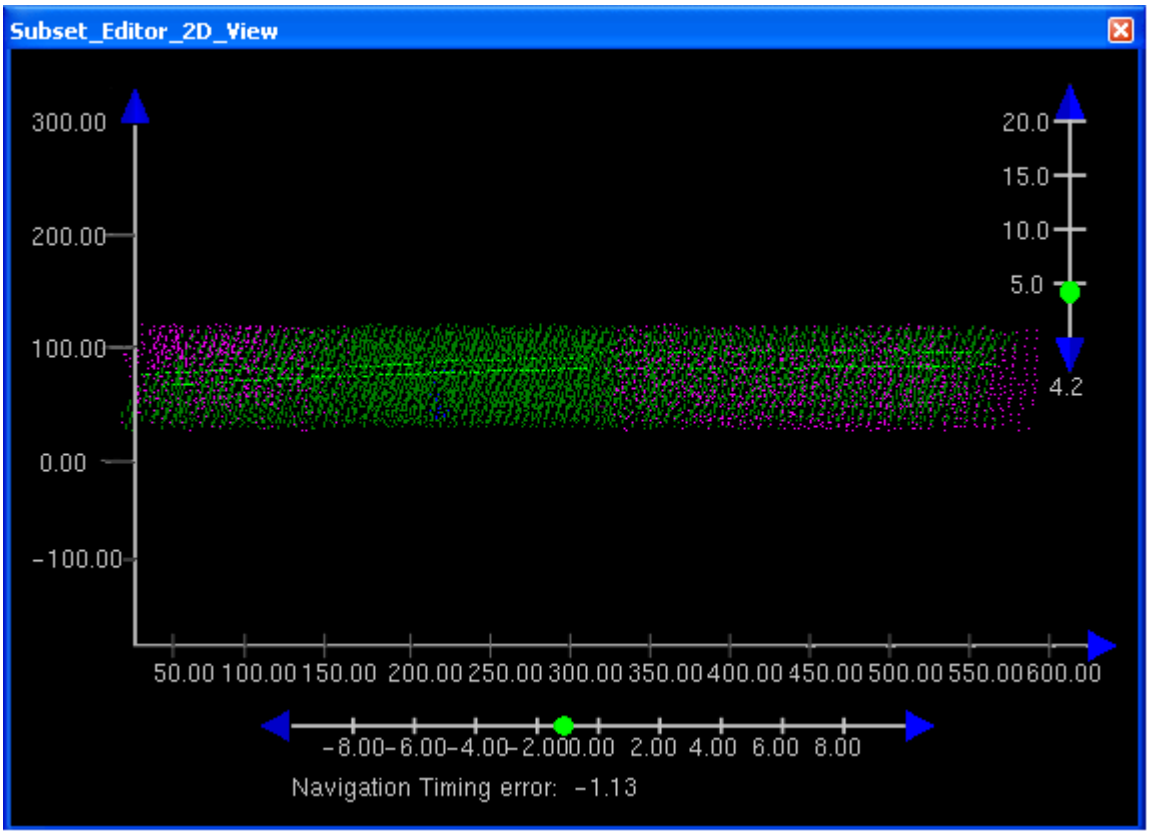
5. Click **Add**.

The new time is added to the HIPS Vessel file.

Apply Calibration

1. Select the sensor to be calibrated, for example, Navigation.
2. Select the sensor property to adjust, for example, Timing Error.
3. Click **Start.**

The 2D and 3D Views now displays a scale and slider controls with the data, as below:



Use the controls to adjust the error values so that the two data lines are aligned. Use the vertical exaggeration slider or the compass control to view the data

Values can be adjusted:

- by sliding the green button along the ruler, or
- by clicking the blue arrowheads at the ends of the ruler, or
- by entering a value in the Value field in the Calibrate table.

As you adjust the slider, the *Value* field is updated. Also, if you type specific value in the field, the slider will move to that point on the ruler.

4. Click Stop when the desired value has been reached.

At this point you will be prompted to save the data.

5. Click **Yes** to save the new values to the HVF.
6. Repeat the process with other sensors.

When you finish calibration, you must Merge the line(s) again for the calibration adjustments to take effect.

During Calibration, data displayed in the Subset Editor views use the Merge functionality “on the fly” for display purposes only to visually show settings adjusted in the Calibration window. Any auxiliary sensor data already applied to the line, such as Refraction Coefficients or GPS Tide, will also be applied in the Calibration mode display.

Defining subset area for calibration

Calibration compares pairs of lines, surveyed under specific conditions. To view the data in Subset Editor, the subset is created parallel or perpendicular to the lines depending on sensor values being examined, as follows:

Sensor	
Navigation Time Error	Performed on sets of two coincident lines, run at different velocities, over sloping terrain or a conspicuous topographic feature. Align the subset along track so you can view a profile of the two centre beams.
Transducer pitch offset	Performed on sets of two coincident lines, run at the same velocity, in opposite directions, over sloping terrain or a conspicuous object. If data is from a dual-head transducer system, the error may be different between port and starboard transducers., Align the subset along track so you can view a profile of the centre beams.
Transducer azimuth (Yaw) offset	Performed on sets of two lines, run over a conspicuous topographic feature. If data is from a dual-head transducer system, the error may be different between port and starboard transducers. Lines run in opposite directions, with the same outer beams crossing the feature. Align the subset along track so you can view a profile of the same outer beams for both lines.
Transducer roll offset	The line pattern to detect the roll errors of a dual-head transducer is different from a single-head system, so error for each transducer must be resolved separately. Calibration is performed on sets of lines, offset by half the swath width, run over flat terrain. The centre line is run in the opposite direction to the offset lines, to allow for port and starboard swaths to be compared independently. Align the subset across track, to view a profile of individual swaths. The 2D slice should focus on an seabed area that appears flat For single-head transducer configuration, the lines can be coincident rather than offset.

7

Sounding Rounding

Sounding rounding rules are used in HIPS and SIPS to control the display and use of sounding units.

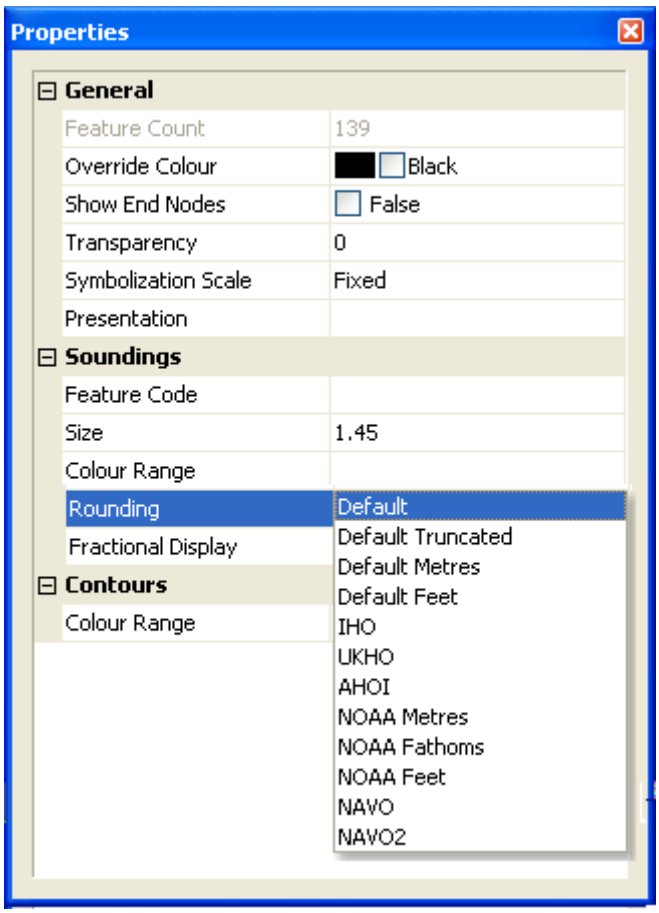
In this chapter...

Applying Sounding Rounding

In HIPS and SIPS sounding rounding is applied during sounding selection when the overplot removal option is used to suppress soundings.

Sounding rounding is also applied to data displayed in HOB or CARIS Map files that are opened as background data.

The Properties for a layer containing soundings will show which rounding rules are being applied to the sounding display. You can change which rules are applied, by selecting another option from the Rounding list in the Soundings properties.



Rules

Rules for rounding sounding units are contained in the `SoundingRounding.xml` file, located in the System\ folder of your HIPS installation. This file can be viewed in any text editor or XML-compliant browser, and modified to create a custom file.

The sounding rounding file is controlled through the `uslXSndRndCfg` environment variable in your system Registry. If you create a custom sounding rounding file, use the Registry Editor to point to the new file.

File Structure

Displayed below is an extract from the SoundingRounding.xml file. It shows the text defining the default rounding rules for soundings measured in metres and in feet.

```
<?xml version="1.0" encoding="UTF-8" ?>
- <CARIS_SdgConfigFile versionID="1.0">
  - <Rule Name="Default Metres" Description="Default rounding in metres and
    decimetres (= 30,30,R)" Whole_Unit_Conversion_Factor="1.0"
    Whole_Unit_Label_Singular="Metre" Whole_Unit_Label_Plural="Metres">
    <!--  Because Subscript is in decimals of the metre,          -->
    <!--  no subscript unit information needs to be defined.      -->
    <!--  This range applies to soundings deeper or equal to 30   -->
    - <Range Threshold="30">
      <Element Precision="1.0" Rounding_point="0.5" />
    </Range>
    <!--  The last range, with no threshold specified, applies    -->
    <!--  to all other soundings, i.e. dry heights down to 30m  -->
    - <Range>
      <Element Precision="0.1" Rounding_point="0.05" />
    </Range>
  </Rule>
  - <Rule Name="Default Feet" Description="Default rounding to whole feet"
    Whole_Unit_Conversion_Factor="3.2808399" Whole_Unit_Label_Singular="Foot"
    Whole_Unit_Label_Plural="Feet">
    <!--  Because Subscript is in decimals of the metre,          -->
    <!--  no subscript unit information needs to be defined.      -->
    <!--  This range applies to all soundings     -->
    - <Range>
      <Element Precision="1.0" Rounding_point="0.5" />
    </Range>
  </Rule>
</CARIS_SdgConfigFile>
<!--  NOTES:                                                      -->
<!--    To always round up to the next unit, set Rounding_point="0"  -->
<!--    All truncating is toward zero, all rounding up is away from zero.  -->
```

The first two lines of the file contain the declaration of the XML file. Both lines are necessary for the Sounding Rounding file to work and must be included in any custom file.

The first line,

```
<?xml version="1.0" encoding="UTF-8"?>
```

indicates that the file uses version 1.0 of the XML standard and that this file can be used on computers that support UTF-8 character encoding.

In the second line,

```
<CARIS_SdgConfigFile versionID="1.0">
```

is the name of the tag that encloses the definitions of the rule components in the Sounding Rounding file.

The next lines define the first rule.

<Rule>

There are four attributes that define the <Rule> tag: Name, Description, Whole Unit Conversion Factor and Whole Unit Label.

Name

The Name attribute is used as a title for the rule being defined. In the example above the Name attribute value is **"Default Metres"**.

Description

The Description attribute describes the named rule and its parameters. (The parameters are optional and can be omitted.) For example, in

Description= "Default rounding in metres and decimetres (30,21,R)"

The content of the description is followed by the parameters (in brackets) which define the upper and lower thresholds of the soundings range. (The upper threshold is defined as any soundings at 30 metres or deeper, and the lower threshold is soundings at 21 metres and less. See "<RANGE>" ON PAGE 174 for information on ranges.)

Soundings can be rounded, truncated, or have a hydrographic agency's rule scheme applied. In the parameters of the above example, the "R" means that the soundings are rounded.

The following table lists the abbreviations that can be used.

Value	Description
R	Values are rounded
T	Values are truncated
A	Use the AHOI standard to round/truncate soundings
N	Use the NOAA standard to round/truncate soundings
U	Use the UKHO standard to round/truncate soundings
V	Use the NAVO standard to round truncate soundings

Whole Unit Conversion Factor

The Whole_Unit_Conversion_Factor attribute defines the multiplier that is used for measurement units. CARIS applications use metres by default, so the conversion factor for metres would be set to 1.0. For example,

```
Whole_Unit_Conversion_Factor= "1.0"
```

However, if you were converting to another unit you would use a conversion multiplier. For example, to convert from metres to feet,

```
Whole_Unit_Conversion_Factor= "3.2808399"
```

Whole Unit Label

The Whole_Unit_Label_Singular and Whole_Unit_Label_Plural attributes define how the unit labels are displayed in the application. For example,

```
Whole_Unit_Label_Singular= "Metre"
Whole_Unit_Label_Plural= "Metres" >
```

<Range>

The attributes located between the <Range> tags define the depth/height ranges for a sounding rounding rule.

You can use any number of ranges in a sounding rounding file. The range values can be for soundings or drying heights. Drying heights are identified with a minus (-) notation.

Threshold

The threshold attribute defines the limit of the ranges. Each range is defined using shoalest sounding or maximum drying height within the range. The order is from the deepest sounding to the highest drying height.

The following list is an example of the threshold order.

```
<!--  This range applies to soundings deeper or equal to 30   -->
- <Range Threshold="30">
    <Element Precision="1.0" Rounding_point="0.750" />
  </Range>
  <!--  This range applies to soundings between 30 and 21      -->
- <Range Threshold="21">
    <Element Precision="0.5" Rounding_point="0.5" />
  </Range>
  <!--  This range applies to soundings between 21 and zero    -->
- <Range Threshold="0">
    <Element Precision="0.1" Rounding_point="0.08" />
  </Range>
  <!--  This range applies to drying heights from zero to -21  -->
- <Range Threshold="-21">
    <Element Precision="0.1" Rounding_point="0.03" />
  </Range>
  <!--  This range applies to drying heights from -21 to -30   -->
- <Range Threshold="-30">
    <Element Precision="0.5" Rounding_point="0.5" />
  </Range>
  <!--  This range applies to drying heights from -30 and shoaler  -->
- <Range>
    <Element Precision="1.0" Rounding_point="0.750" />
  </Range>
```

Precision and Rounding Point

These two attributes are located in the <Element> tag. They define the value that the soundings/drying heights are rounded and to which precision the values are rounded.

For example, the following range:

```
- <Range Threshold="30">
    <Element Precision="1.0" Rounding_point="0.750" />
  </Range>
```

means that for soundings deeper or equal to 30, the value will be increased to the next metre at every 0.750, as shown in the following table.

Depth	Display
30.0	30
30.749	30
30.750	31
30.999	31
31.000	31
31.749	31
31.750	32

Element tags can be grouped together, for example, as in the following range:

```
<Range Threshold=”30”>
   <Element Precision=”1.0” Rounding_point=”0.8”/>
   <Element Precision=”0.5” Rounding_point=”0.3”/>
</Range>
```

This means that for soundings deeper than 30:

if the decimal part is greater or equal to 0.8 then the sounding is rounded to the deeper unit.

if the decimal part is greater or equal to 0.3, the sounding is rounded to 0.5.

This is shown in the following table:

Depth	Display
30.00	30
30.299	30
30.300	30.5
30.799	30.5
30.800	31
30.999	31

A truncating effect can be created by setting the Precision and Rounding_Point to 1.0. which removes the decimal part without rounding. For example,

```
<Range Threshold="10">
  <Element Precision="1.0" Rounding_point="1.0"/>
</Range>
```

would truncate as follows:

Depth	Display
10.3	10
11.8	11
15.8	15
20.0	20
25.6	25

Hydrographic Agency Rules

The SoundingRounding.xml file contains rounding and truncating standards from the following hydrographic organizations:

- AHOI - Australian Hydrographic and Oceanographic Instruction.
- IHO - International Hydrographic Association
- NAVOCEANO - Naval Oceanographic Office
- NOAA - National Oceanographic and Atmospheric Administration
- UKHO - United Kingdom Hydrographic Office.

AHOI

The following three Rules are applied by AHOI for soundings:

- In waters that are shoaler than 31 metres, depths are given in metres and decimetres.
- In waters that are 31 metres or deeper, depths are shown in metres only.
- A rounding point of .065 is used to round the sounding value upwards or downwards:

Range	Level	Shoalest	Deepest	Direction	Result
0.000 to 30.999	x.1	x.y00	x.y64	Shoaler	x.y
	x.1	x.y65	x.y99	Deeper	x.(y+1)
31.000 and deeper	x	x.000	x.649	Shoaler	x.000
	x	x.650	x.999	Deeper	x+1

Soundings Example

0.1 Level		1.0 Level	
Depth (m)	Display (m)	Depth (m)	Display (m)
0.000	0	31.000	31
0.010	0	31.649	31
0.064	0	31.650	32
0.065	0.1	31.999	32
0.099	0.1	32.000	32
0.100	0.1	32.649	32
0.164	0.1	32.650	33

0.1 Level		1.0 Level	
Depth (m)	**Display (m)**	**Depth (m)**	**Display (m)**
0.165	0.2	32.999	33
0.199	0.2		
0.900	0.9		
0.964	0.9		
0.965	1		
0.999	1		
30.900	30.9		
30.964	30.9		
30.965	31		
30.999	31		

IHO

The following rules are applied by the IHO M-4 Chart Specifications for sounding rounding:

- For soundings between 0 and 20.999:

  Soundings are rounded to the shoalest decimetre.
- For soundings between 21 and 29.999

  Soundings are rounded to the next shoalest half metre.
- For soundings 30 metres and deeper:

  Soundings are rounded to the shoalest metre.

Range	Level	Shoalest	Deepest	Direction	Result
0.000 to 20.999	x.1	x.y00	x.y99	Shoaler	x.y
21.000 to 30.999	x.5	x.000	x.499	Shoaler	x.000
	x.5	x.500	x.999	Shoaler	x.500
31.000 and deeper	X	x.000	x.999	Shoaler	x.000

Soundings Example

0.1 Level		0.5 Level		1.0 Level	
Depth (m)	**Display (m)**	**Depth (m)**	**Display (m)**	**Depth (m)**	**Display (m)**
0.000	0	21.000	21	31.000	31
0.001	0	21.100	21	31.999	31
0.008	0	21.400	21	32.000	32

0.1 Level		0.5 Level		1.0 Level	
Depth (m)	**Display (m)**	**Depth (m)**	**Display (m)**	**Depth (m)**	**Display (m)**
0.009	0	21.499	21	32.999	32
0.010	0	21.500	21.5		
0.020	0	21.800	21.5		
0.080	0	21.999	21.5		
0.099	0	30.499	30		
0.100	0.1	30.999	30.5		
0.110	0.1				
0.180	0.1				
0.199	0.1				
0.900	0.9				
0.910	0.9				
0.980	0.9				
0.999	0.9				
20.900	20.9				
20.910	20.9				
20.980	20.9				
20.999	20.9				

NAVOCEANO

The following rules are applied by NAVOCEANO for sounding rounding:

- Deeper than 40 metres:

  If the decimal part is greater or equal to 0.8, round to the deeper whole unit. Otherwise, round to the shoaler whole unit.

  Example: 40.7 rounds to 40, 40.79 rounds to 40, 40.78 rounds to 41

- Deeper than 30 metres:

  If the decimal part is greater or equal to 0.8, round to the deeper whole unit.

  If the decimal part is greater or equal to 0.3, round to 0.5, otherwise round to the shoaler whole unit.

  Example: 30.2 and 30.29 round to 30, 30.3 rounds to 30.5 30.7 and 30.79 round to 30.5, 30.8 rounds to 31.

- Shoaler or equal to 30 metres:

If the second decimal is greater or equal to 0.05, round to the deeper first decimal. Otherwise round to the shoaler first decimal.

Example: 20.740 and 20.749 round to 29.7
29.75 rounds to 29.8.

Range		Level	Shoalest	Deepest	Direction	Result
0.000	29.999	x.1	x.y00	x.y49	Shoaler	x.y
0.000	29.999	x.1	x.y50	x.y99	Deeper	x.(y+.1)
30.000	39.999	x.5	x.000	x.299	Shoaler	x.000
30.000	39.999	x.5	x.300	x.799	Either	x.500
30.000	39.999	x.5	x.800	x.999	Deeper	x+1
40.000	9999	X	x.000	x.799	Shoaler	x
40.000	9999	X	x.800	x.999	Deeper	x+1

Soundings Example

0.1 Level		0.5 Level		1.0 Level	
Depth (m))	Display (m))	Depth (m)	Display (m)	Depth (m)	Display (m)
0.000	0	30.000	30	40.000	40
0.049	0	30.299	30	40.799	40
0.050	0.1	30.300	30.5	40.800	41
0.099	0.1	30.799	30.5	40.999	41
0.100	0.1	30.800	31	41.000	41
0.149	0.1	30.999	31	41.799	41
0.150	0.2	39.000	39	41.800	42
0.199	0.2	39.299	39	41.999	42
0.900	0.9	39.300	39.5		
0.949	0.9	39.799	39.5		
0.950	1	39.800	40		
0.999	1	39.999	40		
29.900	20.9				
29.949	20.9				
29.950	30				
29.999	30				

NOAA

The following rules are applied by NOAA for sounding rounding:

- For 30.5 metres and deeper, if the decimal part is 0.75 or greater, round to the deeper whole unit.
- For soundings between 21 and 30.499 metres

  If the decimal part is greater or equal to 0.875, round to the deeper whole unit

  If the decimal part is greater or equal to 0.375, round to 0.5
- For soundings 20.999 metres or shoaler, if the second decimal is 0.075 or greater, round to the deeper first decimal
- Rounding in fathoms.feet and feet use a single threshold.
- Fathoms and feet are in the format X.YZZZ., where X is fathoms, Y is feet, and ZZZ is decimals of the foot.
- For fathoms.feet shoaler than threshold, soundings round to the deeper foot if the decimals of the foot are X.Y75000 or greater. For example, 35.574 becomes 35.5.
- For fathoms.feet deeper or equal to the threshold, soundings round to the deeper fathom if feet and decimals of the foot are X.45000 or greater, because 4.5 feet is equal to 0.75 fathoms. For example, 35.575 becomes 35.6.

Rules for depths below datum (in metres)

Range		Level	Shoalest	Deepest	Direction	Result
0.000	20.999	x.1	x.y000	x.y749	Shoaler	x.y
0.000	20.999	x.1	x.y75	x.y99	Shoaler	x.(y+.1)
21.0	30.499	x.5	x.375	x.874	Shoaler	x.000
21.0	30.499	x.5	x.375	x.874	Deeper	x.5
21.0	30.499	x.5	x.875	x.999	Deeper	x+1
30.5	9999	x	x.000	x.744	Shoaler	x
30.5	9999	x	x.750	x.999	Deeper	x+1

For depths below datum in fathoms.feet (x.y)

Range	Level	Shoalest	Deepest	Direction	Result
< threshold	y	x.y00	x.y74	Shoaler	ff ft
< threshold	y	x.y75	x.y99	Deeper	ff ft+1
=> threshold	x	x.000	x.y44	Shoaler	x.000
=> threshold	x	x.y45	x.599	Deeper	x+1

Rules for drying heights
(all units)

Range	Level	Shoalest	Deepest	Direction	Result
-0.001 and shoaler	x	-x.049	-x.001	Deeper	-x.000
	x	-x.999	-x.050	Shoaler	-x-1

Soundings Example
(Metres)

0.1 Level		0.5 Level		1.0 Level	
Depth (m)	Display (m)	Depth (m)	Display (m)	Depth (m)	Depth (ft)
0.000	0	21.000	21	30.5	30.5
0.001	0	21.374	21	30.740	30.5
0.074	0	21.375	21.5	30.750	31
0.075	0.1	21.874	21	30.999	31
0.099	0.1	21.875	22	31.000	31
0.100	0.1	30.000	30	31.749	31
0.174	0.1	30.374	30	31.750	32
0.175	0.2	30.375	30.5	31.999	32
0.199	0.2				
0.900	0.9				
0.974	0.9				
0.975	1				
0.999	1				
20.900	20.9				
20.974	20.9				
20.975	21				
20.999	21				

Soundings Example
(fathoms and feet)

Fathoms and Feet		
Depth (m)	Depth (ff)	Display (ff)
0.000	0.000	0
1.139	0.374	0.3
1.143	0.375	0.4
1.216	0.399	0.4

Fathoms and Feet		
Depth (m)	**Depth (ff)**	**Display (ff)**
53.035	29.000	29
54.784	29.574	29.5
54.788	29.575	30
54.860	29.599	30
54.864	30.000	30
56.232	30.449	30
56.236	30.450	31
56.689	30.599	31
91.440	50.000	50
92.808	50.449	50
92.812	50.450	51
93.265	50.599	51

UKHO

The following rules are applied by UKHO for sounding rounding:

- Soundings 30 metres or deeper:
  If the decimal part is .0750, round up to the next whole metre.
- Soundings between 21 metres and 29.999 metres:
  If the decimal part is 0.5 or greater, round down to 0.5
- Soundings between 0 metres and 20.999 metres:
  If the decimal part is 0.80 and deeper, round up by 0.1.
- Drying heights from -0.001 to -20.999 metres:
  If the decimal part is greater than 0.030, round down by 0.1.
- Drying heights from -21 to -29.999:
  If the decimal part is greater than 0.5, round up by 0.5.
- Drying heights from -30.
  If the decimal part is greater than 0.750, round up by 1.0.

Range	Level	Shoalest	Deepest	Direction	Result
0.000 to 20.999	x.1	x.y00	x.y79	Shoaler	x.y
	x.1	x.y80	x.y99	Deeper	x.(y+.1)
21.000 to 29.999	x.5	x.000	x.499	Shoaler	x.000
	x.5	x.500	x.999	Shoaler	x.500
30.000 and deeper	x	x.000	x.749	Shoaler	x.000
	x	x.750	x.999	Deeper	x+1
-20.999 to –0.001	x.1	-x.y29	-x.y00	Deeper	-x.y
	x.1	-x.y99	-x.y30	Shoaler	-x.(y-.1)
-29.999 to –21.000	x.5	-x.499	-x.000	Shoaler	-x.5
	x.5	-x.999	-x.500	Shoaler	-x-1
-30.000 and shoaler	x	-x.749	-x.000	Deeper	-x.000
	x	-x.999	-x.750	Shoaler	-x-1

Sounding Example

0.1 Level		0.5 Level		1.0 Level	
Depth (m)	Display (m)	Depth (m)	Display (m)	Depth (m)	Display (m)
0.000	0	21.000	21	30.000	30
0.001	0	21.499	21	30.749	30
0.008	0	21.500	21.5	30.750	31

0.1 Level		0.5 Level		1.0 Level	
Depth (m)	**Display (m)**	**Depth (m)**	**Display (m)**	**Depth (m)**	**Display (m)**
0.009	0	21.999	21.5	30.999	31
0.010	0	29.000	29	31.000	31
0.079	0	29.499	29	31.749	31
0.080	0.1	29.500	29.5	31.750	32
0.099	0.1	29.999	29.5	31.999	32
0.100	0.1				
0.179	0.1				
0.180	0.2				
0.199	0.2				
0.900	0.9				
0.979	0.9				
0.980	1				
0.999	1				
20.900	20.9				
20.979	20.9				
20.980	21				
20.999	21				

Drying Heights Example

Depth (m)	Display (m)
-0.999	-1
-0.930	-1
-0.929	-0.9
-0.900	-0.9
-0.199	-0.2
-0.130	-0.2
-0.129	-0.1
-0.099	-0.1
-0.030	-0.1
-0.029	0
-0.010	0

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