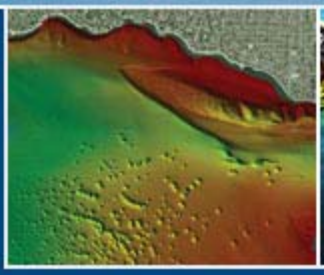
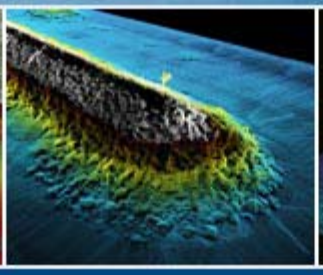
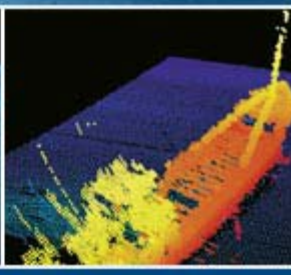
CARIS HIPS and SIPS 8.1

Reference







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CARIS
(Global Headquarters)
115 Waggoners Lane
Fredericton, NB
Canada
E3B 2L4

Phone: 1 (506) 458-8533
(English/French/Spanish)
Fax: 1 (506) 459-3849
Email: info@caris.com
Assistance: support@caris.com
Web site: www.caris.com

CARIS USA
415 N. Alfred Street
Alexandria, VA
United States
22314

Phone: 1 (703) 299-9712
Fax: 1 (703) 299-9715
Email: carisusa@caris.com

CARIS bv
Mgr. van Oorschotstraat 13
PO Box 47 5473 ZG
Heeswijk, NETHERLANDS

Phone: +31 (0)413 296 010
Fax: +31 (0)413 296 012
Email: sales@caris.nl
Assistance: support@caris.nl

CARIS Asia Pacific
Level 3 Shell House, 172 North Terrace
Adelaide SA 5000
Australia

Phone: +61.(0).8.8231.9474
Email: info@caris.com

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Preface

This guide describes the HIPS and SIPS interface and how it works. It also describes the options that control the layout and appearance of the interface.

Table of Contents

1

The HIPS and SIPS Interface

This chapter describes the interface and its components (menus, toolbars and windows), and how projects and background data can be viewed.

In this chapter...

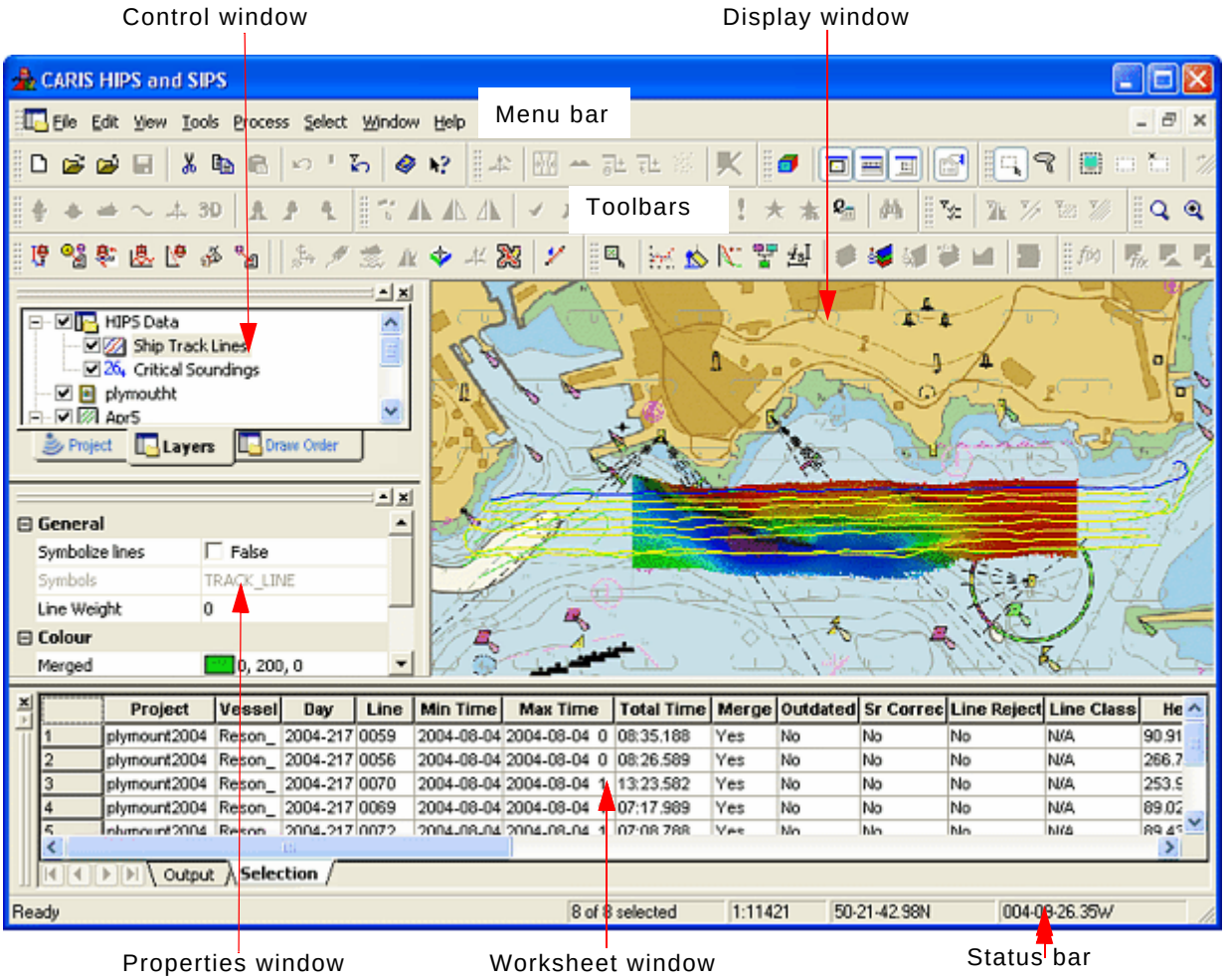
Opening HIPS and SIPS

1. To open HIPS from the Windows interface, select Start > Programs > CARIS > HIPS and SIPS *version number* > CARIS HIPS and SIPS

During installation you were prompted to place a HIPS icon on the desktop. If you selected this option you can also open HIPS and SIPS by double-clicking this icon.

Main Interface

The HIPS and SIPS interface is composed of a menu bar, various toolbars, four main windows, and a status bar (see "Status Bar" on page 36).



The Menu bar (see "Menus" on page 27) and toolbars (see "Toolbars" on page 34) can be hidden from display, or moved to other locations on your desktop. Windows can be undocked and moved to another location, resized, or hidden (see "Display, Reposition and Resize Windows" on page 25).

Display Window

The Display window shows graphical representations of the survey data. To select data such as track lines in the Display Window, that layer must first be highlighted in the Layers tab of the Control Window.

To open the Display window:

Menu	Window > Display
Tools	

1. Select the Display window command.

- select track lines, soundings or contours (see "Query Data" on page 269).
- zoom and pan data (see "Zoom" on page 39 and "Pan" on page 38).
- view imagery files (see"Open Background Data" on page 46) and S 57 data (see "Display S-57 Data" on page 53).
- save screen captures of the display in the window (see "Screen Captures" on page 41).
- define a field sheet area (see "Create a Field Sheet" on page 170).
- display a temporary geographic or projected grid over the extent of your project (see "Geographic Grid" on page 102 or "Projected Grid" on page 108).

You can also open a range of files such as GeoTIFF, HOB, S-57 and JPEG as background files. (see " Display Background Data" on page 45 for full description.

Pop-up menu

When you right-click in the Display window, a pop-up menu gives you access to a variety of commands. (Commands which are greyed out are not available for the current data.)

These commands include:

- viewing commands such as Overview and Zoom
- tools such as the Attitude, Navigation and other HIPS and SIPS editors,
- editing commands such as Cut, Paste and Copy Position
- Query and Sort functions
- save the content of the display as an image

For options for the display of the ship and towfish track lines see "Display window" on page 100.

Control Window

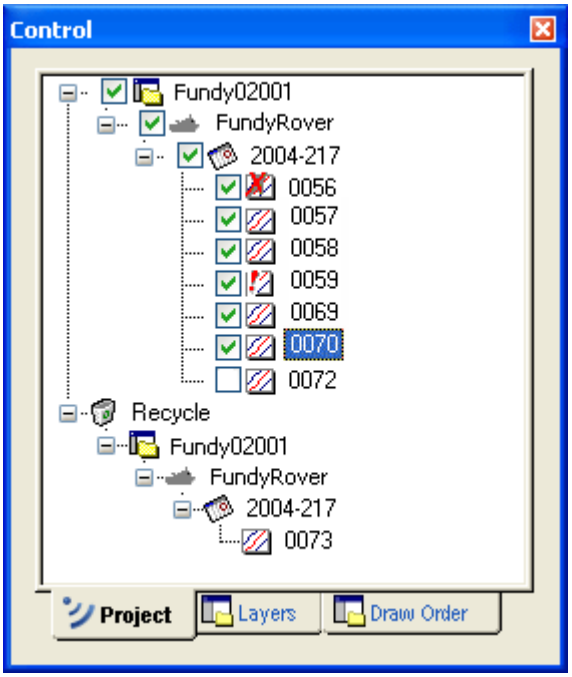
The Control window has three tabbed windows: Project, Layers, and Draw Order.

A fourth tabbed window will be available when you open a HIPS and SIPS editor, such as the Mosaic Editor or Attitude Editor.

Project tab

The Project tab displays the currently open project.

You can expand the tree by clicking the plus sign (+) to reveal the layers of the Project/Vessel/Day/Line hierarchy. A green check mark in the check box for each line indicates that the line is visible in the Display window. By default all lines are visible.



The red ✗ icon indicates that this line is Rejected.

The red ! icon indicates that this line is Outdated.

Highlighting on a line indicates it is selected in the Display window.

An empty check box indicates the line is not visible in the Display window..

You can perform the following operations in this window:

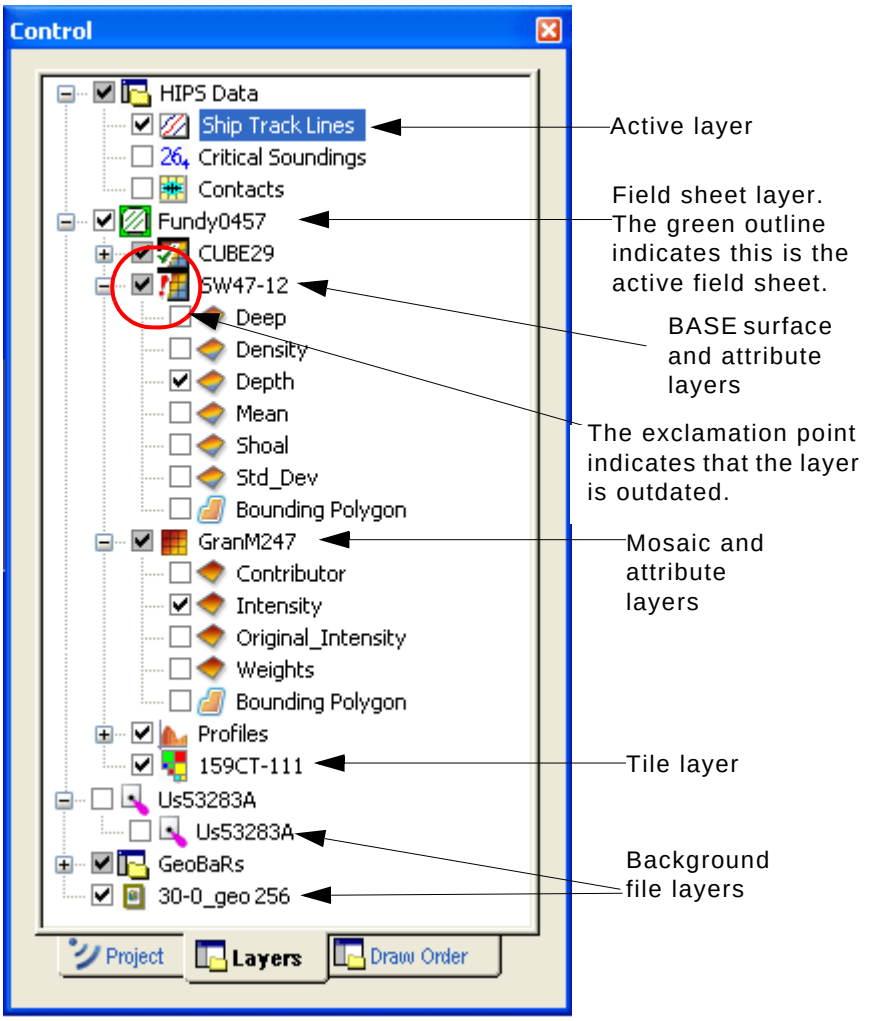
- open and close lines (see "Close a Project" on page 42)
- select track lines (see "Query Data" on page 269)

For information on working with projects, see "Create a New Project" in the CARIS HIPS and SIPS User Guide.

Layers tab

The Layers tab lists the open data layers. Control what is viewed in the Display window by selecting or clearing the check boxes for the various layers.

Besides survey data, a layer can consist of a BASE Surface, a BASE surface attribute layer, a CARIS map, an image, or field sheet products such as contours, selected soundings, tiles, etc.



1. Expand the file tree by clicking the + icon beside it.
2. Show/hide the display of a layer (in the Display window) by selecting or clearing the check box beside the layer name. (See also "Toggle visibility of layers" on page 15.)
3. Selecting a layer (so that it is highlighted) makes it the active layer. The data in that layer can now be selected in the Display window.
4. Select Use Coordinate System from the pop-up menu to apply the coordinate system from a layer to the view of data in the Display window. For an example of changing the coordinate using a background data layer, see "Use Coordinate System" on page 48.

Menu	View >Refresh
Tools	
Key	F5

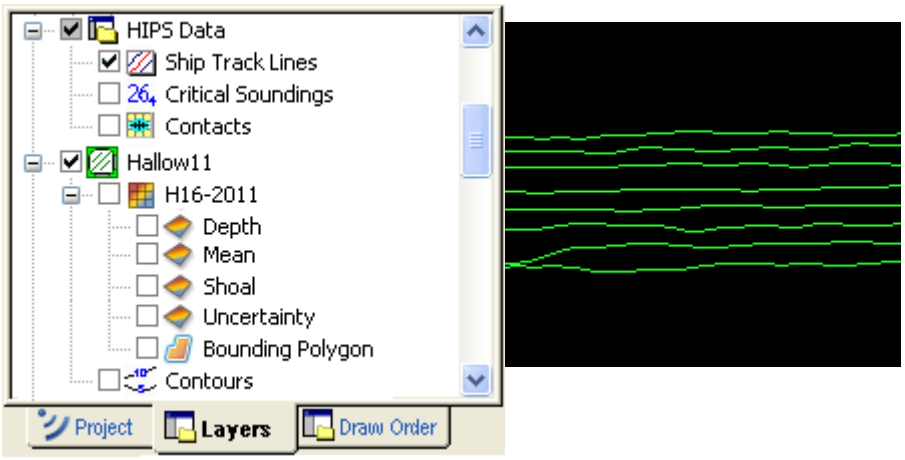
5. To update the Display, window select the Refresh command.
   - Or turn on the Automatic Refresh option in the General Options dialog box (see "GENERAL" ON PAGE 93).

BASE surfaces can be grouped together in the Layers tab in order, for example, to apply the same display properties to the attribute layers of multiple surfaces simultaneously. See "GROUP MULTIPLE SURFACES" ON PAGE 238.

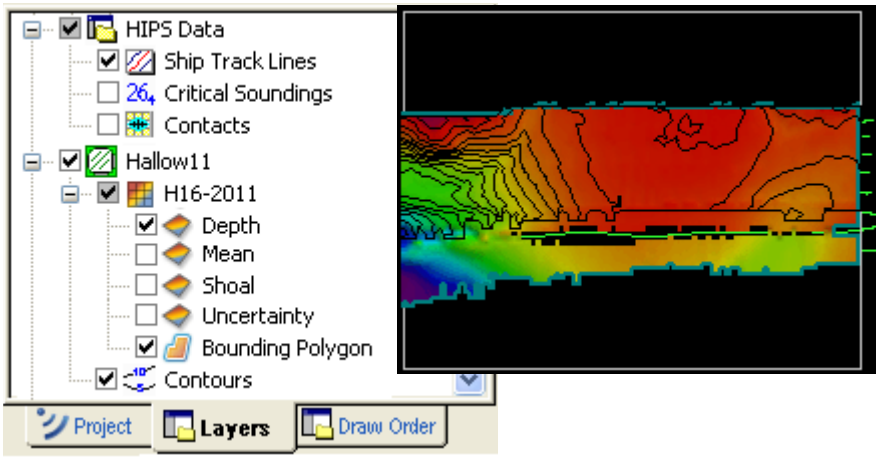
Toggle visibility of layers

You can also toggle many layers on and off at the same time. The parent layer (for example, a BASE surface layer) controls the visibility of its child layers (such as the attributes layers).

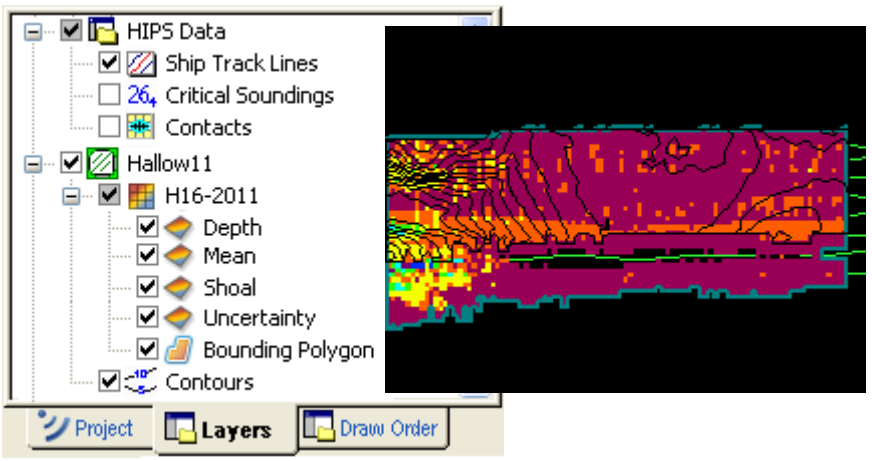
- When the check box for a parent layer is cleared, all selected child layers of the parent layer are also cleared. None of the layers is visible in the Display. (In the example below, the BASE surface H16-2011parent layer is turned off as are all its attribute layers.



- When the parent layer check box is selected again, any of the child layers that were selected at the time the parent layer was cleared, are also re-selected. These child layers are now visible again in the Display. (In the example below the Depth and Bounding Polygon are selected.)

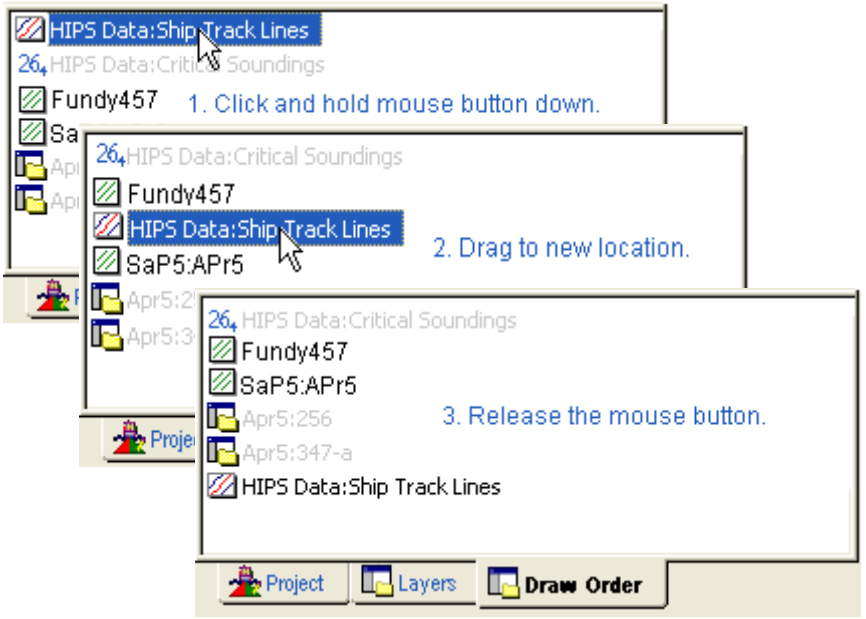


- If you select all the child layers, you can toggle them all on and off using the parent layer check box. In the following example *all* the child layers of H16-2011 have been toggled on.



Draw Order tab

The Draw Order tab displays the order that objects are drawn to the Display window. Objects are drawn in order, from top to bottom, as they appear in the Draw Order tab. You can change the draw order by dragging an object to another position on the list, as illustrated below.



Tab for HIPS and SIPS editors

When you open the Attitude, Navigation, Swath, Subset or Sidescan Editor, a fifth tab will be displayed in the Control window. It will contain the controls for the active editor.

For example, the Swath Editor tab contains 3 tabbed pages:

- The General tab controls the data display in the Swath Editor windows.
- The 3D tab contains the Swath 3D view controls.
- The WCI tab controls display options for the water column imagery windows.

Properties Window

The Properties window displays the properties of lines, surfaces and features that are listed in the Layers tab and selected in the Display window.

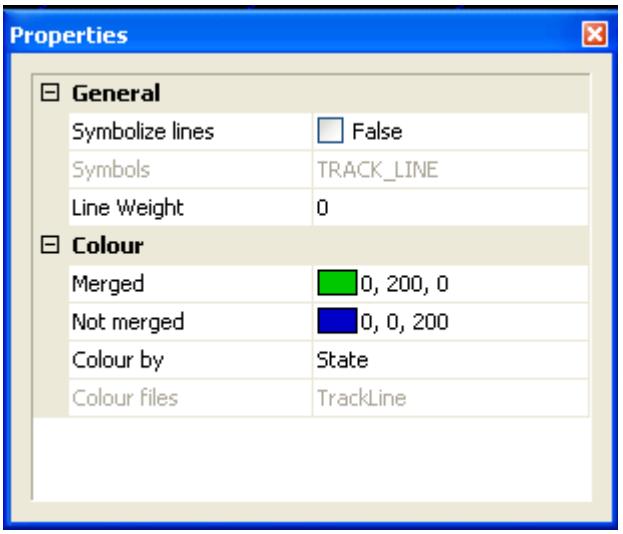
The properties shown in the window are determined by the type of layer selected, that is, ship track lines, field sheet and BASE Surface layers will display different properties, and not every layer displays properties.

The Properties window can be undocked and moved around the interface.

Menu	Window > Properties
Tools	
Pop-up	Properties

1. Select the Properties window command.
2. Select a layer in the Layers tab of the Control window.

The display properties for that layer are shown in the window. The example shown below shows properties for the Ship Track Line layer.



For more information on viewing and setting properties for specific layers, see the following in the HIPS and SIPS User Guide:

- "Set Line Properties" on page 67
- "Critical Soundings" on page 293
- "View Project Properties" on page 63
- "View Vessel Properties" on page 66
- "Properties of BASE Surfaces" on page 200
- "Set Field Sheet Properties" on page 177 for Field Sheet layers.

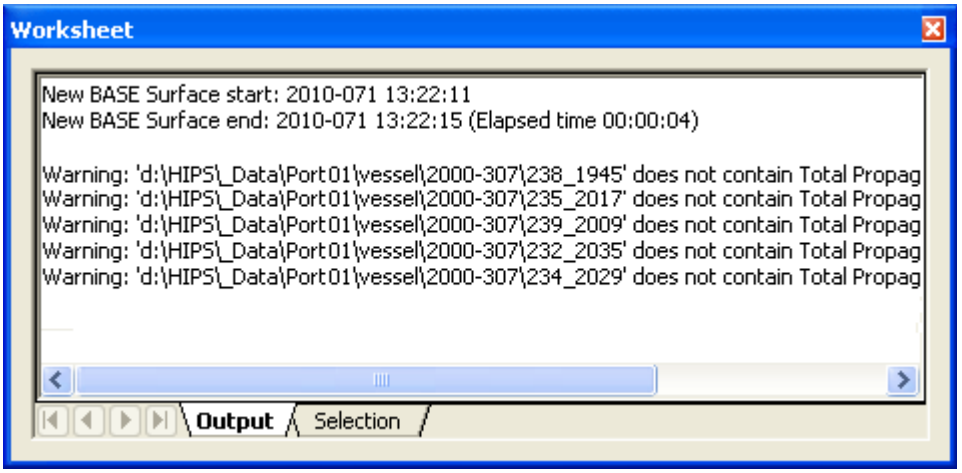
Worksheet Window

The Worksheet window has two tabs which are visible at all times while HIPS and SIPS is open: Output tab and Selection tab.

- Output (for viewing the result of a command or process).
- Selection (for viewing information on selected data)
- QC Reports (for displaying quality control reports)

Output Tab

In this tab you can view the results of a command or process.



Information in this tab is read-only and cannot be modified.

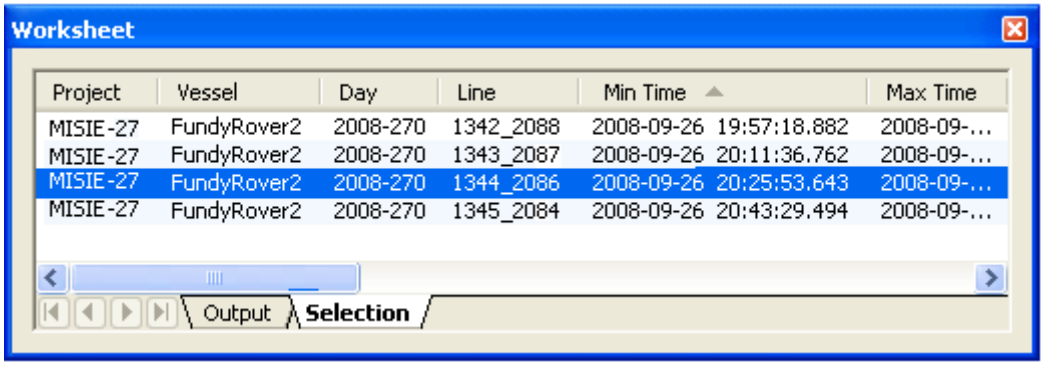
If you want to remove the information in this tab, right-click the mouse and select Clear from the pop-up menu.

Selection Tab

When you select features such as lines, soundings or contours in the Display window, their data profiles are automatically displayed in the Selection tab.

To see this information for data selected in a HIPS and SIPS editor, use a Query command. See "QUERY DATA" ON PAGE 269 in the User Guide.

The example below displays the data profiles for four selected lines. The line highlighted in the table is the line that is superselected in the Display window.



Data profiles in the Selection tab are shown in tabular format, with a column for each data field. Records in a column can be sorted by clicking on the column header. This will sort the records by ascending or descending order of the values in the column.

This data is read only. However, it can be saved to a text file using the command on the pop-up menu.

Which columns are displayed, and the order in which they are displayed, is controlled by the pop-up menu. To set which data to display:

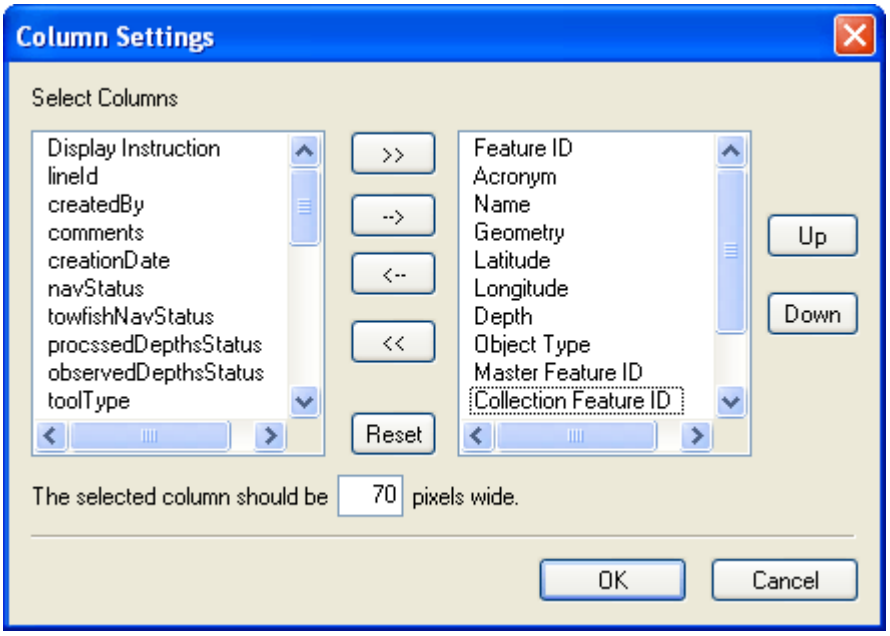
1. Right-click on a column header in the Selection tab.
2. Select columns by name from the list on the pop-up menu, or select **More** to open the Column Settings dialog box.

Column Settings

Use the Column Settings dialog box to determine the column headings to be displayed. The example below shows the column headings for contacts selected in the Display window.

The left side of the dialog box lists headings that are available but not currently visible, and the right side lists the column headings currently displayed in the Selection tab

3. Use the **<--** and **-->** buttons to move the headings from one column to the other.

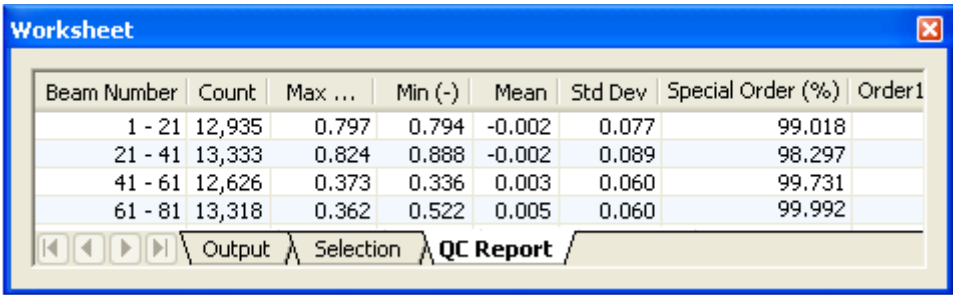


4. Use the **Up** and **Down** buttons to change the order in which they are shown in the Selection tab.
5. To adjust the width of a column, select it in the right-hand list and type the desired width in pixels. (Column width can also be set manually in the Selection tab by dragging the right or left edge of a column header.)
6. To restore the default listing of fields and their order, click Reset.
7. Click **OK**.

See also "Query Data" on page 269.

QC Reports Tab

The QC Reports tab contains statistical data generated from the QC Reports tool on the Process menu. For details on creating QC reports, see "Quality Control Reports" on page 303.



You can customize display of data in the QC Reports tab in the same manner as in the Selection tab. See "Selection Tab" on page 20 for more information.

You can also create graphs of this data using the Graph tool.

Detailed Line Query Window

The Detailed Line Query window can display a table of more than 50 columns of detailed line information for a selected line or lines. This is activated using the Detailed Line Query command on the Process menu. (See "Detailed Line Query" on page 270.)

Which data is visible and in what order it is displayed is controlled using the Column Settings dialog box from the right-click menu. (See "Column Settings" on page 20.)

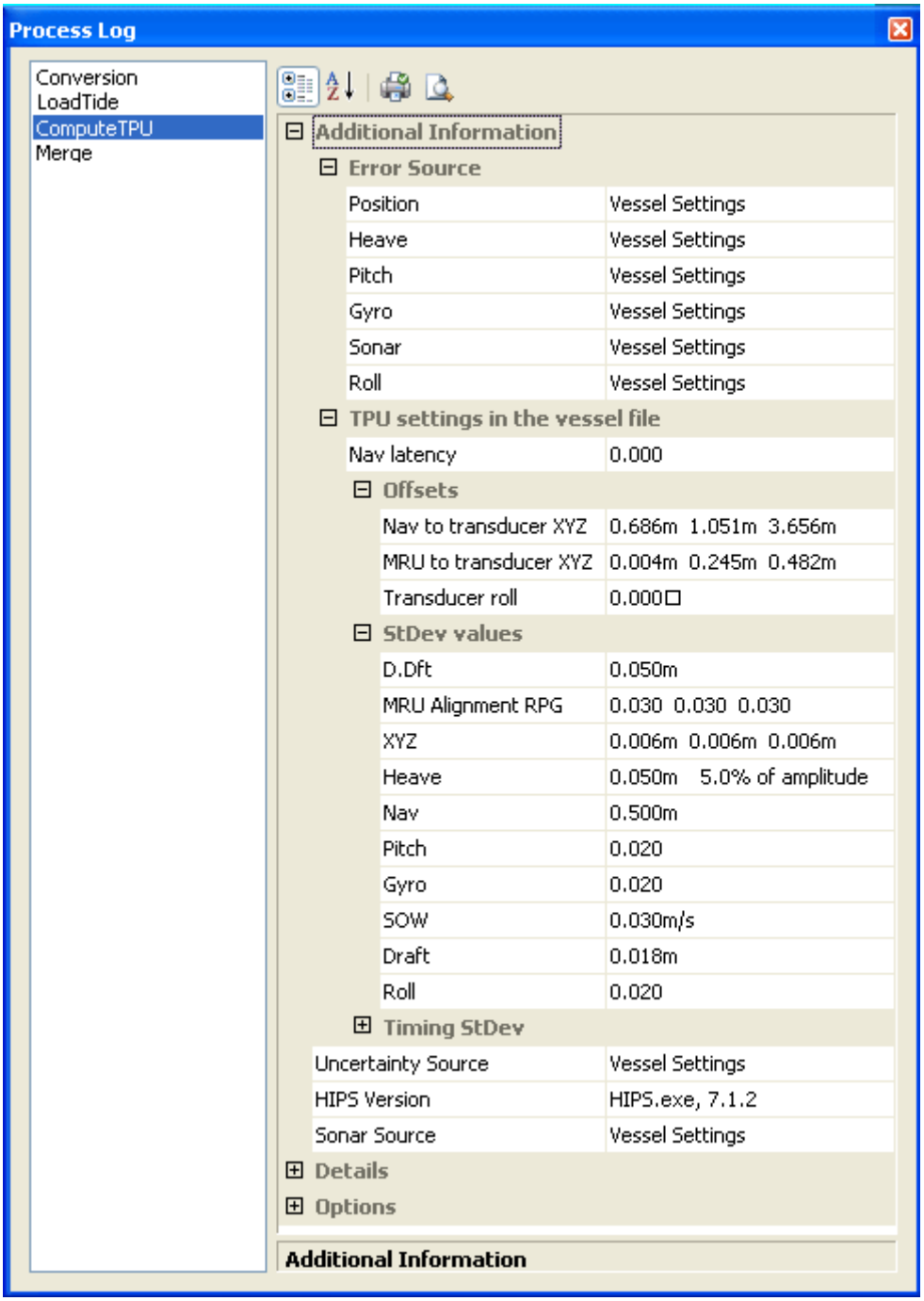
As with the Selection tab, records in a column can be sorted by clicking on the column header.

This information can be saved to a text file, using the Save As command on the right-click menu.

To save a customized selection of the data, see "Line Report" on page 271.

Process Log Window

HIPS automatically creates a text Log file in the line directory for each line, recording the operations that are applied to the line. The Process Log window, opened from the Window menu, displays the process log for a superselected line.



Processes are listed in the left hand column in chronological order, with the earliest applied process at the top of the list and the latest process applied at the bottom of the list.

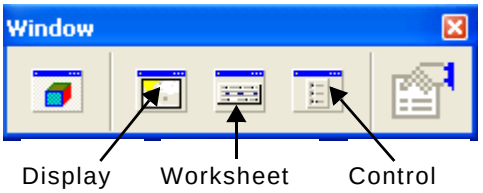
Processes that can be displayed include:

- Conversion
- Load Tide
- Load Delta Draft
- Load True Heave
- Sound Velocity Profiles applied
- Merge
- Compute TPU
- Compute GPS Tide
- Load Error Data
- Load Attitude/Navigation Data
- Shift Navigation
- Beam Pattern Correction
- Recompute Towfish Navigation

Display, Reposition and Resize Windows

Display

The Display, Worksheet and Control windows are open in the default HIPS and SIPS layout, but they can be closed, and re-opened by clicking the appropriate button on the Window toolbar, or in the Window menu.



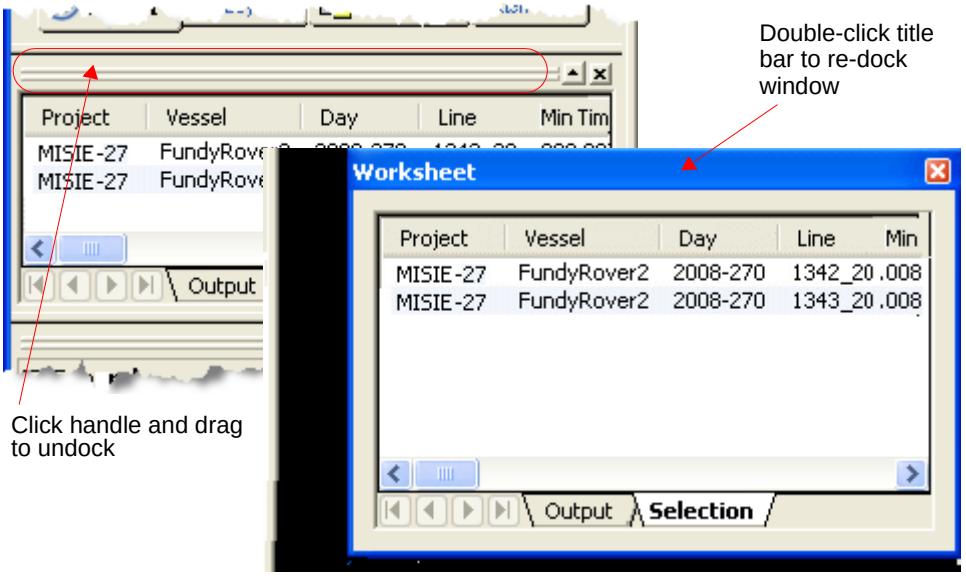
Reposition

All windows can be undocked from their default positions and moved within the HIPS interface or to positions on your desktop.

1. Click and hold your cursor on the title bar or handle of the window and drag the window to the new position.

As you drag the cursor, the window un-docks from its current location and moves with the cursor.

2. Release the mouse button when you want to position the window in its new location.



To prevent a window from automatically docking within the interface, hold the <Ctrl> key while dragging the window.

A floating window can be restored to its last docked position by double clicking on its title bar.

Re-size

Windows can also be sized to a new length and width.

1. Position the cursor on any edge of the window.

The cursor becomes a two-headed arrow.

2. Press and hold the mouse button and drag the edge of the window to a new position.

As you drag the cursor, the window expands or contracts, depending on whether you are pulling or pushing the window edge.

3. Release the mouse button when you have resized the window to the desired length and width.

Restore default windows layout

You can close all editors open in the HIPS and SIPS interface, and reset the interface windows (such as the Control window) to the same position as when the application was first installed.

Menu	Window > Restore Default Window Layout

1. Select the Restore Default Window Layout command.

You will be prompted to save data as editors are closed.

Menus

Most HIPS and SIPS commands can be accessed from menus on the menu bar at the top of the interface. The following is an outline of the commands available.

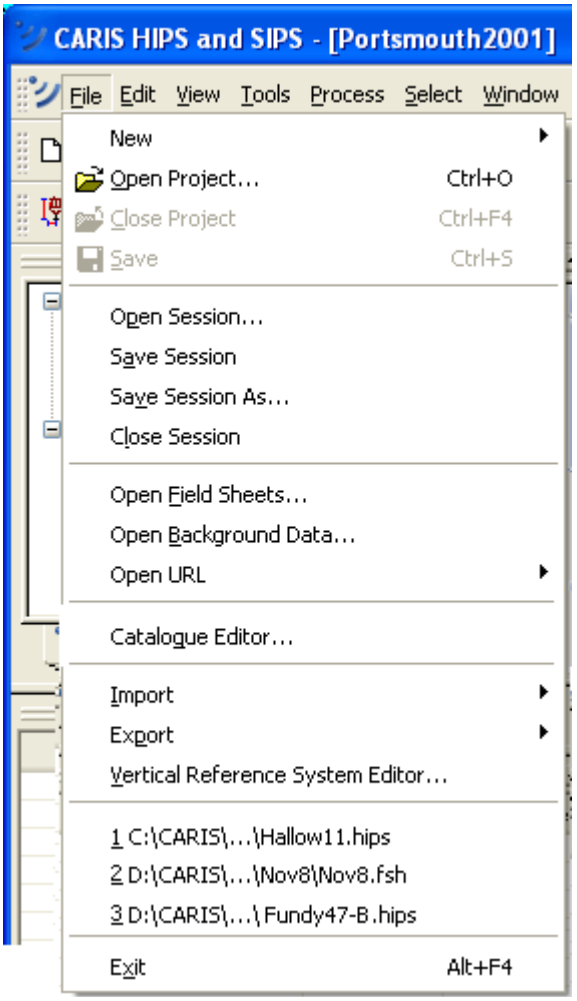
For an alphabetical listing describing all the HIPS and SIPS commands, see the "COMMAND OVERVIEW" in the HIPS and SIPS Tools guide.

The functions of the various commands are described within the workflow outlined in the HIPS and SIPS Users Guide.

File menu

Use the File menu commands to open, save and close projects, sessions and field sheets and to open background data.

It also contains the commands for importing and converting data and for exporting processed data to various formats, as well as a access to the Vertical Reference Editor.

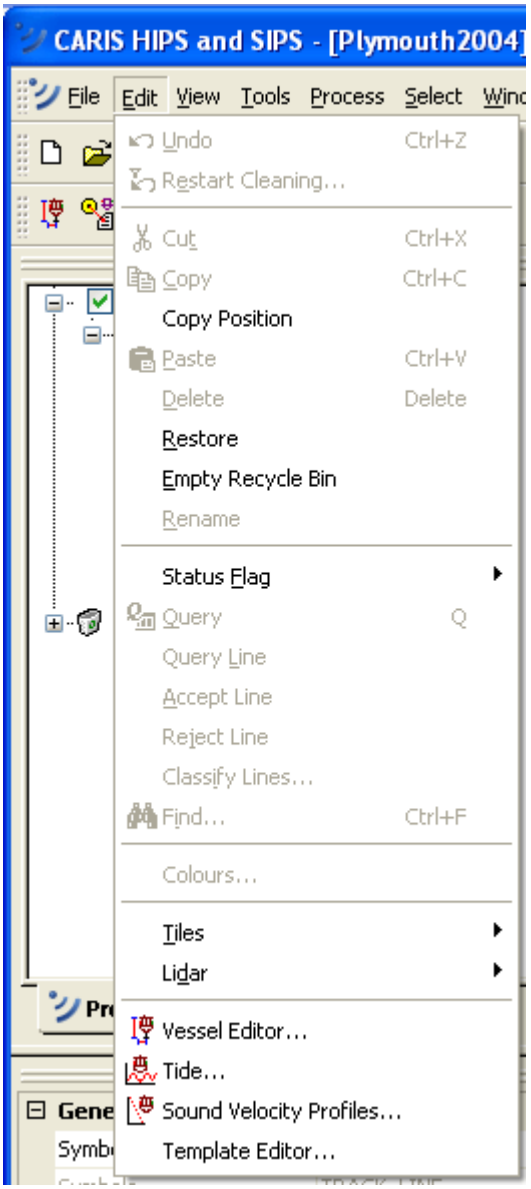


Edit menu

This menu contains editing commands such as Undo, as well as data cleaning commands to reject, accept and query data.

Commands to query tile soundings and to create a tile histagram, as well as viewing and editing commands for LIDAR data are also listed.

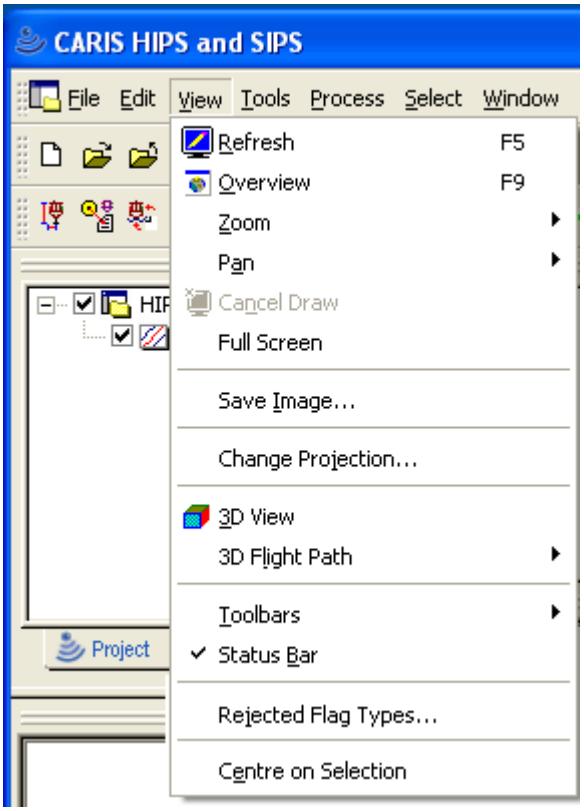
Vessel, SVP and Tide Editors can also be opened from the Edit menu.



View menu

Commands on the View menu enable you to change the display of data with Zoom and Pan, Refresh, Change Projection and Centre on Selection commands.

Commands to display and manipulate data in 3D, and to record 3D “fly-throughs” are also on the View menu as well as commands to display specific data such as rejected data.

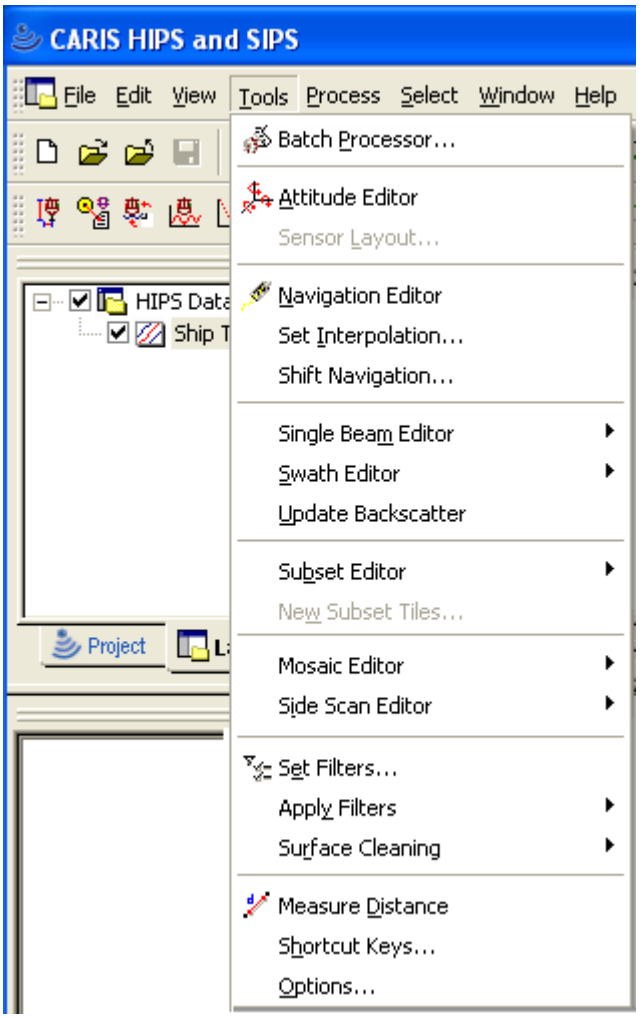


Tools menu

Use the Tools menu commands to run batch processing, interpolation or shifting of navigation data, set and apply filters, measure distances and create beam pattern correction files.

As well, SingleBeam, Subset, Swath, Side Scan and Mosaic Editors can be opened from the Tools menu.

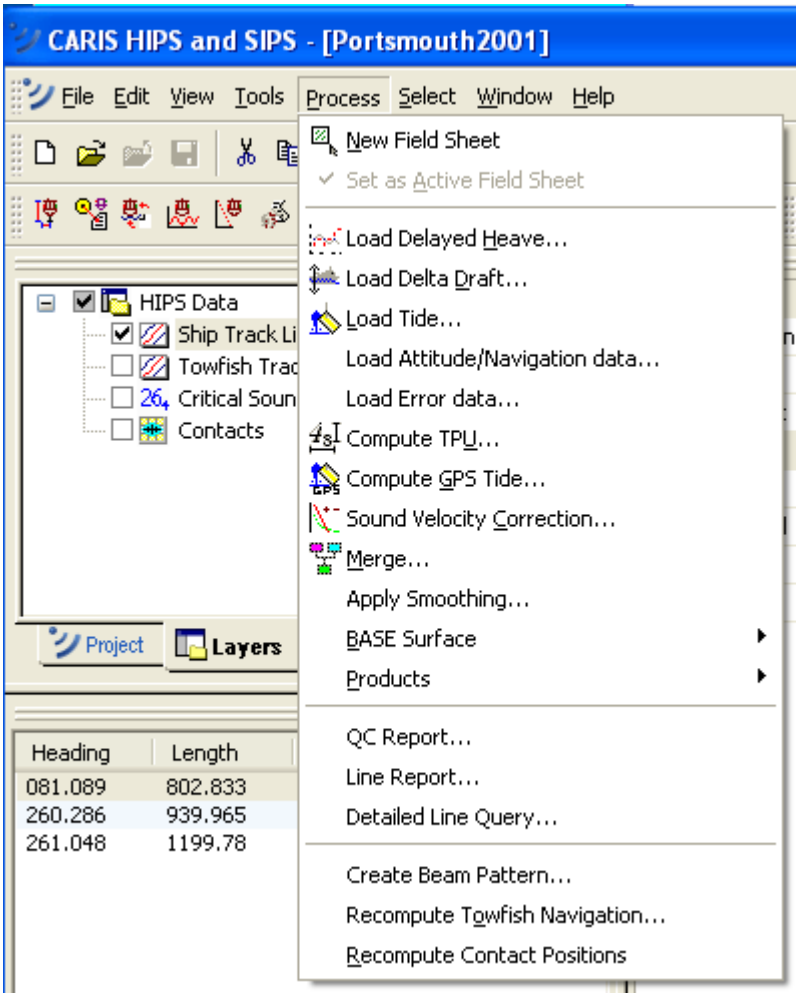
HIPS and SIPS options can also be set from the Tools menu.



Process menu

From the Process menu you can create field sheets and QC reports, load corrections such as TrueHeave and tide, compute TPU and SVC and then merge your data.

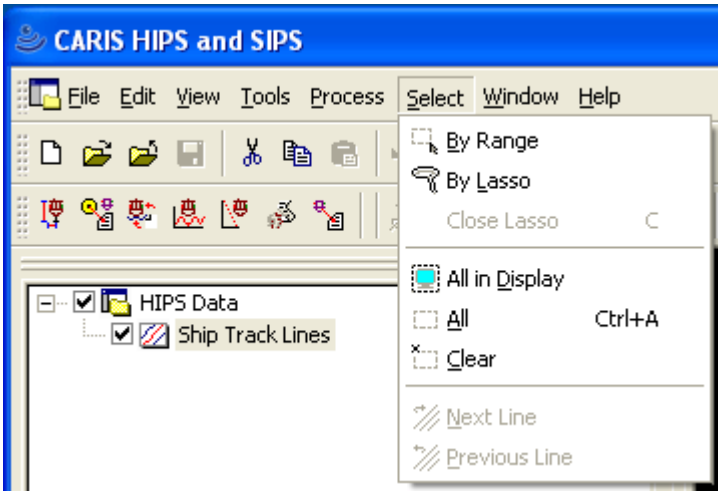
The commands to create and work with BASE surfaces, Product surfaces and products such as contours are also on the Process menu. Imagery corrections such as Beam Pattern Correction can be applied from the Process menu.



Select menu

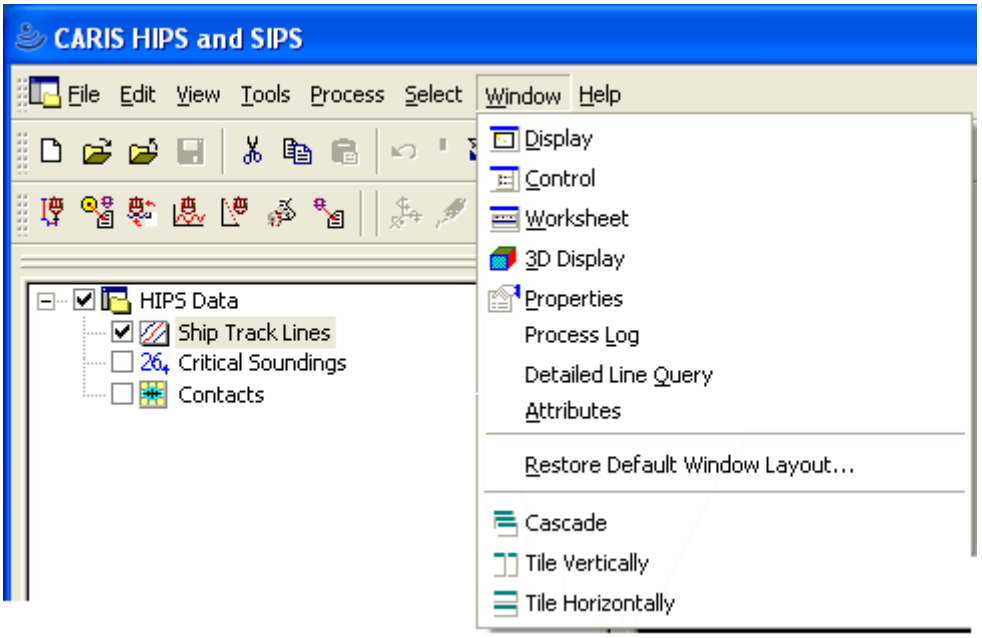
Commands on the Selection menu enable you to select data by range or by lasso, to select all data, or only the data in the display.

There are also commands to enable you to move through data line by line.



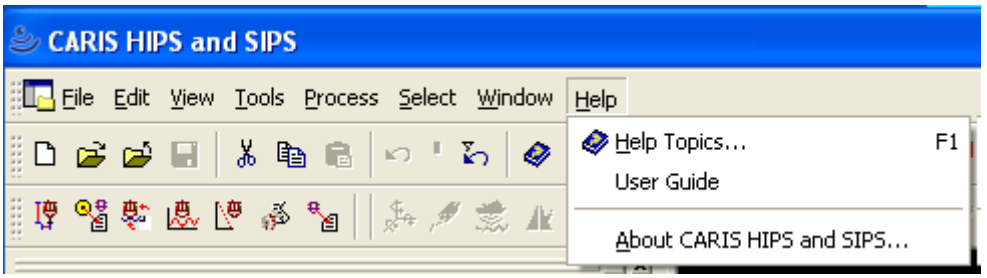
Window menu

From the Windows menu you can display, hide and arrange the main HIPS and SIPS windows, view project properties and restore the arrangement of windows in the HIPS and SIPS interface to that of the initial install.



Help menu

From this menu you can open the Help file and view information about the version of HIPS and SIPS you have installed.



Many of these commands on menus are also accessible from toolbars. For a description of these toolbars, see "HIPS AND SIPS TOOLBARS" in the HIPS and SIPS Tools Guide.

Toolbars

Toolbars allow swift access to commonly used commands. Toolbars can be undocked and moved about the desktop or hidden from view until needed.

The HIPS and SIPS toolbars are:

- **Standard:** activate standard Windows commands such as opening and saving files.
- **Edit:** activate functions used for editing data.
- **View:** activate functions for controlling the view in the Display window.
- **Tools**: activate functions for opening editors and for processing data.
- **Process:** activate functions for executing processes such as creating BASE surfaces and merging.
- **Filter:** activates functions for defining and executing automatic filters.
- **Select:** activate functions for selecting objects in the Display window.
- Window: activate commands for toggling windows to on or off.
- **Swath Editor:** activate functions for examining and cleaning pre-merged sounding data.
- **Single Beam Editor:** activate functions for examining and cleaning single-beam data.
- **Subset Editor:** activate functions for examining and cleaning sounding data in the subset mode.
- **Side Scan Editor:** activate functions for examining data, slant-range correcting raw side data, and creating contacts.
- **Process Side Scan**: activate
- **LIDAR** activate functions for selecting and examining soundings recorded by a LIDAR system.
- **Surface Cleaning**: activate functions for surface cleaning and tiling.
- **Beam Pattern:** activate functions for creating and adjusting beam patterns for use in beam pattern correction.
- **Mosaic Editor**: activate functions for creating GeoBaRs and Mosaics and Sediment Analysis.

For a fuller description see "HIPS AND SIPS TOOLBARS" ON PAGE 10 in HIPS and SIPS Tools.

Display Toolbars

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

To display toolbars not currently open:

Menu	View > Toolbars

1. Select the View Toolbars command.
2. On the Toolbars sub-menu, click on the toolbar name that you want to display.

The toolbar is displayed the desktop. To hide the toolbar, reverse the process.

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.
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.

To return the toolbar to its previous position in the interface, double-click on the toolbar's title bar.

> The Menu bar can be repositioned in the same way as toolbars.

Modify button size

You can alter the appearance and size of toolbar buttons.

Menu	View > Toolbars > Customize

1. Select the Customize command.

The Customize dialog box is displayed.

2. Select any of the following three options by checking a box.
   - *Tool Tips*: Display the name of a command button when the cursor is placed over it.
   - *Cool Look*: Remove the border outline from the buttons.
   - *Large Buttons*: Display buttons with 32 x 32 pixel icons instead of 16 x 16 pixel icons.
3. Click **OK**.

Custom toolbar

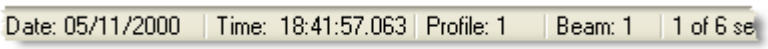
You can also create a custom toolbar (see "CREATE A CUSTOM TOOLBAR" ON PAGE 24 in HIPS and SIPS Tools).

Status Bar

The status bar at the bottom of the interface displays the following information:

- a message about the operation currently taking place, or the information in the tool tip for the command button or menu item your cursor is on
- the number of track lines selected out of the total lines open in the interface
- the scale of the current display in the Display window (when in the 3D Display window this field shows the "height" of the flight above the surface.)
- the coordinates of the current cursor position in the units chosen in Tools > Options (see also "COPY POSITION" ON PAGE 37)
- disk usage for a selected data repository

Depending on which editor you have open, the status bar will also display information such as the day the survey was conducted, profile and beam number, etc.



Status Bar options

You can hide the status bar:

Menu	View > Status Bar

1. Select the Status Bar command.

The check mark beside the Status Bar option is gone and the status bar is no longer visible in the desktop.

Cursor coordinates

The units for the coordinates of the cursor's current position are set in the Options dialog box of the Tools menu. You can use the Units option to set the type of unit e.g. Geographic or Ground.

The Position Precision option is used to set the number of places to the right of decimal point in the coordinate display.

For further information see "UNITS" ON PAGE 119.

Copy Position

Menu	Edit > Copy Position
Pop-up	Copy Position

This command enables you to copy the coordinates of the current position of your cursor in the Display window. The coordinates are copied to the clipboard.

To copy the position under your cursor in the Display window:

1. Right-click on the position in the Display window.
2. Select Copy Position from the pop-up menu.
3. Open a text editor such as Notepad, and Paste the coordinates into the editor.

Alternatively, click in the Display window at the point from which you want to copy the coordinates, and select Copy Position from the Edit menu.

Data Viewing tools

There are two kinds of tools that you can use to manipulate the view of data in the Display window: Pan and Zoom. The Pan function lets you reposition your view within the Display window. The Zoom function magnifies or reduces the viewing area within the Display window.

The Zoom/Pan Reverse and Forward tools let you toggle between views, and you can zoom to centre on a specific set of coordinates using the Zoom To command.

Pan

There are two ways to move the view of data up, down, or to the left or right, within the Display window:

- by using the Pan tool to move by a defined amount, or
- by dragging the display with the mouse.

Pan tool

The Pan tool will let you move the view by a percentage of the visible display. You can set the amount that the view will move in the *Pan Factor* field on the General tab of the Tools > Options dialog box. (See "GENERAL" ON PAGE 93.)

To move the view of data with the Pan tool:

Menu	View > Pan > Up/ Down/Left/Right

1. Select a Pan command:
   - *Pan Up*: Re-centre the display at a position that is above the current display area.
   - *Pan Down*: Re-centre the display at a position that is below the current display area.
   - *Pan Left*: Re-centre the display at a position to the left of the current display area.
   - *Pan Right*: Re-centre the display at a position to the right of the current display area.

The Pan commands on the View menu can be added as buttons to a new or existing Toolbar by using the View > Toolbars > Customize… command.

Pan with the mouse

You can pan the display with your mouse by using a press and drag action.

To pan with the mouse:

1. Press and hold down the scroll wheel or middle button on your mouse. (The cursor changes to a hand.)
2. Use the mouse to drag the view in any direction.
3. Release the mouse button when you have repositioned the view.

Zoom

There are two ways to magnify or reduce the viewing area in the Display window:

- use the scroll wheel on your mouse, if available
- use the Zoom tools

Zoom with the mouse

To zoom in or out using a mouse:

1. Click in the Display window.
2. Scroll back and forth with the scroll wheel to zoom the view up and down.

Zoom tool

Use the Zoom tool to select a specific area of the Display to enlarge:

Menu	View > Zoom
Tool	
Key	<F10>

1. Select the Zoom command.

The cursor changes to a magnifying glass icon.

2. Press and hold the mouse button and drag the cursor to create a rectangle around the area you want to magnify.

The display is enlarged so that the area within the rectangle now fills the Display window.

Once you enlarge the area, the Zoom tool button is no longer active. To keep the Zoom tool active, select the *Enable Constant Zoom* function in the Options dialog box (see "GENERAL" ON PAGE 93).

Zoom In

The Zoom In tool lets you enlarge the viewing area in the Display window automatically by a set amount.

Menu	View > Zoom In
Tool	
Key	<Ctrl+Down>

1. Select the Zoom In command.

The display is automatically enlarged by the percentage set in the *Zoom Factor* field on the General tab of the Options dialog box (see "GENERAL" ON PAGE 93).

Zoom Out

Zoom Out automatically reduces the viewing area in the Display window by a set amount.

Menu	View > Zoom Out
Tool	
Key	<Ctrl+Up>

1. Select the Zoom Out command.

The display is automatically reduced by the percentage set in the *Zoom Factor* field on the General tab of the Options dialog box (see "GENERAL" ON PAGE 93).

Zoom/Pan Previous

This tool returns the view to the position or magnification that was displayed before you zoomed or panned the view.

Menu	View > Zoom/Pan Previous
Tool	

1. Select the Zoom/Pan Previous command.

Zoom/Pan Forward

This tool returns the view to the position or magnification that it was in prior to using the Zoom/Pan Previous command.

Menu	View > Zoom/Pan Forward
Tool	

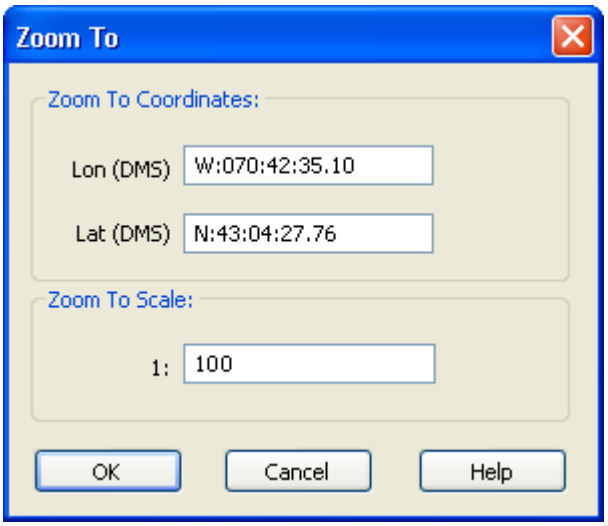
1. Select the Zoom/Pan Forward command.

Zoom To

Re-centre the view on specific coordinates in the Display window, or zoom in so that the viewed area is displayed at a specific scale.

Menu	View > Zoom To

1. Select the Zoom To command to display the Zoom To dialog box.



2. Type the new coordinates in their respective fields to re-centre on that point in of the Display window,

OR

3. Type a new scale to zoom into or out of the display.
4. Click **OK**.

Refresh Display

Redraw the view in the Display window.

Menu	View > Refresh
Tool	
Key	<F5>

1. Select the Refresh command, or
2. Click the middle mouse button when the cursor is in the Display window.

The display is redrawn.

Overview Display

Redraw the Display window to the full extent of all the data that is currently open.

Menu	View > Overview
Tool	
Key	<F9>

1. Select the Overview command.

Cancel Draw

Select the Cancel Draw command from the View menu to stop a display from being drawn in the Display window. This command is only active while the image is being drawn.

You can create a Cancel Draw tool button and place it on a new or existing Toolbar by using View > Toolbars > Customize… command.

Screen Captures

You can take a screen capture of the current display in the Display window or 3D Display window and save it as an 8-bit or 24-bit GeoTiff image.

Menu	View > Save Image
Pop-up	Save Image

1. Right-click in the Display window or 3D Display window and select a Save Image command.

The Save As dialog box is displayed.

2. Select a directory and type a name for the image in the *File Name* field.
3. Select to either save the image as an 8-bit or 24-bit image by selecting the appropriate option.
4. Select a *Sizing Parameter* (either dots per inch or resolution) from the drop-down list.
5. Click **Save** to save the image to the selected directory.

Save, Close and Exit

Save Projects

Save changes to data after cleaning or when the display in a session file is changed.

Menu	File > Save
Tool	
Key	<Ctrl + S>

1. Select the Save command.

You can automatically save data-cleaning changes at regular intervals by selecting the Auto Save option (see "GENERAL" ON PAGE 93).

Close a Project

Menu	File > Close Project
Tool	
Key	<Ctrl > F4>

1. Select the Close Project command.

You are prompted to save any changes.

2. Click **OK** to save changes.

Close individual track lines

1. Select a track line file in the Project tab of the Control window, or select a track line in the Display window.

Pop-up	Close Lines

2. Right-click the mouse and select the Close Lines command.

The track line closes.

Exit HIPS and SIPS

Menu	File > Exit
Key	<Alt + F4>

1. Choose the Exit command.
2. You may be prompted to save any changes.
3. Click **OK**.

HIPS and SIPS is closed.

2

Display Background Data

Geo-referenced TIFF files and other formats can be opened as backdrop to the Display window. S-57 files can also be opened in the HIPS interface.

In this chapter...

Open Background Data

HIPS and SIPS can open any of the following data types as background in the Display window:

- AutoCAD files (DXF, DWG)
- BSB images (KAP)
- Bitmap images (BMP)
- CARIS files (DES, SAF)
- ECW images
- GeoTIFF (TIF)
- GML (Geography Markup Language)
- HCRF images (CHR)
- HIPS Field Sheet (FSH)
- HIPS and SIPS Project (HIPS, HPF)
- Hydrographic Object Binary (HOB) files (including Edit and Marker layers created in CARIS Notebook).
- IGA images
- JPEG 2000 images (JP2)
- MrSid image files (SID)[1]
- NetCDF (NC)
- S-57 files (000)
- Shapefile files (SHP)
- sound velocity profile files (SVP)
- tide zone files (ZDF)VPF database files (DHT)
- TFW images (TFW)

Surface formats that can be opened as background data include :

- BIN files, including the NGS GEOID, European Gravimetric Geoid/QuasiGeoid (EGG97 and EGG2008) and German Combined QuasiGeoid
- CSAR
- ESRI ASCII and binary grid formats
- HNS, IGA, MTS, HCS, DEF, BMS
- Datum model files ("OPEN DATUM MODEL FILE" ON PAGE 47)

1. MrSID image files can only be opened if you have installed the CARIS plug-in for MrSID images. This free plug-in can be downloaded from http://www.caris.com/downloads/mrsid.cfm.

Menu	File > Open Background Data

To open files in any of these formats:

1. Select the Open Background Data command.

The Open dialog box is displayed.

Multiple instances of various types of supported files can be opened at the same time if they are located in the same folder.

2. Select one or more files within a folder.
3. [Optional] Use the *Files of type* drop-down list to filter selection choice to files of a specific type.
4. Click **Open**.

The selected files are opened in the Display window and are listed as layers in the Control window.

Open Datum model file

Menu	File > Open Background Data

To open a datum model file as background:

1. Select the Open Background Data command.
2. Select an XYZ file (must have the .xyz extension) and click **Open**.

This opens a dialog box so you can select a format description (*.info) file, used to parse the information from the XYZ file. See "INFO FILE" ON PAGE 160 for an example and description of this file.

3. Select the .info file that describes the format of the selected.xyz file.
4. Click **Open**.
5. This opens the Select Projection dialog box.
6. Select the Coordinate system that describes the position format in the *.xyz file . Click **OK**.

The model file is displayed as a TIN (triangulated terrain model) data in the Display window, using the default *Rainbow* colour map.

Use Coordinate System

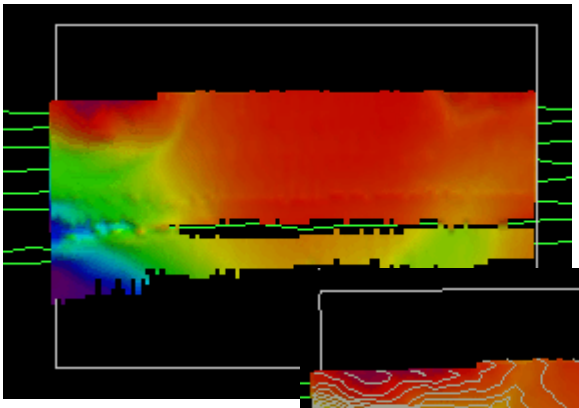
You can apply the coordinate system used by a background layer to the view of the data in the Display window.

Pop-up	Use Coordinate System

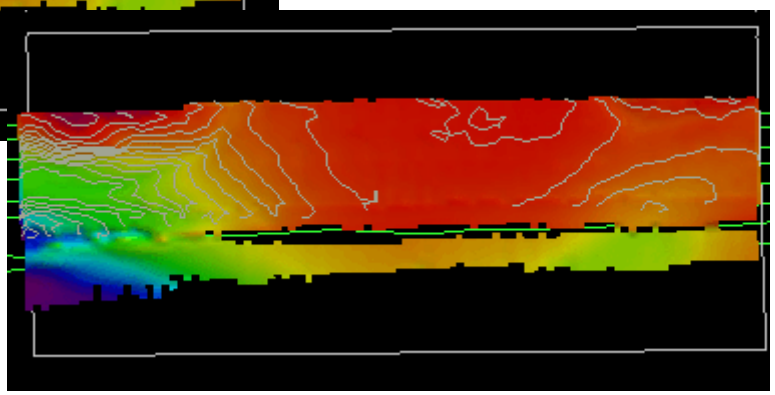
1. Right-click on the open background layer.
2. Select the Use Coordinate System command from the pop-up menu.
3. Refresh the display.

The view of the data now reflects the coordinate system of the background layer instead of that defined in the project file.

The following shows the change to the display when the coordinate system of an S-57 file, open as background, is applied to a project that had a different projection.



Project data in Display window



View of project using coordinate system of S-57 file (contours)

To restore the project coordinate system,

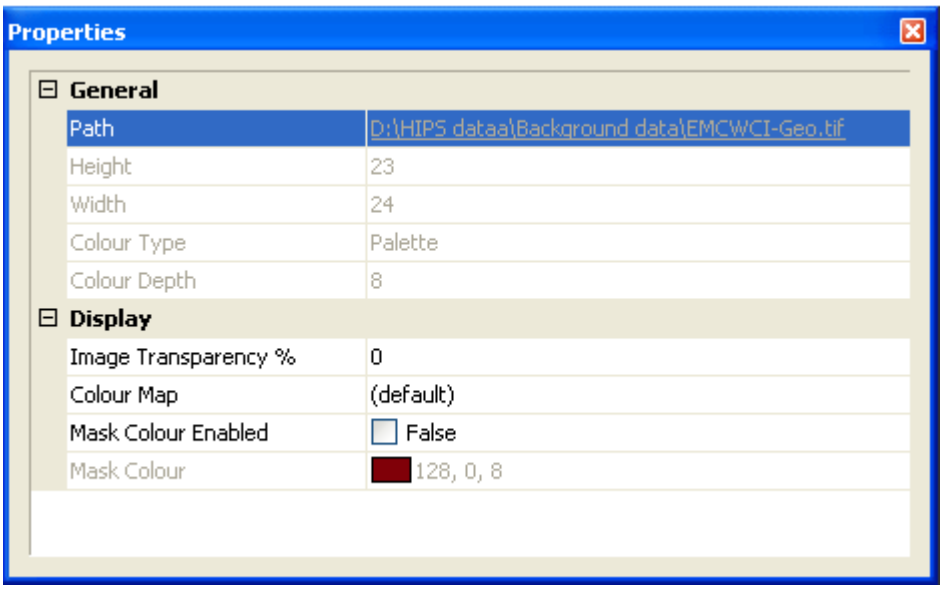
1. Right-click on the project layer.
2. Select the Use Coordinate System command from the pop-up menu.
3. Refresh the display.

Image Properties

Image files which can be opened as background layers (TIFF, TFW, raster images, etc.) display properties in the Properties window. To view the image properties:

1. Select the image layer in the Layers tab of the Control window.

The Properties window automatically lists the display options for the selected image layer. The General fields display read-only data such as the location of the image file, and its dimensions. These fields vary with the type of



The *Display* fields adjust transparency and masking for the background image.

The *Image Transparency* field controls the transparency of the entire image: the higher the percentage value, the more transparent the image will appear. The default is 0, (no transparency).

2. To make the entire background image transparent, type a *Transparency* percentage.

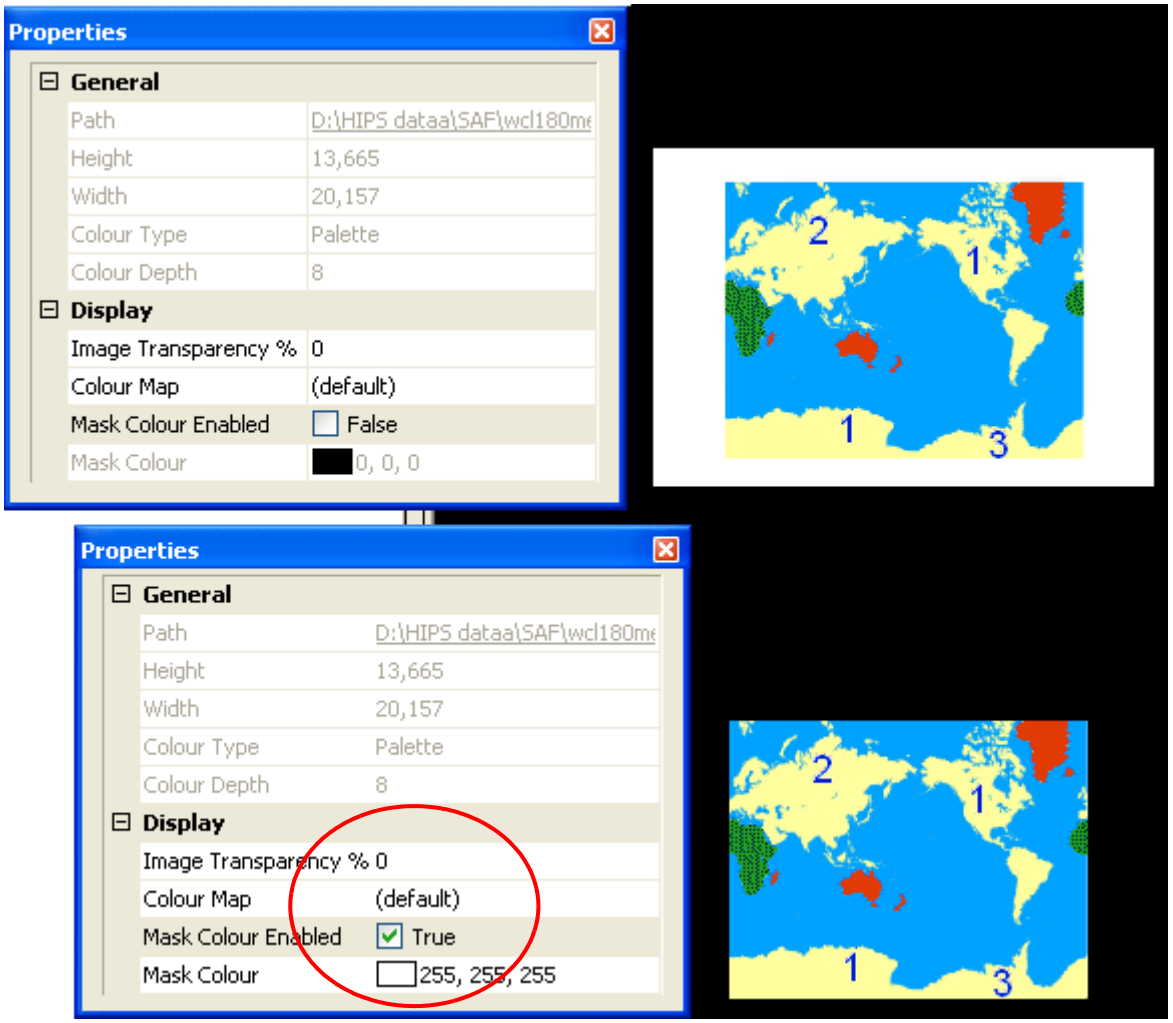
The *Colour Map* field controls the colour display of the image. The value `(default)` indicates that the image is displayed in its original colour mapping. You can apply another colour map by selecting it from the drop down list.

The masking fields make a single colour transparent. This is useful if the image background is different from the colour of the Display window.

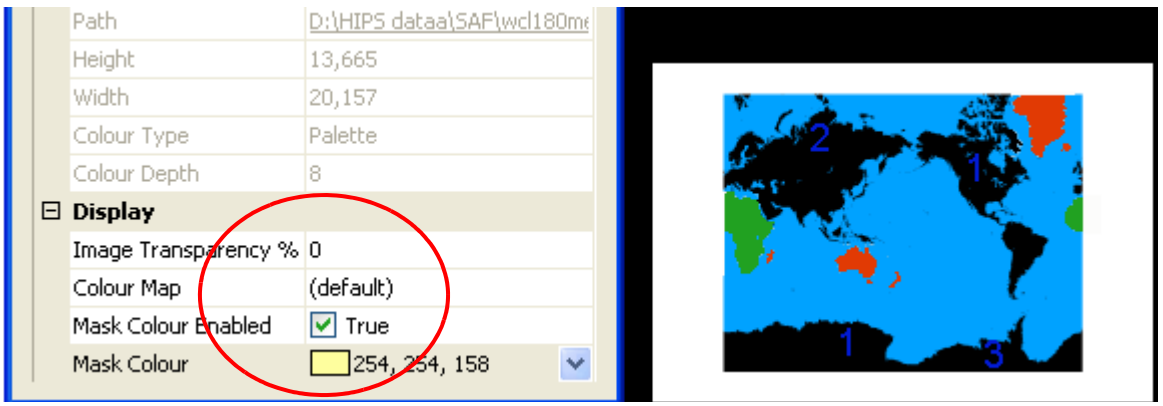
To mask a particular colour:

3. Set *Mask Colour Enabled* to True.
4. Select the colour to be made transparent from the *Mask Colour* drop-down list, and refresh the Display.

In the example below, the top image shows a GeoTiff with white background displayed in the Display window (which has its background set to Black). The bottom image shows how masking the white background colour makes it transparent.



The image masks another colour, in this case, the yellow areas. (Only one colour can be masked at a time.)



View soundings in HOB file

To display the soundings stored in a HOB file, you must first set the display options in the S-52 tab of the Tools > Options dialog box.

1. Open the Tools > Options dialog box and select the S-52 tab.
2. In the *Display filters* section, select “Base + Other” or “Standard + Other” from the *Category* drop-down list.
3. Select the *Soundings* check box.

Menu	File > Open Background Data

4. Select the Open Background Data command.
5. Browse to the HOB file where the soundings are stored.
6. Click **Open**.

The HOB file layer is displayed in the Layers tab of the Control window, and the soundings are shown in the Display window.

Open URL

Use this command to connect to a Web Map Service or ECW/JPEG2000 image site.

To connect to a Web Map Service:

Menu	File > Open URL > WMS

1. Select the Open URL command.

The Connect to Web Map Server dialog is displayed.

2. Type the URL of the server to which you wish to connect.
3. Click **OK**.

To connect to a ECW/JPEG2000 image site:

Menu	File > Open URL > ECW / JPEG 2000

1. Select the Open URL command.

The Open ECW / JPEG 2000 URL dialog box is displayed.

2. Type the URL of the site you wish to connect to.
3. Click OK.

Display S-57 Data

HIPS and SIPS is capable of displaying S-57 Ed 3.1 (ENC) and HOB (Hydrographic Object Binary) files. (For information on other data types that can be opened in HIPS and SIPS, see "Open Background Data" on page 46.)

To open S-57 Ed 3.1 (ENC) data files:

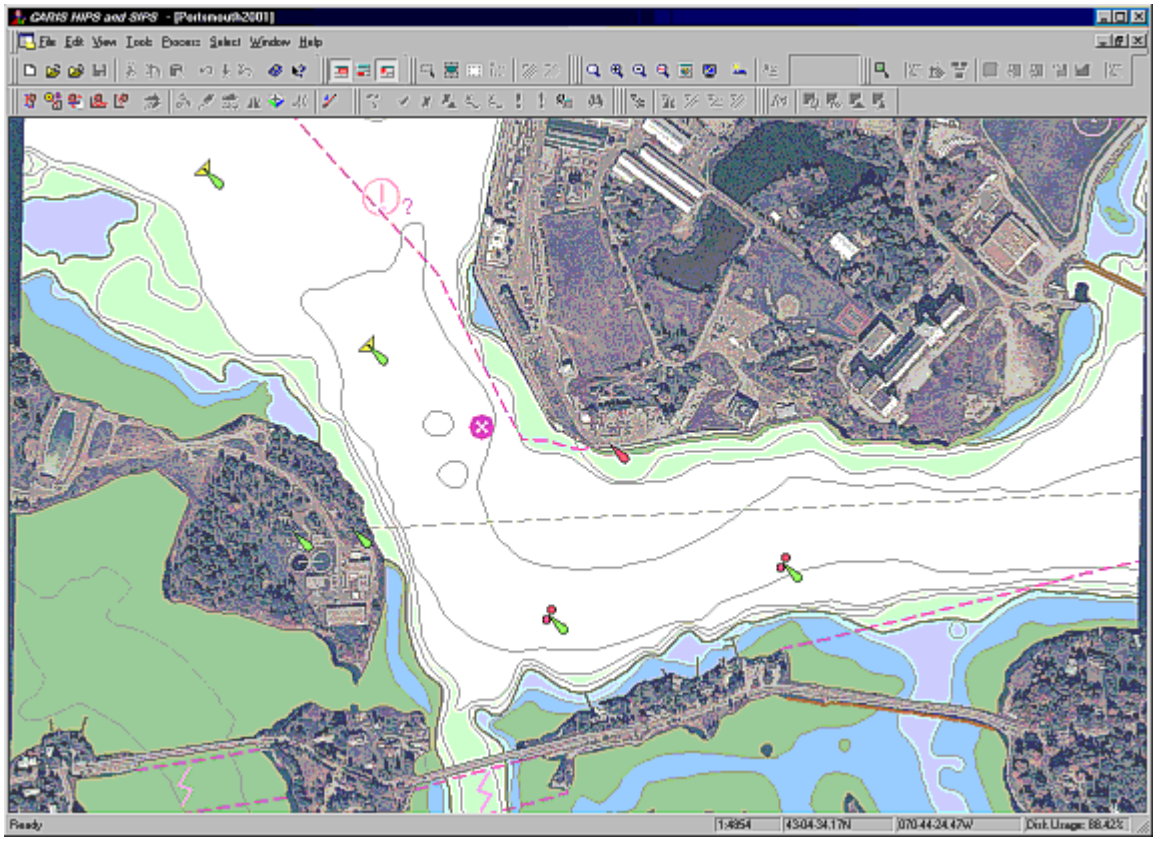
Menu	File > Open Background Data

1. Select the Open Background Data command.

The Open dialog box is displayed.

2. Select S-57Files (*.000) from the Files of type drop-down menu.
3. Browse to the folder containing the S-57 dataset and select the file.
4. Click **Open.**
5. From the Select Catalogue dialog box, select either S-57 ENC 3.1 or S-57 USACE ENC IENC 4.0 from the Name list, whichever is appropriate to the ENC being opened. (The other fields on the dialog box are automatically filled.)
6. Click **OK**.
7. In the S-57 Update Options dialog box, click **OK**.

This will display the selected S-57 dataset in the Display window and list the file in the data tree in the Layers tab.



Create Layers of S-57 objects

You can determine which feature objects are shown in the Display window using the filtering function of the Create Layer command.

You can create a layer of all objects with the same attribute value, acronym, ID or type, or use the Rule Wizard to create customized layers. You can also automatically create layers for objects by their unique feature acronyms.

Pop-up	Create Layer

1. Right-click on the S-57 file in the *Layers* tab of the Control window.
2. Select the Create Layer command from the pop-up menu.
3. From the list, select an option to filter which objects will be displayed in a new layer.

Some of the dialog boxes in this process contain an *Exclusive* option. This option reverses the selection process by excluding the chosen features from the layer. For example, if you select a Point feature type and select the *Exclusive* option, all feature types *except* the point type are selected.

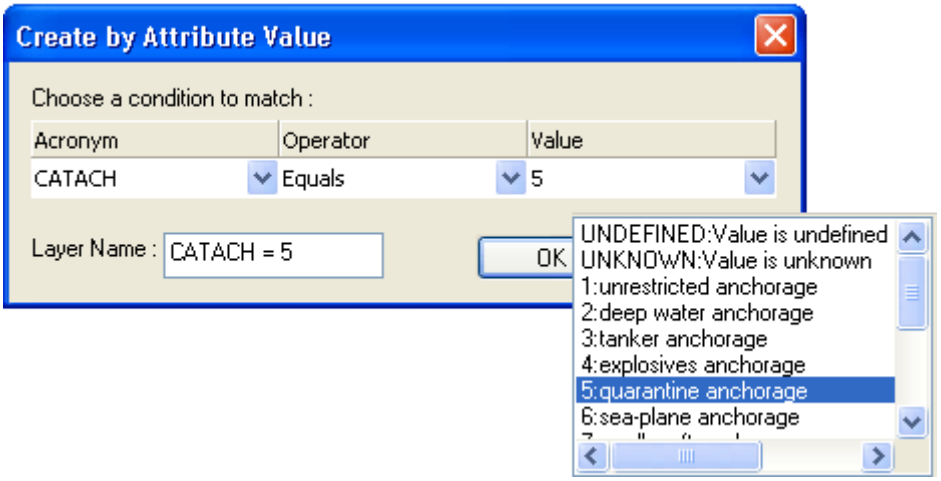
Layers are created:

- "By Attribute Value" on page 54
- "By Feature Acronym" on page 55
- "By Feature Object ID (FOID)" on page 56
- "By Feature Type" on page 57
- "By Unique Feature Acronyms" on page 57
- "Create Layers with the Rule Wizard" on page 59

By Attribute Value

The options in the *Operator* and *Value* fields are determined by the selected attribute. For example, if an attribute requires a numeric value, a list with numeric values associated with the attribute will drop down from the *Value* field. If the attribute requires text, an area for typing text is opened from the *Value* field.

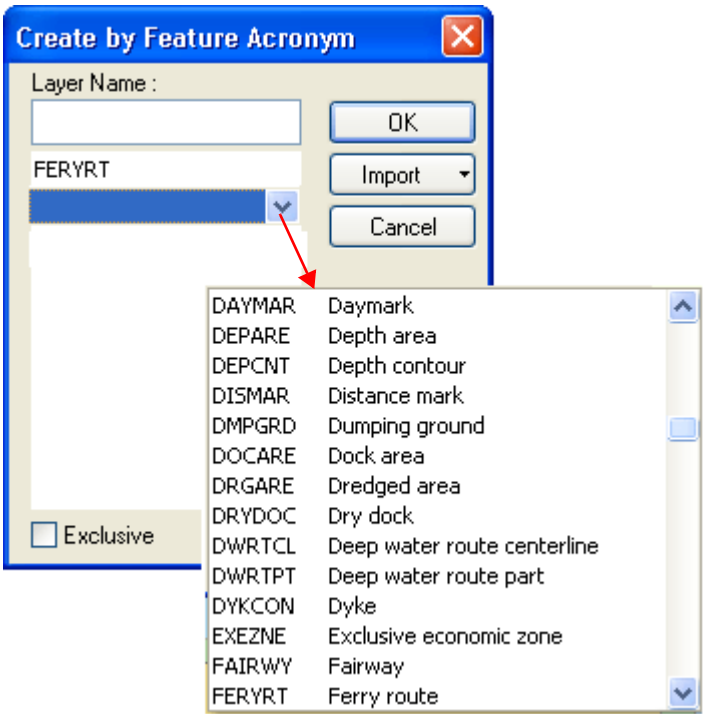
1. Select an attribute from the drop-down list.
2. Select an operator from the list. The choice of operators is determined by the selected attribute.
3. Select an attribute value from the *Value* field. (The field only displays values related to the selected attribute.)



4. Type a name for the layer in the *Layer Name* field, or automatically create a name from the above three fields by clicking the mouse once within the Layer Name field.
5. Click **OK**.

A layer will be created containing the objects with the attribute values that meet the search criterion. The new layer will be listed in the Layers tab data tree under the name of the S-57 file.

By Feature Acronym



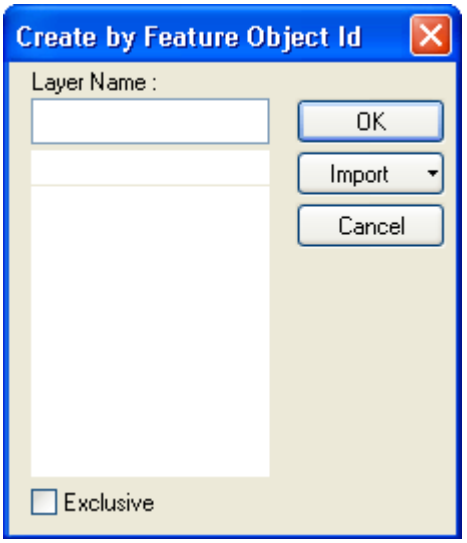
1. Select one or more feature acronyms. Use any of three methods:

- Click a Feature Acronym cell and select a feature acronym from the drop-down list.
- Type the feature acronym in the field using capital letters.
- Add feature acronyms to the clipboard (using the cut or copy commands) from another application, such as Notepad and select *From Clipboard* from the **Import** drop-down list.

2. Click the *Exclusive* check box to select all BUT the chosen feature acronyms.
3. Click **OK**.

A layer will be created containing all objects with the same feature acronyms. The new layer will be listed in the Layers tab data tree under the name of the S-57 file.

By Feature Object ID (FOID)



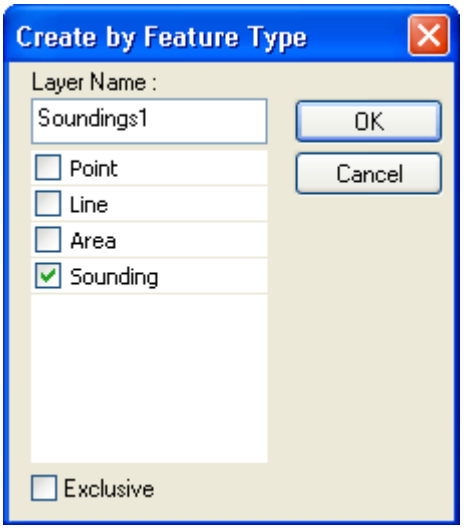
1. Type the Feature Object ID in the fields provided. (You can enter more than one ID.)

   OR copy the FOID to the clipboard using an application such as Notepad, click **Import** and select *From Clipboard* from the drop-down list.

2. Click the *Exclusive* check box to select all BUT the chosen FOIDs.
3. Click **OK**.

A layer will be created containing all objects with the same FOIDs.

By Feature Type

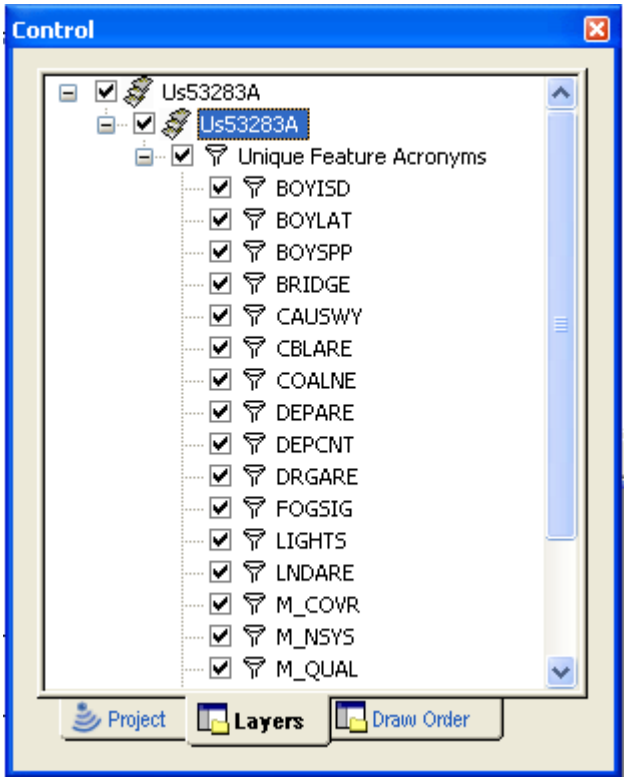


1. Click the check boxes of the primitive feature type(s) (point, line, area or sounding) you want to include in the layer.
2. Click the *Exclusive* check box to select all BUT the checked feature types.
3. Click **OK**.

A layer will be created containing all objects of the same type(s). The new layer will be listed in the Layers tab data tree under the name of the S-57 file.

By Unique Feature Acronyms

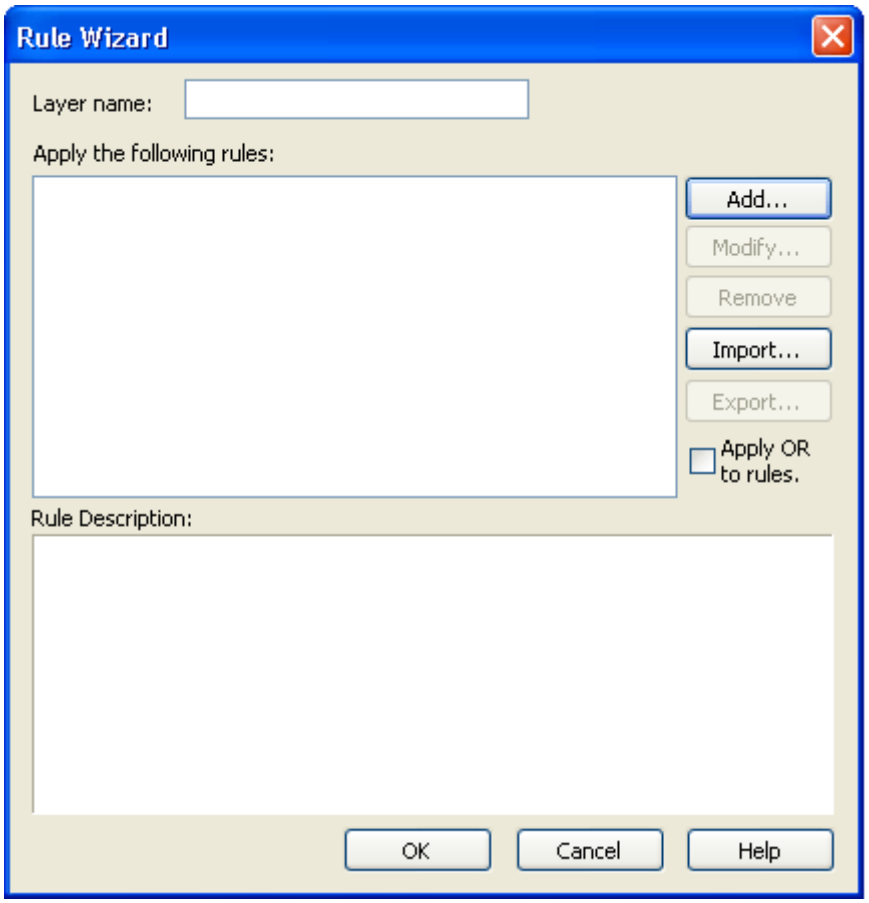
This option will automatically create a layer for each unique feature acronym represented in the open S-57 file. An example of these layers is displayed below.


Control
Us53283A
Us53283A
Unique Feature Acronyms
BOYISD
BOYLAT
BOYSPP
BRIDGE
CAUSWY
CBLARE
COALNE
DEPARE
DEPCNT
DRGARE
FOGSIG
LIGHTS
LNDARE
M_COVR
M_NSYS
M_QUAL
Project
Layers
Draw Order

Create Layers with the Rule Wizard

The Rule Wizard command will create a layer containing objects using rules for complex filtering. Each rule is defined by one or more conditions, such as, “select only certain object types with specific attribute values”.

Rules are saved as CRFX files in XML format, which you can re-open in another dataset. You can also modify a saved filtering rule.



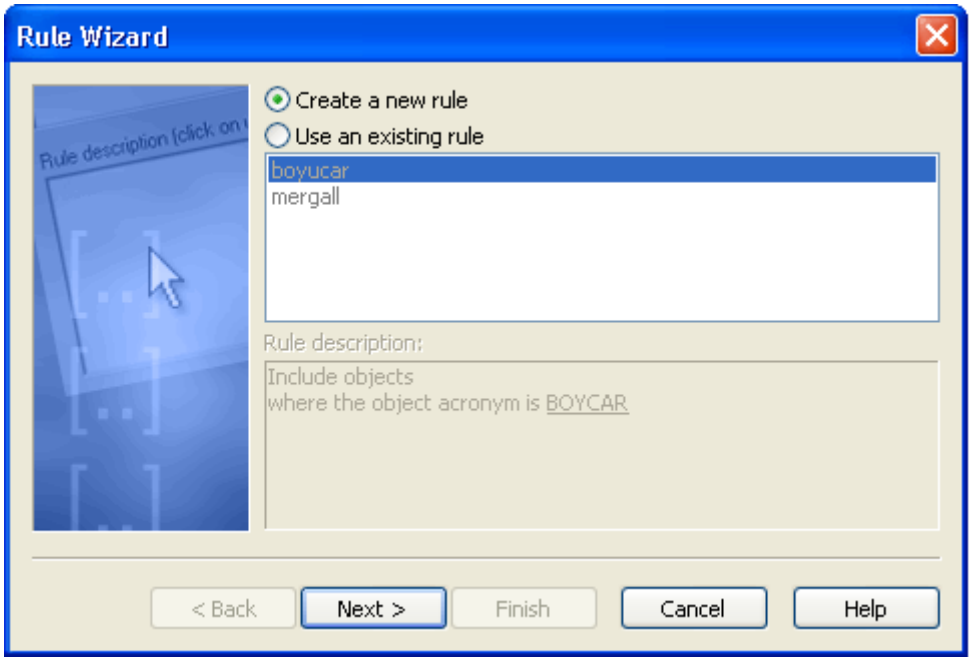
1. Click **Add** to create a new set of rules.

Or

1. Click **Import** to locate and open an existing rule (*.crfx) file so that it can be applied immediately or modified. See “IMPORT” ON PAGE 63.

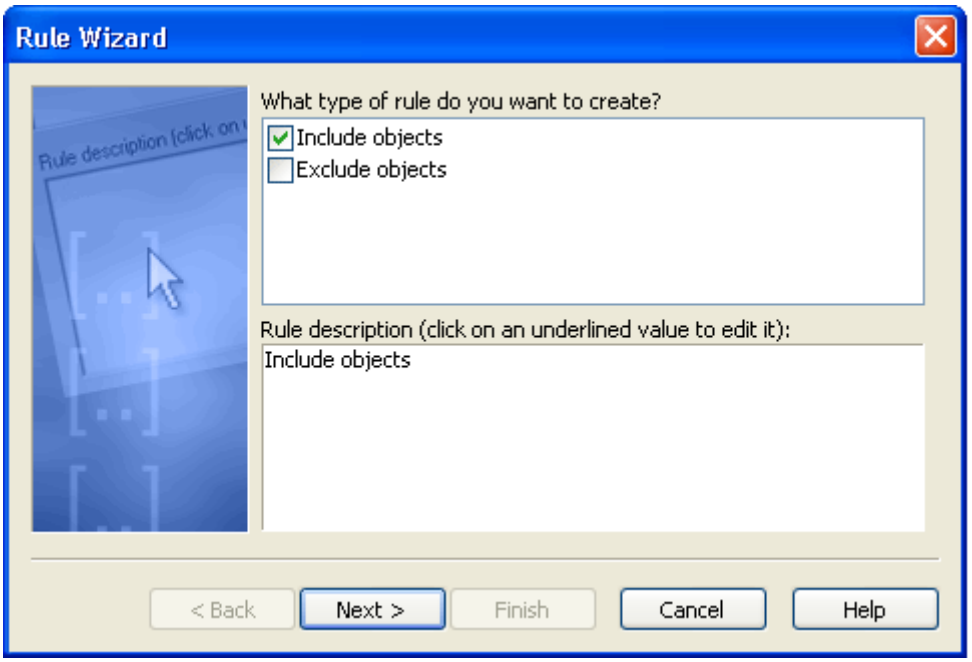
Create new rule

The first dialog box is displayed.



2. Select **Create a new rule**.

This opens the next dialog box.



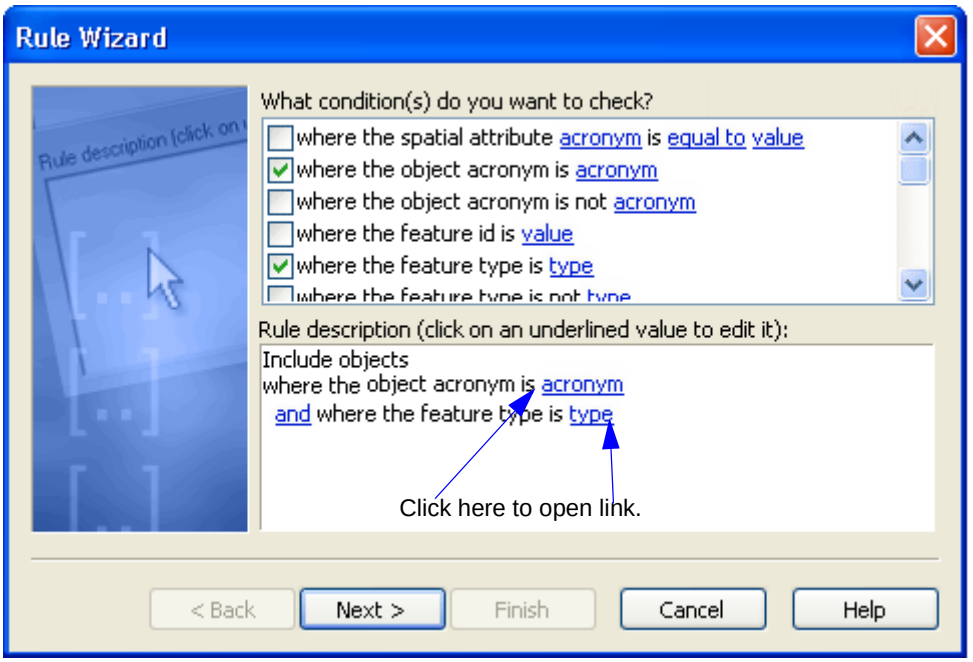
In the top section of the dialog box you can choose to include or exclude objects that match the conditions you are setting.

3. Select the *Include objects* check box to set the rule to include certain objects, or select *Exclude objects* to select all but those objects.

The selected option is displayed in the bottom section of the dialog box.

4. Click **Next**.

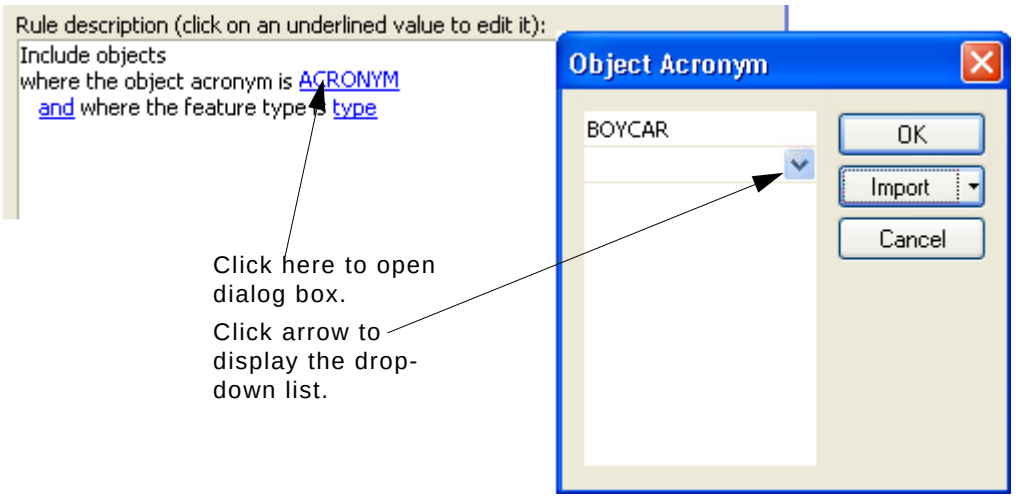
Use this dialog box to set the specifics for the create layer rule.



5. Select the conditions that you want to use for creating the filter.

When a condition is selected, it is added to the rule description in the bottom part of the dialog box.

6. Click on one of the underlined condition names to select the appropriate acronym, feature type or value from the dialog box that is then displayed.

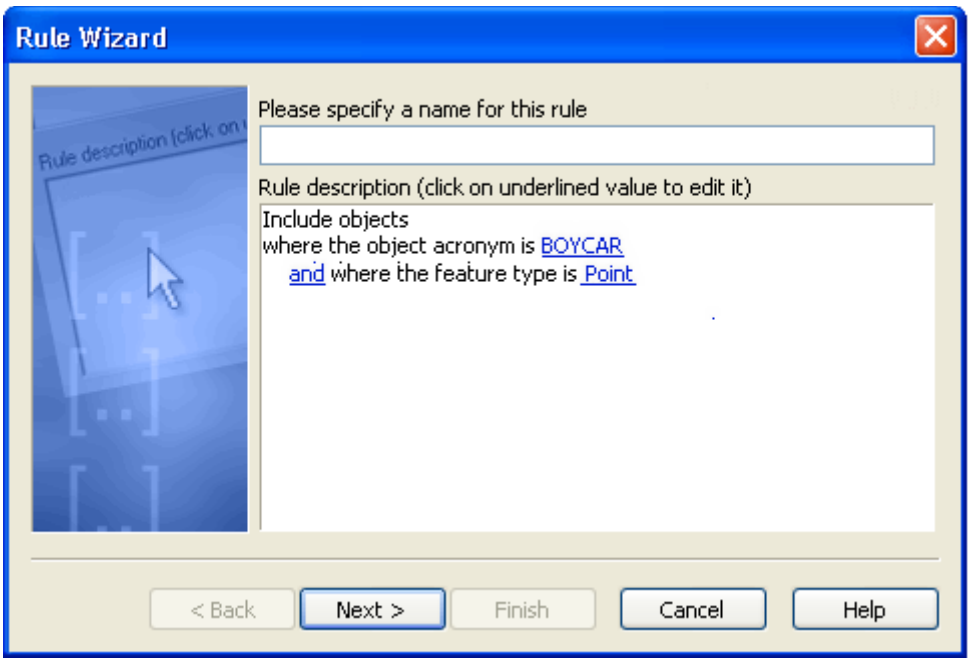


7. Click the underlined “and” to change the conditional operator. The AND operator includes features that meet both conditions. The OR operator will include features with either of the conditions.

The rule content is updated to the condition values you have selected.

8. Click **Next**.

The next dialog box asks you to name your rule so it can be saved.



9. Type a name for the rule.
10. Click **Finish**.

The rule is displayed in the main Rule Wizard dialog box.

Rule Wizard Options

You can choose to import previously created rules, instead of creating a new rule. As well, you can modify and export rules. You can change the order in which filtering rules are applied. To access these options, use the buttons on the right side of the Wizard.

Button	Function
Add	Create a new set of rules
Modify	Open the Rule Wizard to change settings
Remove	Permanently delete a filter rule from the layer.
Import	Import an existing CRFX file into the Rule Wizard so it can be used or modified.
Export	Save the rule for future re-use, as a *.crfx file.

Import

Import an existing CRFX file into the main Rule Wizard dialog box so that it can be used or modified.

1. Click **Import**.

The standard Open dialog box is displayed.

2. Select the CRFX file and click **Open**.

Modify

Change rule properties (such as adding or removing conditions) in an existing rule:

1. Select the rule to modify.
2. Click the Modify button.

The Rule Wizard dialog box displays the information about the selected rule.

3. Use the steps in the wizard make changes to the filter rule. See "CREATE NEW RULE" ON PAGE 59.

Export

Rules can be saved in XML format and re-opened to create layers in other datasets. Rules are saved as CRFX files and can be viewed in a text editor or XML-compliant Internet browser.

1. [Optional] Select a rule and click Export to select a file path and name for the CRFX file.

Rule Order

To change the order in which rules are applied to create the selection:

Select a rule, and drag it to a new location in the list, then release the mouse button.

3

3D Display

3D Display Window

The 3D Display window shows project-level information in three dimensions. Any data layers that are viewable in the HIPS and SIPS Display window can be viewed in 3D. This includes attribute layers for BASE Surfaces, vector data and background images such as GeoTiffs.

The 3D Display is enhanced with a "fly-through" effect that gives the effect of gliding through the display. With practice manipulating the fly-through controls, you will be able to zoom and pan seamlessly in this 3D window. This fly through can also be recorded.(See "3D Flight Path" on page 86.)

To activate the 3D Display window

Menu	Window > 3D Display
Tool	

1. Select the 3D Display command or tool button.

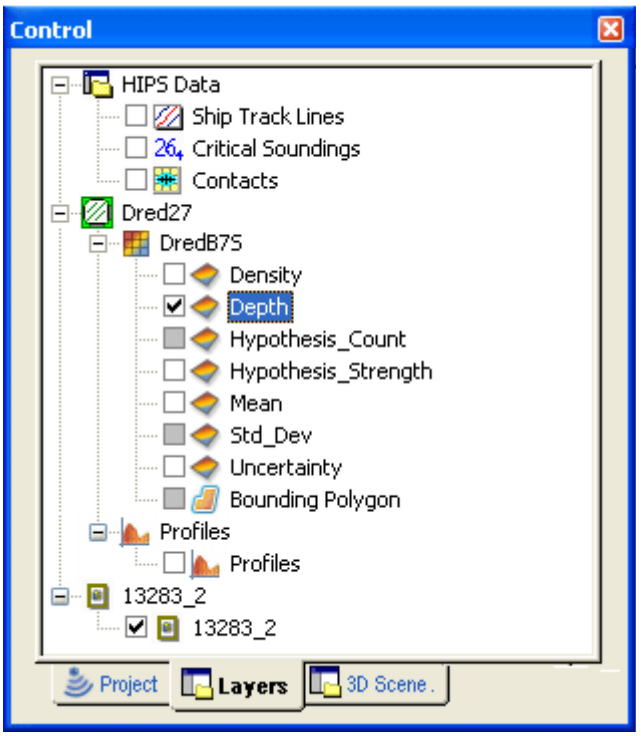
The 3D Display occupies the area of the Display window, and the 3D tab replaces the Draw Order tab.

When first opened, the 3D window is empty of data. You display data by turning layers on and off in the Layers tab.

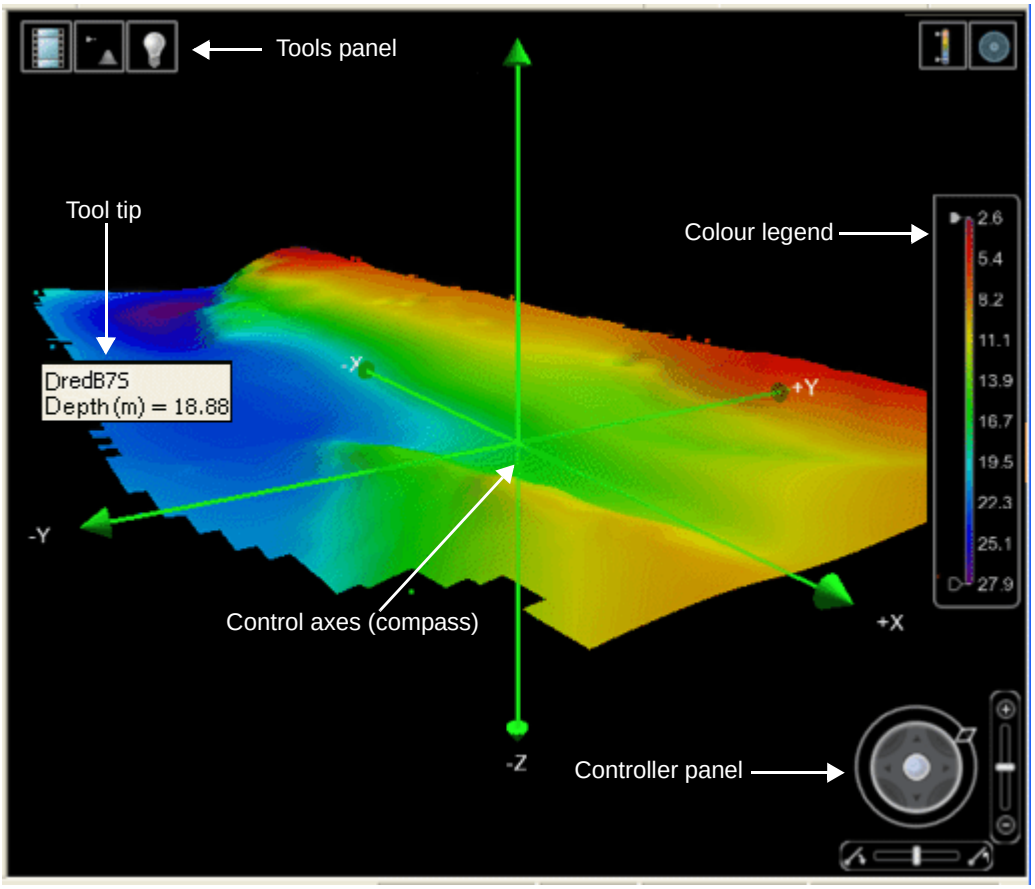
To display data:

2. Select a layer in the Layers tab.

Any layers that can be viewed in 3D are enabled in the Layers tab. Any open layers that cannot be displayed are disabled (greyed out) in the Layers tab, as in the image below.



The following image shows a Depth layer opened in the 3D window.



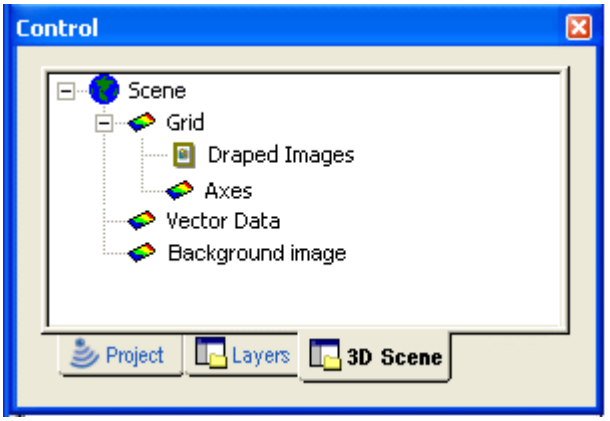
Hover your mouse over the data to display a tool tip giving the name of the data source and the value at the current position of the cursor.

The value is expressed in the units used by the selected layer. In the image above of a Depth layer, the tool tip displays “DredB7S” (the surface name) and “Depth(m) =X”(the depth under the cursor.

The coordinates of the current cursor location are displayed in the HIPS Status bar (on the right). Also displayed in the status bar is the “height” of the flight above the surface.

3D Scene tab

The 3D Scene tab in the Control window lists the various types of data that are currently open in the 3D window.



Each type of data displayed in the 3D Display has its own layer in the 3D Scene tab.

- The Grid layer contains data for the surface being displayed.
- The Draped Images layer contains the data for all draped images.
- The Axes layer contains the Terrain Axes for the surface. The Terrain Axes (displayed as an x,y,z grid) are only visible when turned on in Tools > Options.(See "3D DISPLAY" ON PAGE 97.)
- The Vector Data layer contains any vector data.
- The Image layer contains data for open raster images.

Display Options

Display options are set in the Display tab of the Tools > Options dialog box.

1. Select Options from the Tools menu.
2. Select 3D from the Display tab.

Menu	Tools > Options > Display > 3D

Use the options to turn on and off the display of:

- the *Terrain Axes* (x,y,z) grid for the selected surface (see "TERRAIN AXES" ON PAGE 79.)
- the *Colour Legend* to indicate depths of the surface coloured areas
- the *Controller Panel*
- the 3D View *Toolbar* (Toolbar commands can also be activated from the View > 3D Flight Path submenu)

- the colour to use as the *Background Colour* of the display
- the *View Style* of the 3D window, for example, the default is Full View (the 3D window occupies the entire Display window). The other options include Vertical or Horizontal Tile, and Cascade.

> If the 3D View is open when these options are changed, the new settings do not take effect until the 3D view is closed and reopened.

View Background Images

If you have background images to accompany the surface data, they can also be viewed in the 3D Display.

1. In the Layers tab, click the image layer check box to enable the image.
2. The Image Options dialog box is displayed.

The *Elevation* field allows you to specify the height at which the image sits on the surface.

3. Type a value if you would like the image displayed at a particular elevation.

The *Clip to terrain* option allows you to display only the part of the image that is within the extents of the surface.

4. Select the *Clip to terrain* check box to limit the display of the image.

The image is added to the 3D Display, and listed in the 3D Scene tab.

3D Display Window Properties

The display in the 3D View can be adjusted using properties.

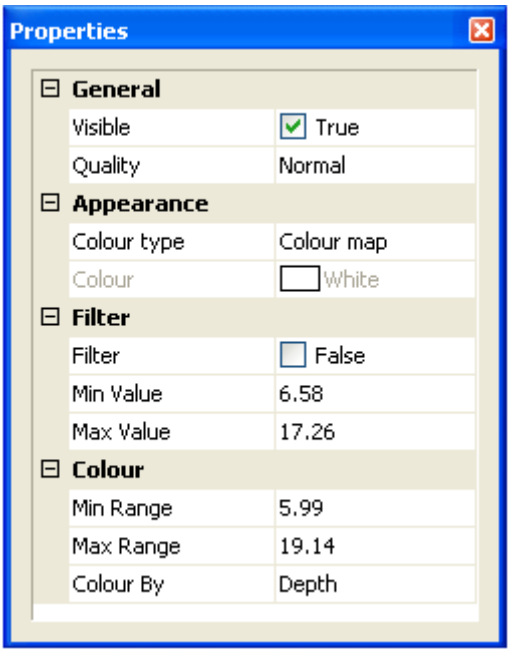
If you have data visible in both the 3D Display and the Display window, switching back and forth from one window to the other will display different properties. A layer must be activated (check box selected) and selected (highlighted) to enable properties to be set in 3D.

The following sections provide information on the 3D properties:

- "Surface Data Properties" on page 70
- "Vector Data Properties" on page 71
- "Raster Data Properties" on page 73

Surface Data Properties

1. Select an attribute layer, for example, Depth, in the Layers tab to view the available properties of that layer in the Properties window.



General

The *Visible* property allows you to have the data open and included in calculations, without actually having it displayed. This frees up resources to speed up processing time. By default this option is set to *True*.

1. [Optional] Set the *Visible* property to False to hide the selected image.

The *Quality* property allows you to display the surface using a finer or coarser resolution. The default setting is *Normal*.

2. Select the *Quality* property and select an option from the drop-down list

Appearance

The *Appearance* property controls the colour of your 3D surface. You can display the surface using a colour map or using a solid colour. By default the display is set to *Colour Map*.

3. [Optional] Change the display by selecting Solid Colour from the drop-down list and selecting the colour from the colour picker.

Filter properties

The Filter properties can be used to filter data displayed in 3D.

4. Enable the *FIlter* property by clicking the check box.

The value will change to True.

5. Enter the *Min* and *Max Value* of the data you want displayed.
6. **Refresh** the display.

Menu	View > Refresh (F5)
Tool	

Only data that falls within the range of the *Min* and *Max* values will be displayed.

Colour properties

Colour properties enable you to adjust the colour range used to colour the displayed data. (See also "COLOUR RANGE" ON PAGE 77.)

7. Enter the *Min* and *Max Values* to be covered by the colour range.

Using the *Colour By* property, you can choose which attribute will be used as the source data for colouring the display.

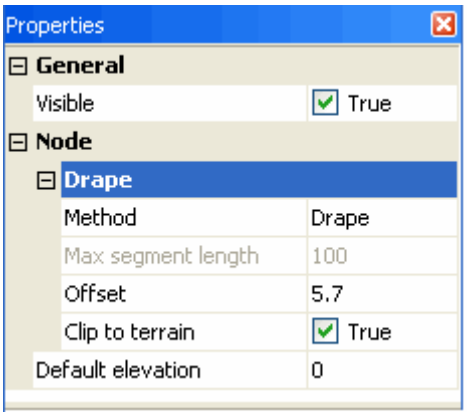
8. Select an option from the *Colour By* drop-down list.

The display is updated to match the selected properties.

Vector Data Properties

To display the 3D display properties for vector data:

1. Select a vector data layer in the Layers tab while the 3D Display is active.
2. Open the Properties window.



The *Visible* property allows you to have the data open and included in calculations, without using resources to actually have it displayed. By default this option is set to True.

3. Click the *Visible* check box to display the selected image, if necessary.

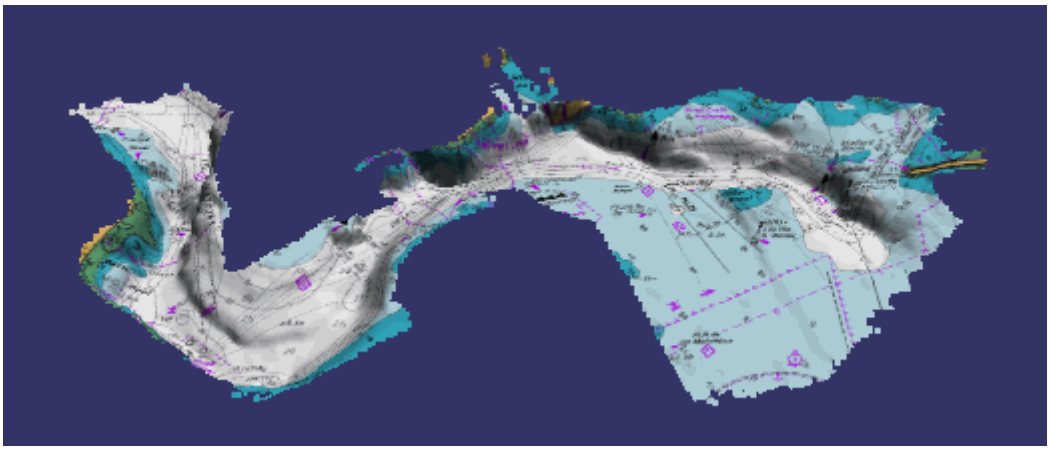
When visible, you have the option of draping data over the surface, so you can accurately view contours and other vector data.

4. Expand the Drape property and in the *Method* field, select one of the following three options:

- None: Data is displayed according to the *Default Elevation* property. With this option, all vector data will be on a level plane unless the data contains its own Z value. The Elevation defines the height at which the data sits above the surface. (The other Draping properties are disabled when None is selected as the method.)Drape: Data is draped using the bathymetry of the surface and the *Offset* property. The bathymetry will apply the proper Z value to the data and the *Offset* will define the height at which it sits above the surface.
- Drape *(use line splitting)*: Data is draped using the same values as the *Drape* method, but line segments are adjusted in length based on the *Max segment length* property. A larger segment length means less vertices and faster processing times. A smaller segment length means more vertices and slower processing times, but a more accurate representation of the elevations. (The *Max segment length* property is only enabled when the *Drape (use line splitting)* method is selected.)

5. Choose an option from the drop-down list.
6. Depending on the selected method, enter any necessary values in the other properties.

The image is draped over the surface.The example below shows a GeoReferenced TIFF draped over data.



Data that extends beyond the extents of the surface will be displayed according the *Default Elevation* value, regardless of the selected method.

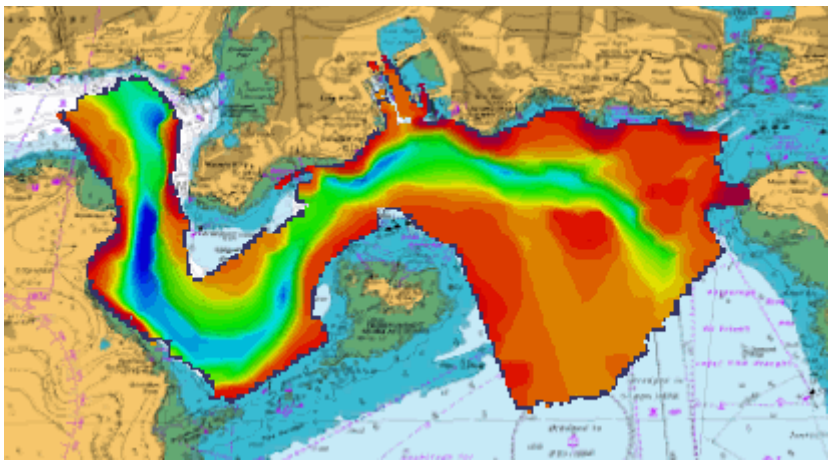
7. [Optional] If the image extends beyond the extents of the data, select the *Clip to terrain* check box to only show the section of the image within the surface extents.

You can also perform the opposite of the drape function where the image is cut away according to the bounding polygon of the surface. This allows you to view a background chart image with the actual surface visible within the chart.

To cut away the image:

8. In the Layers tab, right-click the image layer, select Cut Terrain, then select the name of the surface with which you want to cut the image.

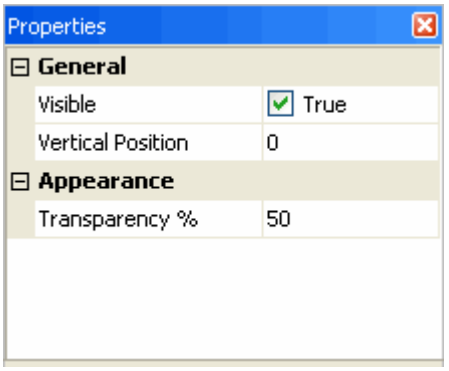
The image is cut and the gap is filled with the surface, as in the example below.



Raster Data Properties

To display the 3D display properties of raster data:

1. Select a raster data layer in the Layers tab while the 3D Display is active
2. Open the Properties window.



The *Visible* property allows you to have the data open and included in calculations, without using resources to actually have it displayed. This option is set to "True" by default.

3. Click the *Visible* check box to display the selected image.

The *Vertical Position* property allows you to adjust the elevation of the image in the display so that it lines up with the surface properly.

4. [Optional] Enter a value in the *Vertical Position* field.

The *Transparency* property allows you to make the image transparent so the surface can be seen in relation to the image.

5. [Optional] Enter a value in the *Transparency* field.

The display is updated to match the selected properties.

Draping Raster Data

Raster images can also be draped over a surface using the bathymetry of the surface.

To drape a raster image:

1. Open a raster image.
2. Select the attribute layer in the Layers tab that you want to use to define the draping elevation.
3. Right-click the attribute layer, then select Drape Image and then the name of the raster image to be draped.

The image is draped over the surface and a sub-layer is added to the Layers tab for the draped image.

Adjusting the Display

In addition to defining properties, there are various tools within the 3D Display that can also be used to adjust the display of data, such as:

- "Lighting" on page 75
- "Vertical Exaggeration" on page 76
- "Colour Range" on page 77
- "Control Axes" on page 78to rotate the data.
-

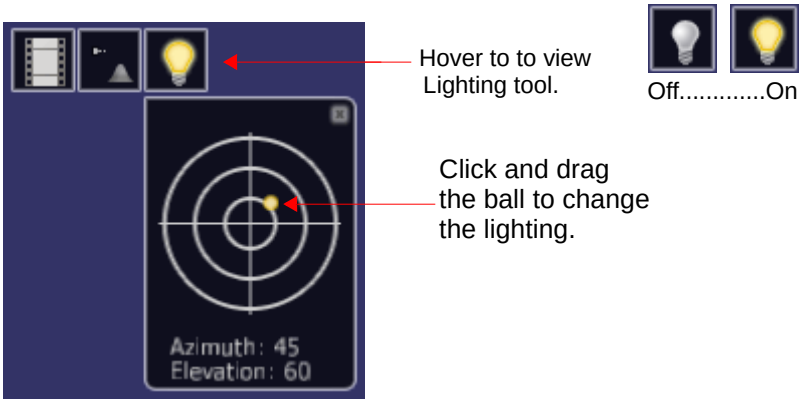
Lighting

The lighting control handles shading effects by controlling the position and angle of the light. The elevation value (displayed when the tool is selected) varies from 0º to 90º starting from the middle of a sundial. The azimuth value (also displayed when selected) varies from 0º to 360º in a clockwise direction.

To turn on the Lighting Control:

1. Pass cursor over the Light Control button in the Tools panel located in the top-left corner of the 3D Display.

The Lighting tool displays the current azimuth and elevation values.



2. Click and drag the ball to change the lighting.

As you drag, the values in the tool will be updated and you can see the affect on the data.

3. Release the mouse when the display has the proper lighting.
4. To close the tool, click the X in the top-right corner of the box.
5. To re-open the lighting tool, click the light bulb.

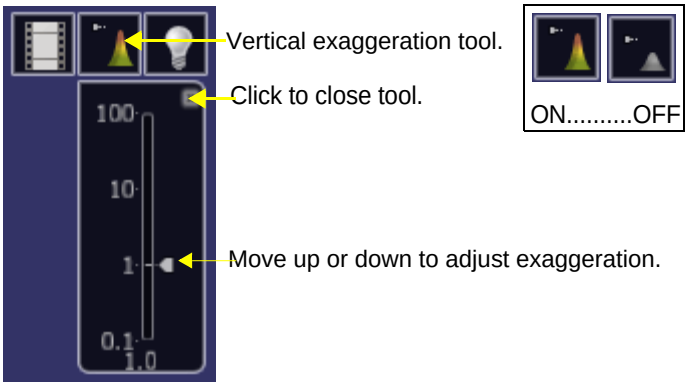
Vertical Exaggeration

Use the Vertical Exaggeration tool to increase or decrease the vertical exaggeration of the data to display seabed features more clearly.

To access the Vertical Exaggeration tool,

1. Hover the cursor over the middle button in the Tools panel (located in the top-left corner of the 3D Display).

The tool activates and a slider bar is displayed below the Tools panel.



2. Click the arrow on the side of the slider and move it up or down the bar.

As you move the arrow, note the change in the display.

3. Release the arrow when the data has the appropriate vertical exaggeration.
4. To close the tool, click the X in the top-right corner of the box.

Colour Range

The colour legend slider bar located along the right side of the 3D Display adjusts the colour range. The arrows on the side of the legend represent the *Min* and *Max Values* of the colour range.

To display the colour legend:

1. Click the Colour Range control.

To change the colour range using the colour legend:

1. Select the control arrow at the top or bottom of the legend.
2. Drag the control to the desired Min or Max value.

The colours in the display will change as you drag the arrow.

3. To reverse the colours, drag one control past the other.

The legend can be turned on or off using the **Colour Legend** button in the top-right corner of the 3D View. When the button is coloured, the legend is turned on and available for use.

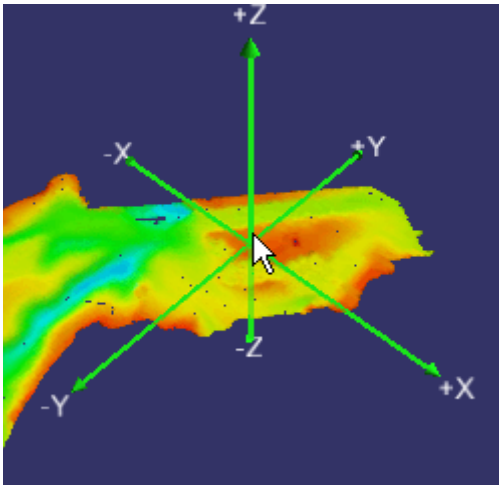
Off.....On

Control Axes

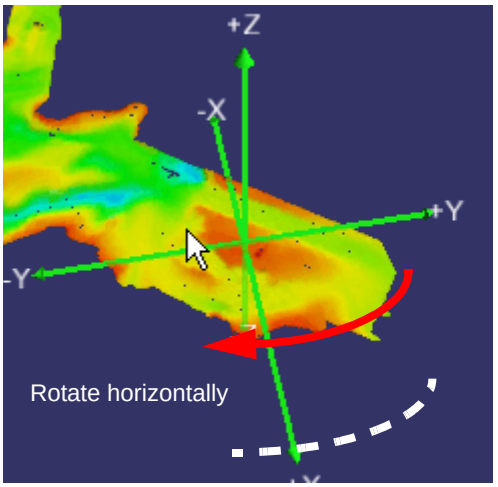
You can manipulate the view along the XYZ axes with the Control axes. Sometimes called compass controls, these are displayed as an overlay to the surface.

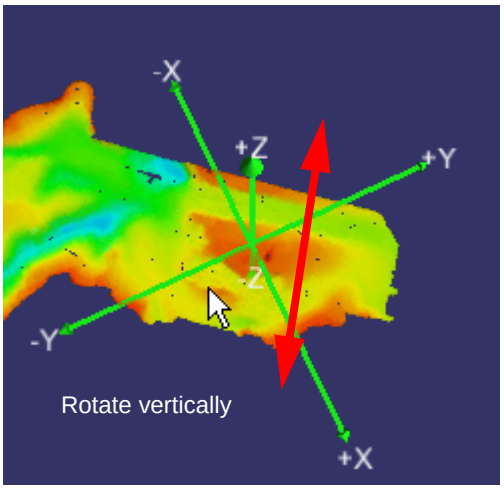
1. While pressing the middle mouse button, click on the surface in the Display.

The control axes appear. They are centred on the point at which you clicked the surface.



If you continue to press the middle mouse button you can tilt the display in three dimensions.





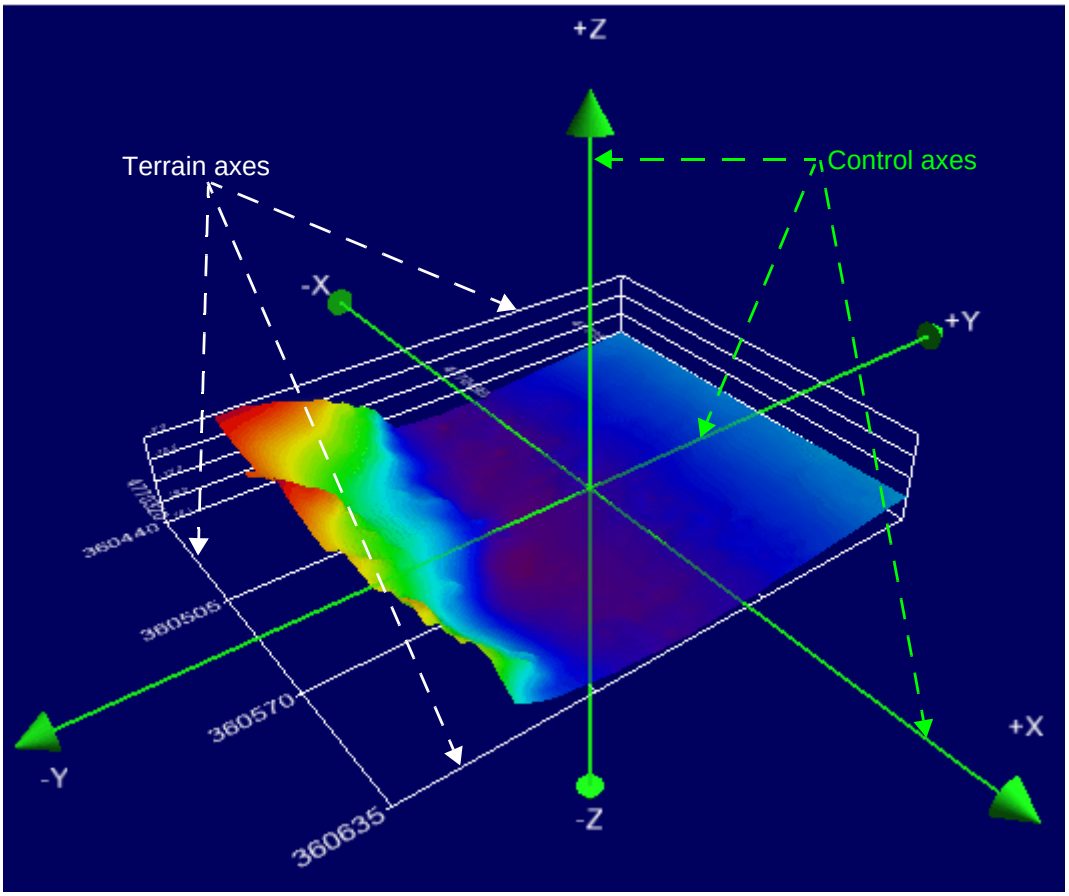
Terrain Axes

The terrain axes make up an XYZ grid that can be turned on in the 3D Display window. This grid runs parallell to the control axes. Whereas the control axes are only visible while being used to rotate data, the terrain axes remain visible until turned off.

To turn on the terrain axes:

Menu	Tools > Options > Display > 3D

1. Select Options from the Tools menu.
2. Select 3D from the Display tab.
3. Select the Terrain Axes check box to make them visible.



Navigate the 3D Display

You can use Zoom commands to zoom in and out, or you can zoom to the extent of the selected layer.

To zoom to the extent:

1. Right-click on a layer in the Layers tab.
2. Select Zoom to Map from the pop-up menu.

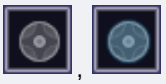
You can also use the zoom and pan functions of the Controller panel, the mouse or the keyboard to create the effect of flying over the display.

- To "fly" using the Controller, manipulate the controls in the CONTROLLERpanel.
- To fly using the mouse, press and hold one or both of the mouse buttons while simultaneously moving the cursor. See "MOUSE AND KEYBOARD CONTROLS" ON PAGE 81
- To fly using the keyboard, use the <Arrow> keys or keyboard shortcuts. The speed you travel through the display or pan the view varies with the cursor's distance from the centre (stationary) point. See "MOUSE AND KEYBOARD CONTROLS" ON PAGE 81
- You can also zoom into the display using the "NAVIGATION ICON" ON PAGE 84.

These controls can be used while recording the fly-through.

Controller

Tool

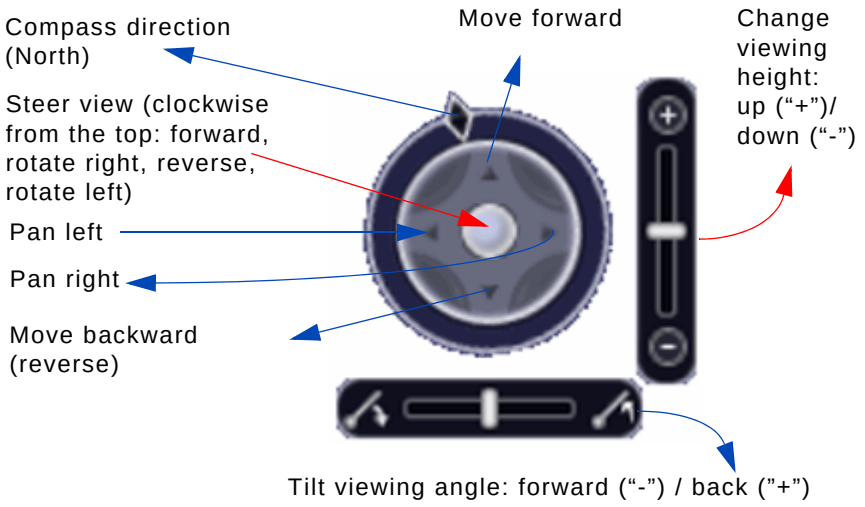


Off ..... On

The Controller panel consists of a directional pad and slider controls used to modify the view and perform a fly-through.

The Controller panel can be turned on or off using the Controller Panel button in the top-right corner of the 3D View. When the button is coloured, the panel is turned on and available for use. When turned on but not in use, the panel becomes transparent so as not to obstruct the view of the data.

The Controller panel contains the following controls:



Mouse and keyboard controls

When navigating with a mouse you can use the left and right buttons as well as the scroll wheel. Certain keys control these same movements.

With both mouse and key controls, the position of the cursor in the display determines the direction in which the image moves. When you click in the window, the data moves away from the cursor.

For example, when you click with the left mouse button, the data will move to the left or the right, depending on where the cursor is in relation to the data. When you click with the right mouse button, the data moves up or down.

Note that the mouse controls differ according to the *Controller Type* set in Tools > Options > 3D:

- If the *Controller Type is* set to Terrain Flyer, the controls allow you to navigate from the perspective of the height source. See “Navigating as Terrain flyer” on page 82.
- If set to First Person, the controls navigate from a camera view of the current 3D scene. See “Navigating as First Person Control” on page 82.

See “Mouse/Keyboard Controller Options” on page 85.

Navigation tools

The following tables list the keyboard and mouse controls for viewing and navigating the display.

Navigating as Terrain flyer

Action	Mouse Control		Key
	Move cursor	Press button	
Pan backward in a straight line, horizontal to the TERRAIN AXES (PAGE 79)	Down	Right	Shift +S
Pan forward in a straight line, horizontal to the TERRAIN AXES (PAGE 79)	Up	Left	Shift +W
Pan left in a straight line, horizontal to the TERRAIN AXES (PAGE 79)	Left	Left+right	Shift + A
Pan right in a straight line, horizontal to the TERRAIN AXES (PAGE 79)	Right	Left+right	Shift + D
Pan up in a straight line, vertical to the TERRAIN AXES (PAGE 79)	Up	Left+right	Shift + R
Pan down in a straight line, vertical to the TERRAIN AXES (PAGE 79)	Down	Left+right	Shift + F
Rotate left	Left	Left	←
Rotate right	Right	Left	→
Tilt back, viewing angle goes up	Up	Right	↓
Tilt forward, viewing angle goes down	Down	Left	↑

Navigating as First Person Control

Action	Mouse Control		Key
	Move cursor	Press button	
Pan backward in a straight line, horizontal to the .	Down	Right	Shift + S
Pan forward in a straight line, horizontal to the TERRAIN AXES (PAGE 79).	Up	Right	Shift + W
Pan left in a straight line, horizontal to the TERRAIN AXES (PAGE 79)	Left	Right	Shift + A
Pan right in a straight line, horizontal to the TERRAIN AXES (PAGE 79)	Right	Right	Shift + D
Pan up in a straight line, vertical to the TERRAIN AXES (PAGE 79).	Up	Left+Right	Shift + R
Pan down in a straight line, vertical to the TERRAIN AXES (PAGE 79)	Down	Left+Right	Shift + F
Rotate left.	Left	Left	←

Action	Mouse Control		Key
	Move cursor	Press button	
Rotate right.	Right	Left	→
Tilt back, viewing angle goes up	Up	Left	↓
Tilt forward, viewing angle goes down	Down	Left	↑

Common controls

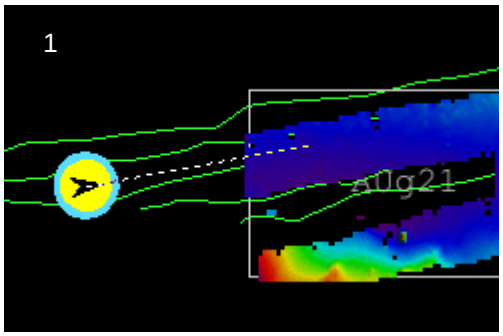
Action	Mouse Control		Key
	Move cursor	Press button	
Rotate and tilt around the x,y,z Control axes	Any direction	Middle	--
Zoom in	Wheel: Scroll forward		Ctrl+ ↓
Zoom out	Wheel: Scroll backward		Ctrl+ ↑

Navigation icon

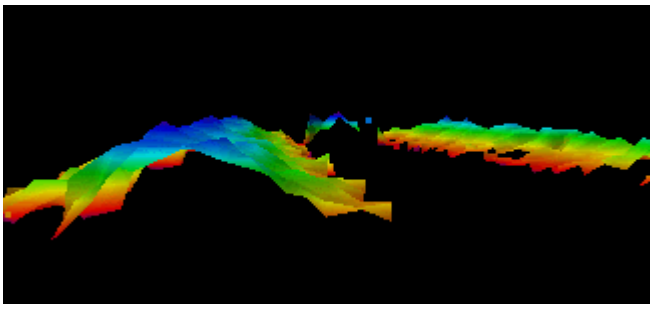
You can also change the view by manipulating the navigation icon around the selected surface in the Display window. Movement of the icon in the Display will be reflected in the 3D View.

To use this tool,

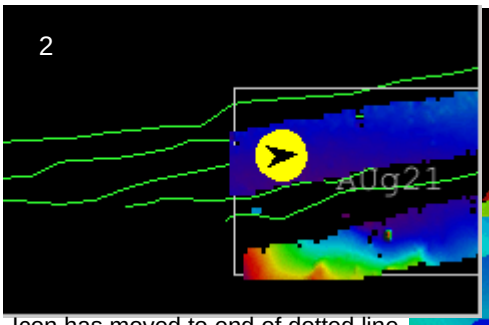
3. Click on the arrow icon and drag your mouse in the direction you want to view. This drags out a dashed line.
   - When you release the mouse click, the icon will move in the direction of the arrow to the spot where you released it.
   - In the 3D view the surface zoom in to follow path made by the dotted line in the Display.



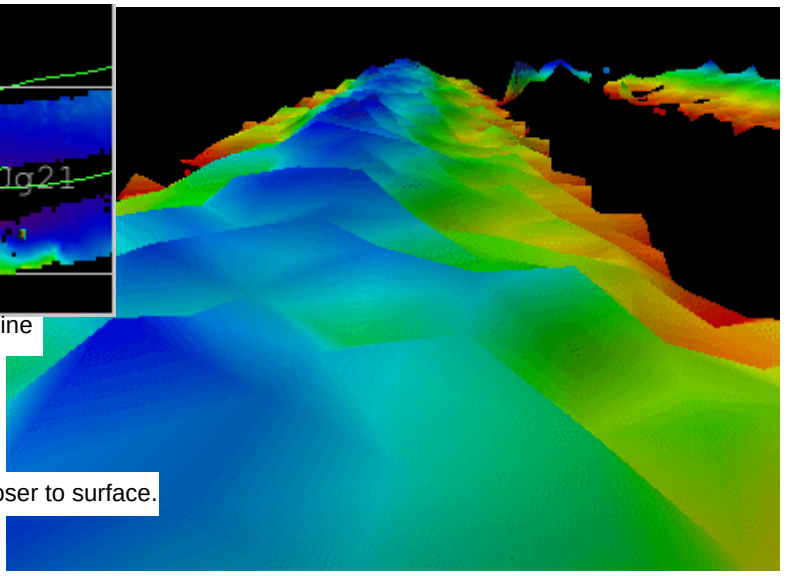
Position of icon in Display window



View of surface in 3 D window



Icon has moved to end of dotted line



View is now zoomed closer to surface.

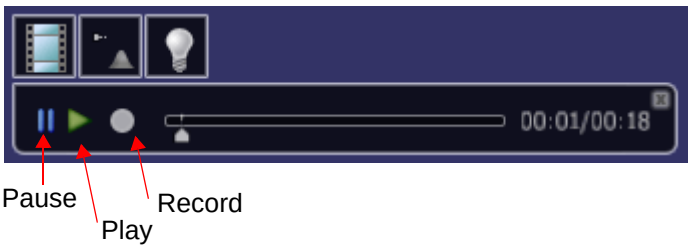
Mouse/Keyboard Controller Options

In the Options dialog box, the 3D tab provides options for adjusting the settings of the keyboard and mouse controllers used to navigate the 3D Display. The following options are available:

- **Controller Type**: Select one of two types of controls to use when navigating the 3D Display:
  - Terrain Flyer: allows you to navigate from the perspective of the height source.
  - First Person: allows you to navigate from a camera view of the current 3D scene.
- **Flight Speed**: Controls the speed at which you move through the display during a fly-through. Move the slider bar left or right to increase or decrease flying speed.
- **Zoom Speed**: Controls how fast the view is changed when using the zoom controls. Move the slider bar left or right to increase or decrease zooming speed.
- **Smooth-Fly-To Speed**: Controls how fast the view is changed when you double-click an area of the 3D View. Move the slider bar left or right to increase or decrease zooming speed.

3D Flight Path

You can make and save movies of a 3D fly-through for playback at a later time. The controls for creation and playback are located in the 3D Display Tools panel and the 3D Flight Path submenu.



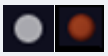
Instructions for using these tools are provided in the following sections:

- "Record a Flight" on page 86
- "Play a Flight" on page 87
- "Load an Existing Flight" on page 87
- "Save a Flight" on page 87
- "Export a Flight to Video" on page 88

Record a Flight

To record a fly-through:

1. Select a layer in the Layers tab to display in the 3D Display.
2. Adjust the view to display the starting point for your fly-through.
3. Select the **Record** command.

Menu	View > 3D Flight Path > Record
Tool	

The Record button will change to red to indicate that you are now recording.

4. Use the controls to navigate your flight path through the 3D Display. See "Navigate the 3D Display" on page 80 for information on navigating.

All movements in the Display window are recorded.

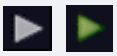
5. To stop recording, select the **Record** command again or select the **Stop** command.

Menu	View > 3D Flight Path > Stop

The **Record** button will return to the inactive state and your fly-through is recorded and ready for playback.

Play a Flight

To playback a recorded fly-through:

Menu	View > 3D Flight Path > Play
Tool	

1. Select the **Play** command.

The fly-through will begin to play. As it does so, the arrow on the slider bar will move from left to right and the counter at the end of the slider bar will count down, indicating the progress of the fly-through. The slider bar can also be used to go forward or backward in the recording.

2. [Optional] Click the arrow on the slider bar and drag it to the left or right to go forward or backward in the recording.

You can pause the playback if necessary without stopping it altogether.

Menu	View > 3D Flight Path > Pause
Tool	

3. [Optional] Select the **Pause** command to pause the playback.

The Pause button will be coloured to indicate that playback has been paused. Both the Pause and Play commands can be used to resume playback after the Pause command has been selected.

4. To stop the playback, either select the **Play** command again, or select the **Stop** command.

Menu	View > 3D Flight Path > Stop

Otherwise, playback stops when you reach the end of the recording.

Load an Existing Flight

If you have saved a fly-through to a file, that file can be loaded and played in the 3D View at anytime.

To load an existing flight:

1. Open the 3D Display.

Menu	View > 3D Flight Path > Load from File

2. Select the **Load from File** command.

A standard Windows Open dialog box is displayed.

3. Navigate to the flight file and click **Open**.

The fly-through is loaded into the 3D Display and the flight path controls are available.

Save a Flight

Once you have finished recording a fly-through, you can save it to an XML file that can be viewed in HIPS and SIPS at any time.

To save a flight to an XML file:

1. Record the fly-through.

Menu	View > 3D Flight Path > Save to File

2. Select the **Save to File** command.

A standard Windows Save As dialog box is displayed.

3. Select a location for the file and enter a **File name**.
4. Click **Save**.

The flight is saved as an XML file in the selected location with the specified name.

Export a Flight to Video

If you do not export your recording, it can only be re-opened in HIPS and SIPS, but an exported recording can be opened in any standard media player.

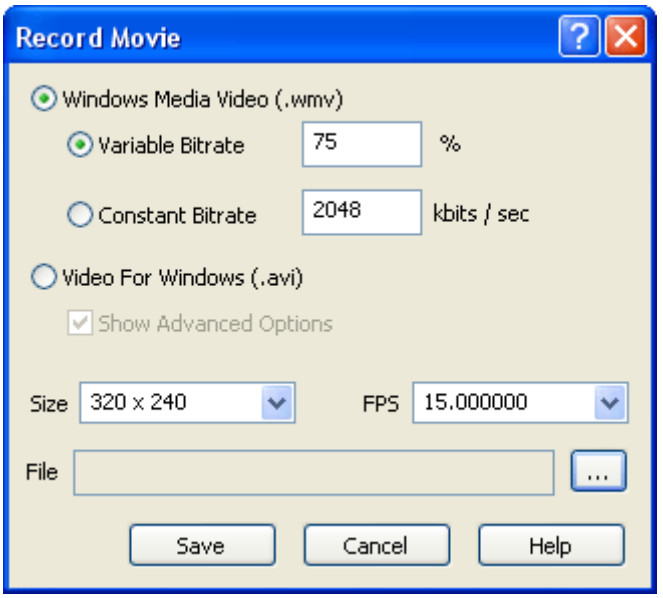
To export a record of your fly-through:

1. Open or create a fly-through.

Menu	View > 3D Flight Path > Export to Video

2. Select the Export to Video command.

The Record Movie dialog box is displayed.



3. Choose the format of the video file. If you selected AVI format, go to step 6. If you selected WMV format, continue with the next step.

You may select a bitrate for the recorded data as a variable or a constant value.

- Variable Bitrate records the video using a fluctuating bitrate, which is based on a user-defined average quality level. During encoding, the bitrate will fluctuate to ensure the video is created with the highest possible quality while maintaining the specified average.

- Constant Bitrate records the video using a user-defined number of kilo-bits per second. This option ensures that a constant bitrate is used during encoding, but may result in a lower quality video.

4. Select a bitrate option.
5. If you selected *Variable Bitrate*, enter the average quality level for the resulting video and go to step 7.

   OR

   If you selected *Constant Bitrate*, enter the number of kilo-bits per second to use to record the video and go to step 7.
6. [Optional] To see the advanced playback options for your AVI movie before it is saved, select the *Show Advanced Options* option.

You must select image size and FPS (Frames-Per-Second) options for the playback of your movie.

7. Select a *Size* option.
8. Select an *FPS* option.
9. To select the save name and location for your movie file, click the Browse button (**...**).

A Save As dialog box is displayed.

10. Type a save name.
11. Select a save folder.
12. Click **Save**.

The Save As dialog box is closed, returning you to the Record Movie dialog box.

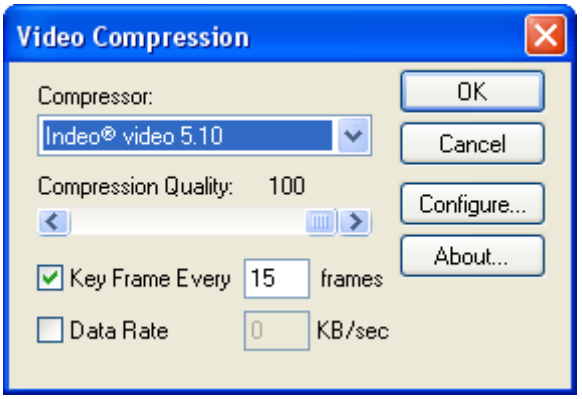
13. If you clicked the WMV format option, click **Save** and go to step 19;

    OR,

    if you clicked the AVI format option, click **Save** and continue with the next step.

Video Compression

The Video Compression dialog box is displayed.



14. Select a *Compressor*.

> Some video compressors do not allow you to set the following options (in steps 15 to 17) for your movie files.

15. Use the slider control to select the compression quality (displayed as a value in the range of 0 and 100 percent).
16. [Optional] To insert key frames, select the *Key Frame* option and type a *frames* value.
17. [Optional] To set the data rate, select the *Data Rate* option and type a *KB/sec* (kilobits per second) value.

With some compressors, you can also choose the configuration settings to use for your AVI movie.

18. [Optional] To configure the selected compressor, click **Configure** and select from the available configuration options.
19. Click **OK**.

A message is displayed stating that the file was saved.

20. To finish, click **OK**.

The process is finished.

4

Options

HIPS and SIPS options control the layout and appearance of the HIPS and SIPS interface, as well as the access to data repositories and files on a network.

In this chapter...

Introduction

The Options dialog box has a number of parameters to help you control the appearance of the interface, the behaviour of some commands, and the system environment.

Menu	Tools > Options

1. Select the Options command.

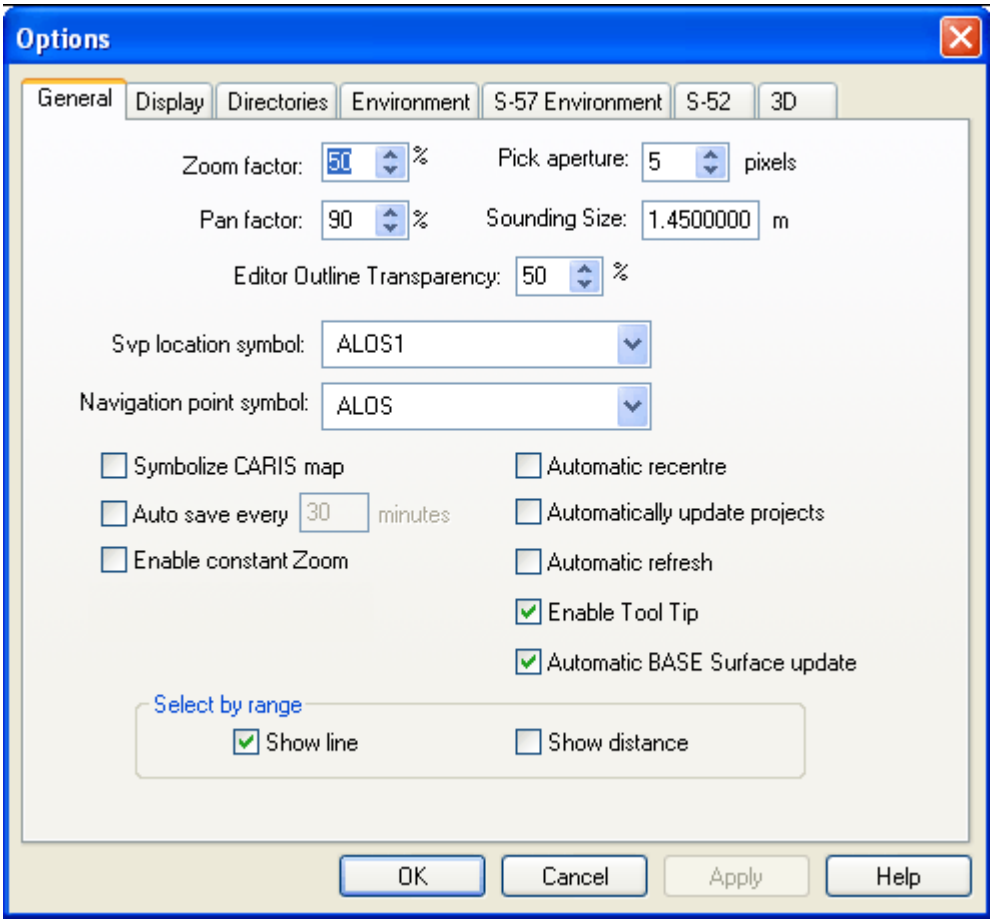
The Options dialog box is displayed. The dialog box contains the following tabs:

•

2. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

General

On the Options - General tab you can set parameters that determine how you want to work with data.



1. Set options as described in the table below.

Field	Description	To assign a value...
Zoom factor	Set the percentage used to increase or decrease the display scale when using the Zoom functions.	Select a percentage rate for the zoom tool using the up or down arrows in the *Zoom factor* box.
Pan factor	Set the percentage used to move up, down, left, or right while using the Pan tools.	Select a percentage by clicking the up or down arrow keys beside the *Pan factor* box.
Pick aperture	The Pick Aperture determines the maximum distance (in pixels) that a cursor can be from an object to select it. For example, if the Pick Aperture is set to five, the cursor must be a distance of five pixels (or less) to select an object.	Select the pixel area for the Pick aperture by clicking the up and down arrow buttons.

Field	Description	To assign a value...
Sounding size	Display sounding digits in a field sheet or tiled area at a selected size (millimetres at map scale).	Enter a sounding size value in the *Sounding Size* field.
Editor Outline Transparency	Control the transparency levels of fills for Swath, Side Scan and Subset Editor outlines in the Display window.	Select a percentage value for transparency (0 equals no transparency, 100 equals total transparency) by clicking the up or down arrow buttons.
SVP location symbol	Select a feature code for the symbol that shows the location where SVP data was recorded.	Select a feature code from the drop-down list.
Navigation point symbol	Select a feature code for the symbol display of points in the Navigation Editor.	Select a feature code from the drop-down list.
Symbolize CARIS map	When enabled, line weights and symbology map are applied based on CARIS master and symbol files. When turned off, the lines are drawn as harilines with not symbology.	Check the *Symbolize CARIS map* box to implement this option for a background CARIS map.
Auto save	Automatically save all status flag changes at set intervals.	Select the *Auto Save* check box to implement this function. Enter the interval (in minutes) that work is to be saved.
Enable constant Zoom	Set the Zoom function to allow repeated Zoom commands until function is turned off. (Default is to switch to Selection function after one Zoom.)	Select the *Enable constant Zoom* check box to implement this option.
Automatic Recentre	Redraw the Display window so that the sounding coverage outline is always displayed in the centre when scrolling along the line.	Select the *Automatic recentre* check box.
Automatically update projects	When this option is set, HIPS/SIPS will check the UTM zone for all lines in a project every time the project is reopened.	By default, *Automatically update projects* is NOT selected. This ensures that HIPS only searches for and sets the UTM zone when the project is first opened, (even if the project was created using the Select UTM zone automatically option).
Automatic refresh	Refresh the Display window automatically when layers are turned on or off, or when the drawing order is changed in the Control window.	Make sure the *Automatic refresh* box is checked to implement this option.
Enable tool tip	Show/hide the display of ToolTips when the cursor is over a BASE surface or toolbar button.	Make sure the *Enable tool tip* box is checked to implement this option.

Field	Description	To assign a value...
Automatic BASE Surface update	Automatically update BASE Surfaces changed due to cleaning sounding data in the Swath and Subset Editors, or after cleaning CUBE data in the Subset Editor.	Select checkbox activate the *Automatic BASE Surface update*.
Show line	Display a diagonal line inside the bounding box that is drawn when selecting data.	Click the *Show line* check box.
Show distance	Display the distance that the bounding box covers when it is drawn on the screen during selection.	Click the *Show distance* check box.

2. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Display

The Display tab lists various display controls for such items as fonts, visibility and position of labels, and so forth.

Many of the colour options set in this tab indicate the status of displayed elements such as track lines (merged or not,) and critical soundings (designated, rejected, outstanding, etc.).

> These colours can also be changed in the Properties for a layer, for example, for example, the colour of designated soundings can be changed in the Critical Soundings layer. However, these colour settings are not retained unless saved to a session file.

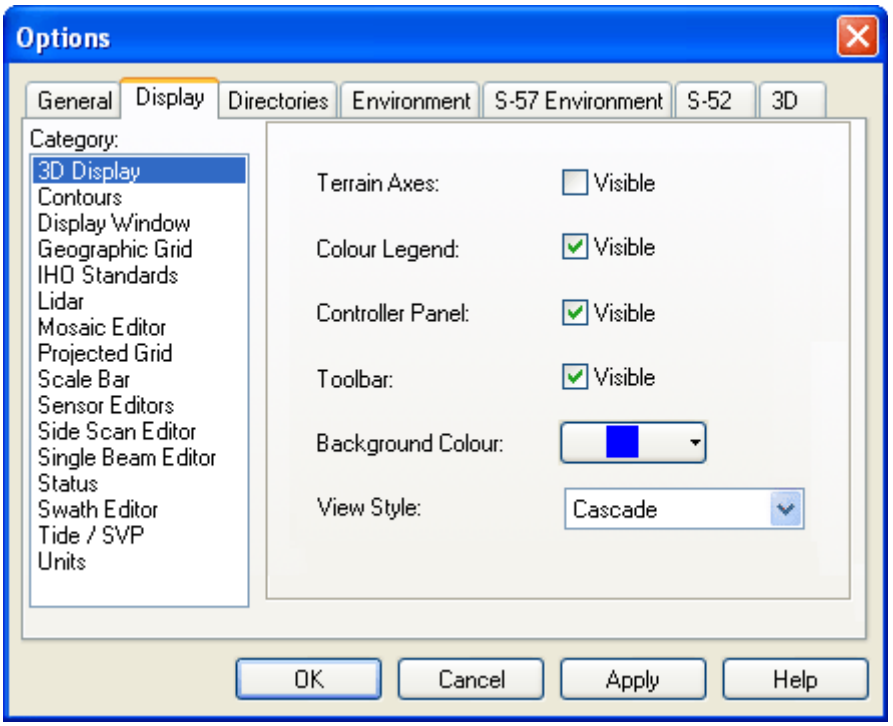
1. Select the Display tab.

The Options - Display dialog box is displayed.

2. Select an item from the Category list.

The controls for the selected editor or window are displayed on the right side of the window. These controls are described below.

3D Display



If the 3D View is open when these options are changed, the new settings do not take effect until the 3D view is closed and reopened.

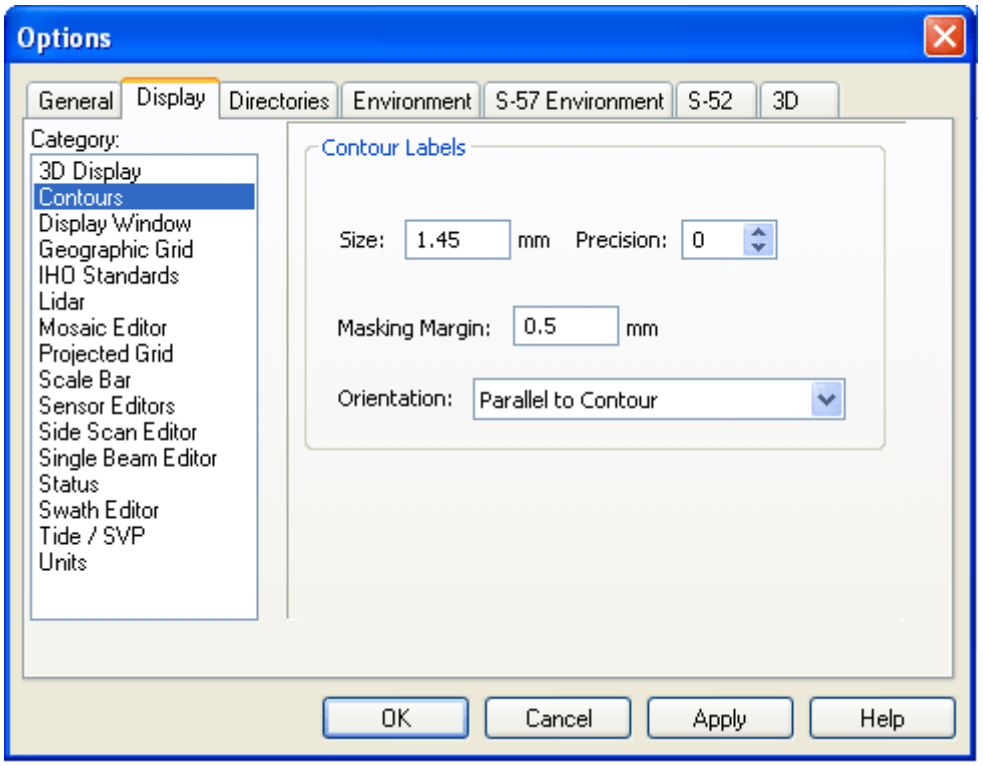
Use settings in Tools > Options > Display > 3D to:

- display a *Terrain Axes* (x,y,z) grid for the selected surface.
- turn on or off the display of the *Colour Legend* which indicates depths of the coloured areas in the display.
- turn on or off the display of the C*ontroller Panel*. When turned off, the controller panel's on/off button within the 3D View is also removed.
- display the 3D View *Toolbar*. If this option is not enabled, the commands can be activated from the View > 3D Flight Path submenu.
- select the colour to use as the *Background Colour* of the 3D View.
- View Style sets the manner in which the 3D window is displayed within the Display window area.

- In Full View the 3D View occupies the entire Display window.
- Vertical Tile (and Horizontal Tile) the 3D View is tiled vertically (or horizontally) with the Display window and any other open windows.
- Cascade arranges all the open windows within the Display window so that they overlap one another, with their title bars visible.

Contours

Use the Contours options to set the display of labels for contour lines created in a product surface.

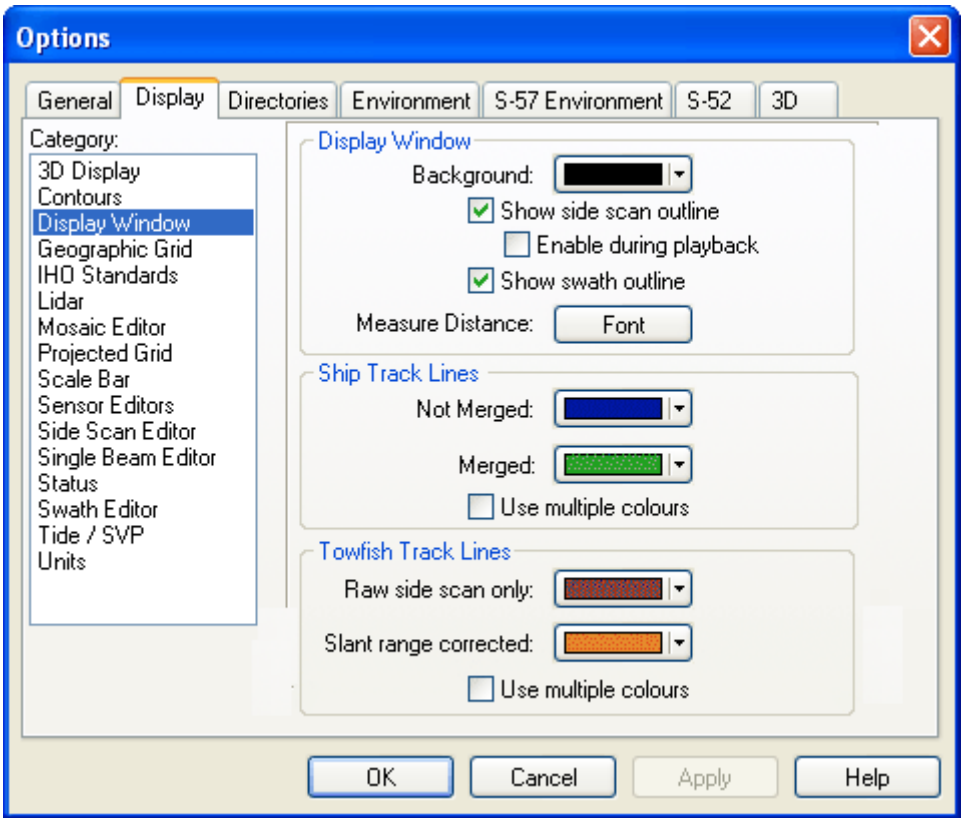


Set:

- Size in mm of the contour label.
- Number of decimal places to the right of the decimal point to display in the label.
- Space in mm around the label when the masking option is used.
- Orientation of the label with respect to the contour line it is labelling.

Display window

Set the display and colour features for the ship and towfish track lines.



1. Set the parameters described in the table below.

Field	Description	To assign a value...
Display Window fields:		
Background	Control the background colour.	Select a colour for the background from the colour palette, or create a custom colour from the standard Windows colour picker.
Show Side Scan Outline	The side scan outline marks the extent of the data currently visible in the Side Scan Editor.	Select the *Show Side Scan Outline* check box to display the marker in the Display window while the Side Scan Editor is open.
Enable during playback	Move the side scan outline along the track line during the Playback option in the Side Scan Editor.	Select the *Enable During Playback* check box to make this option active.

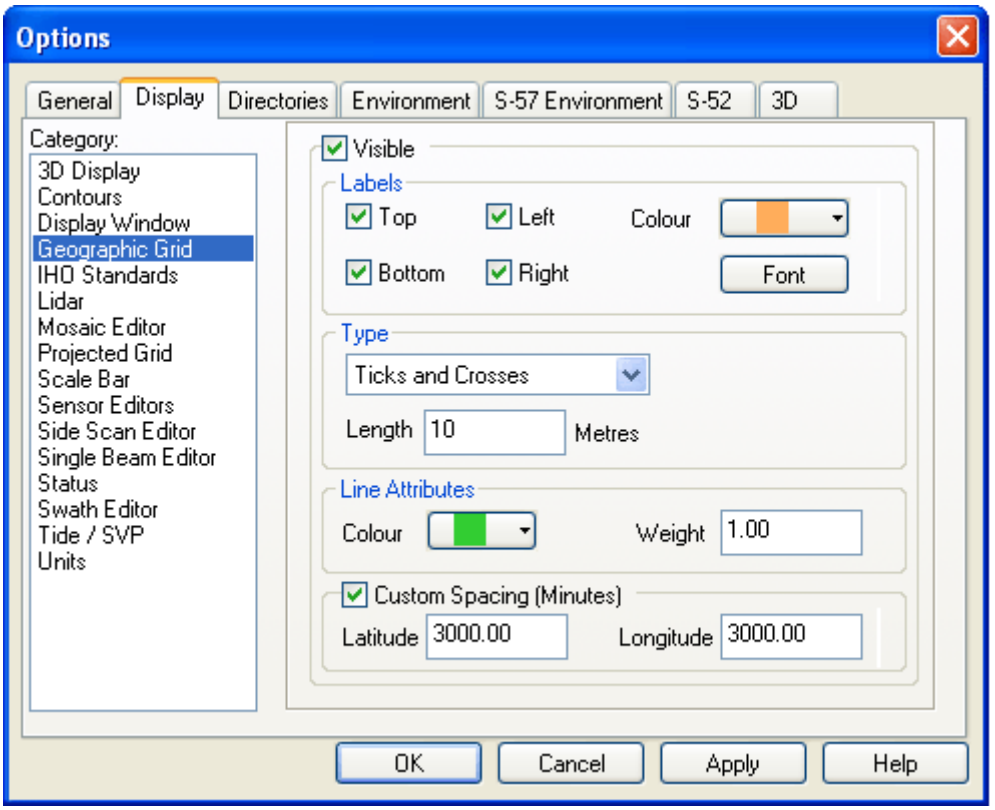
Field	Description	To assign a value...
Show Swath Outline	The swath outline marks the extent of the data currently visible in the Swath Editor.	Select the *Show Swath Outline* check box to display the marker in the Display window while the Swath Editor is open.
Measure Distance	Select a font to display measurements when the Measure Distance command is used.	Click **Font** and select a type face, font size and colour from the dialog box.
Ship Track Lines fields:		
Not Merged	The colour for track lines that have not been merged into a position/depth file	Select a colour from the colour palette, or create a custom colour from the standard Windows colour picker.
Merged	The colour of track lines that have been merged into a position/depth file.	
Towfish Track Lines fields:		
Raw Side Scan Only	The colour used to display track lines when side scan data is still in raw mode.	
Slant Range Corrected	The colour used to display track lines when side scan data has been slant range corrected.	
Use Multiple Colours	This option uses a set of ten distinct colours to colour the track lines in the Display window. This is helpful if the survey data was logged as multiple files along the same runline.	Click the *Use Multiple Colours* check box to enable this option for ship track lines or towfish lines.

2. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Geographic Grid

Options for the Geographic Grid control the display of a temporary grid based on geographic units, drawn over the extent of your project.

For a grid to cover the extent of a field sheet only, see "Field Sheet Projection Grid" on page 178 of the Users Guide.



1. Select the *Visible* check box to display the grid in the Display window.
2. Set other display options as described below.

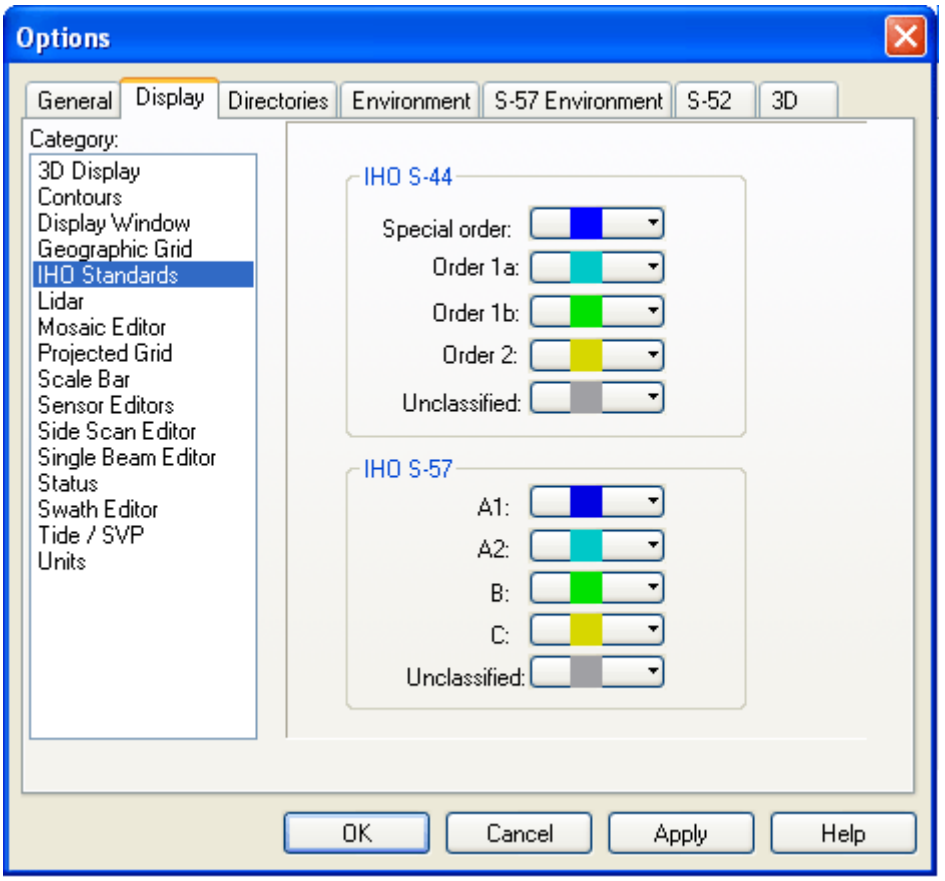
Field	Description	To assign a value...
Labels: Top/Left/ Bottom/Right	Display geographic coordinates at selected locations in the Display window	Select the check boxes.
Colour	Set a colour for the grid labels.	Select a colour from the colour picker, or create a custom colour from the standard Windows colour palette.
Font	Typeface and point size for grid labels	Click the Font button to open the standard Windows Font dialog box to select a font type and size.

Field	Description	To assign a value...
Type	The type of markings to make up the geographic grid.	Select a type from the drop-down list.
Length	The length of the markings (mm at map scale).	Type the length.
Line Attribute Colour	Colour for the geographic grid markings.	Select a colour from the colour picker, or create a custom colour from the standard Windows colour palette.
Weight	Thickness of the markings	Type a value into the field.
Custom Spacing	Set the distance between grid markings in the display.	Select the check box.
Latitude/Longitude	Spacing of grid markers in minutes.	Type a value in the provided field.

3. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

IHO Standards

The IHO Standards options control the colour options for the display of data according to International Hydrographic Organization (IHO) standards. Colours can be set for each S-44 survey order and S-57 Zone of Confidence (CATZOC). The *Unclassified* option sets the colour for soundings that exceed the defined limits of the selected standard.

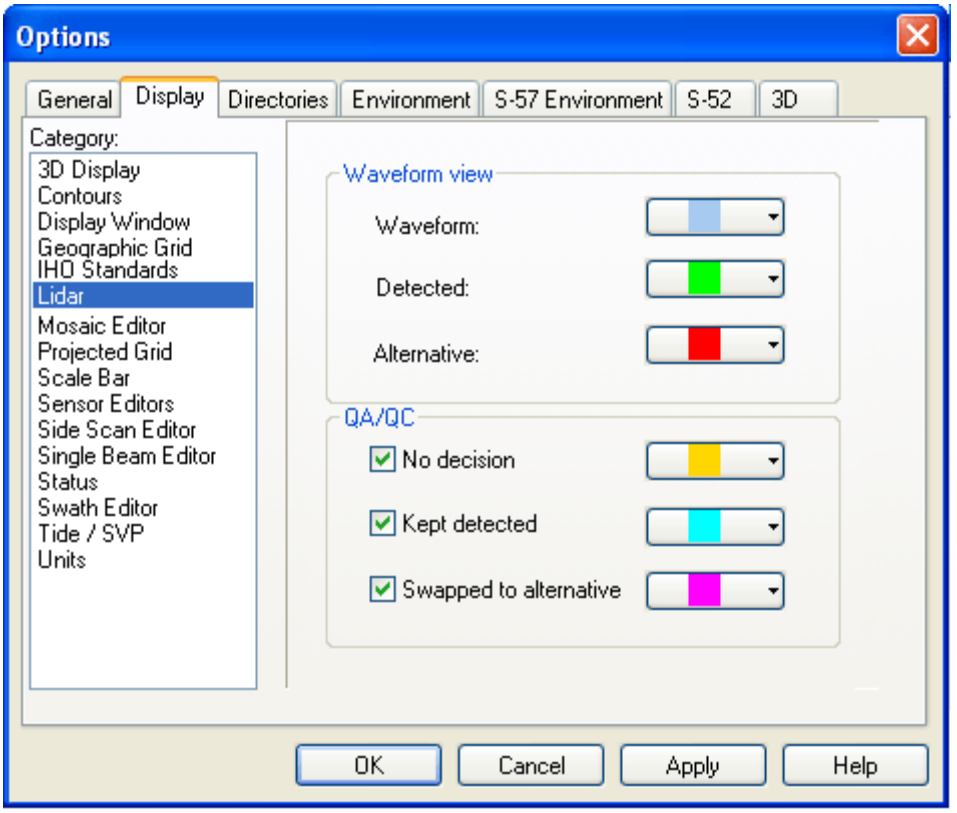


1. Select a colour from the appropriate colour palette, or create a custom colour from the custom colour box.
   - IHO S-44: Colours for displaying soundings according to S-44 survey order.
   - IHO S-57: Colours for displaying soundings according to the S-57 CATZOC zones of confidence attributes.
2. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

See also "TPU Filtering" on page 155 of the User Guide.

LIDAR

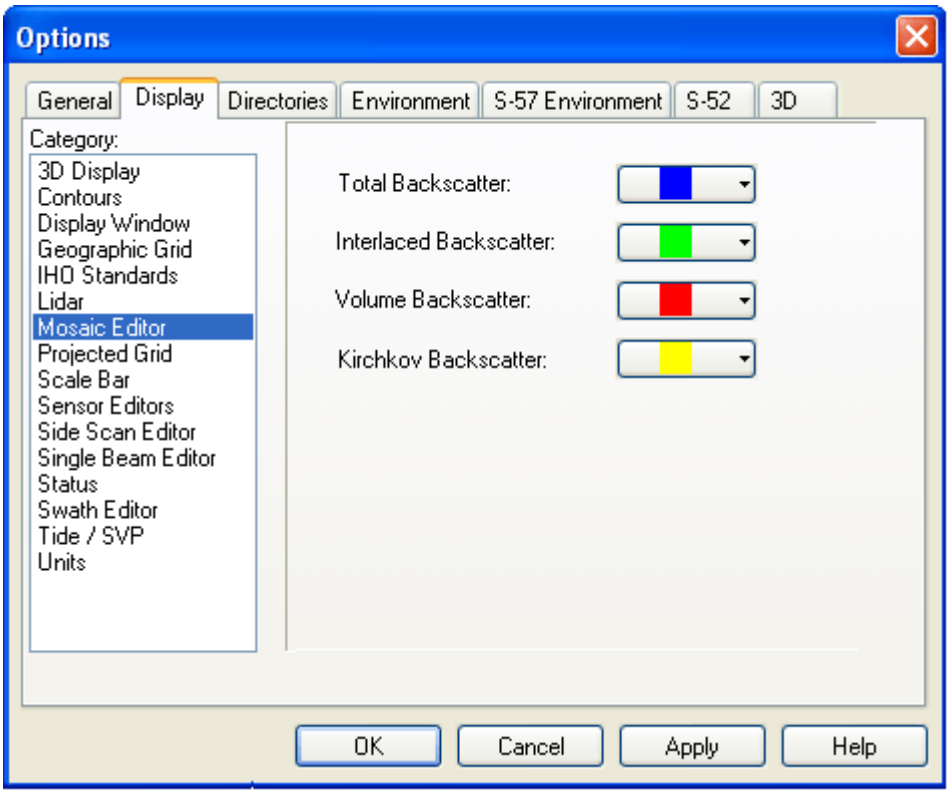
LIDAR options control the colour options for LIDAR data in the Swath and Subset Editors.



1. Select waveform colour from the appropriate colour palette, or create a custom colour from the colour picker.
   - Waveform: colour for displaying waveform data.
   - Detected: colour for displaying soundings.
   - Alternative: colour for displaying soundings with an alternative depth.
2. Select a colour for each of the LIDAR flags.
3. Display or hide soundings with specific quality flag by selecting or clearing any of the quality flag check boxes.
   - No Decision: soundings that have a detected and alternative depth. (Quality 1 flag).
   - Kept Detected: soundings where the detected depth is retained over the alternative depth (Quality 2 flag).
   - Swap to Alternative: soundings where the detected depth has been replaced by the alternative depth (Quality 3 flag).
4. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

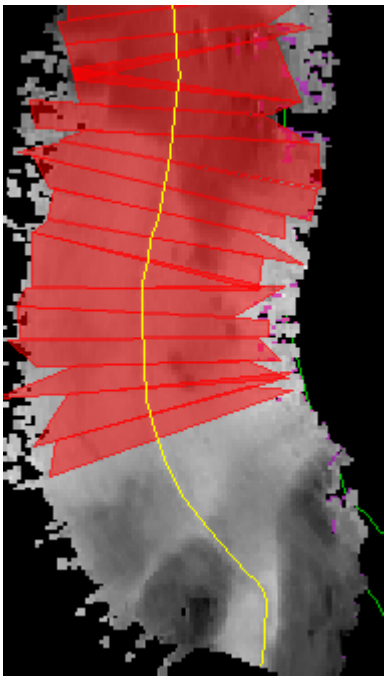
Mosaic Editor

Set the colours for the display of backscatter trace in a Sediment Analysis graph in Mosaic Editor.



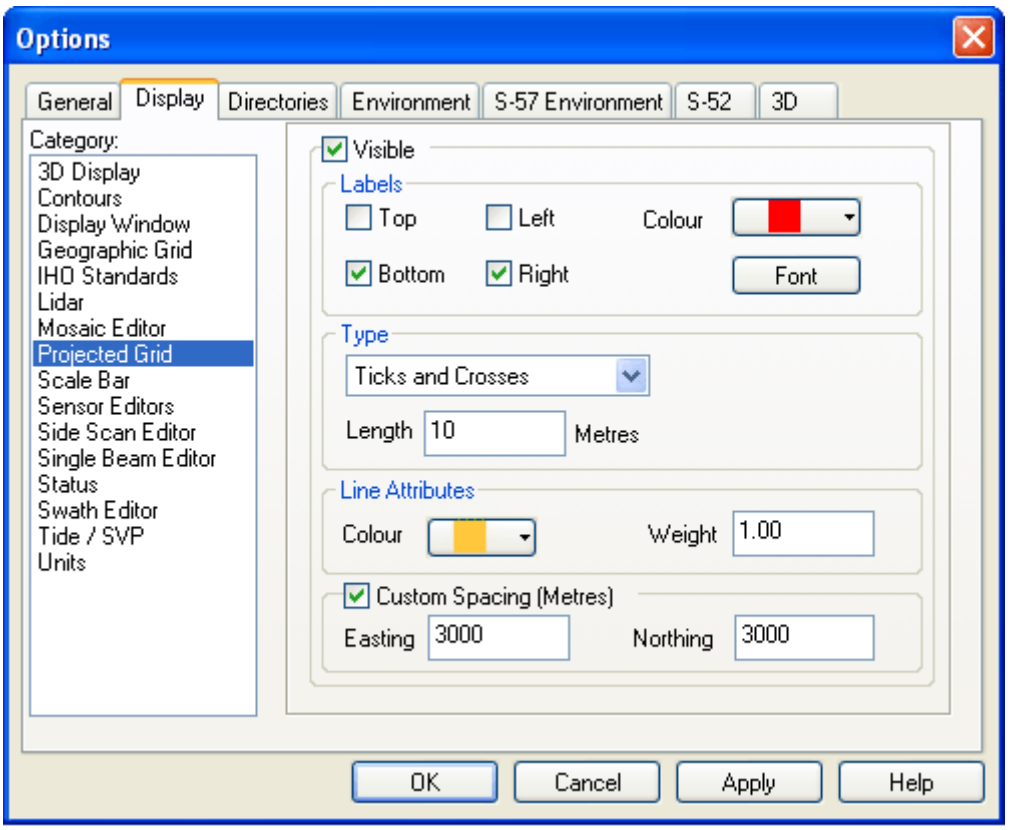
- Total Backscatter (default colour blue) - combined backscatter from the three sources
- Interface Backscatter (default colour light green) - from the sea floor/water interface
- Volume Backscatter (default colour red) - from within the sediment
- Kirchhoff Backscatter (default colour yellow) - models the sea floor roughness.

See also "Sediment Analysis Graph" on page 451



Projected Grid

Projected Grid display options control visibility, labelling and appearance of a grid based on ground coordinates, projected over your entire project.



1. Select the *Visible* check box to display the grid in the Display window, and to activate the display options.

To change from default values:

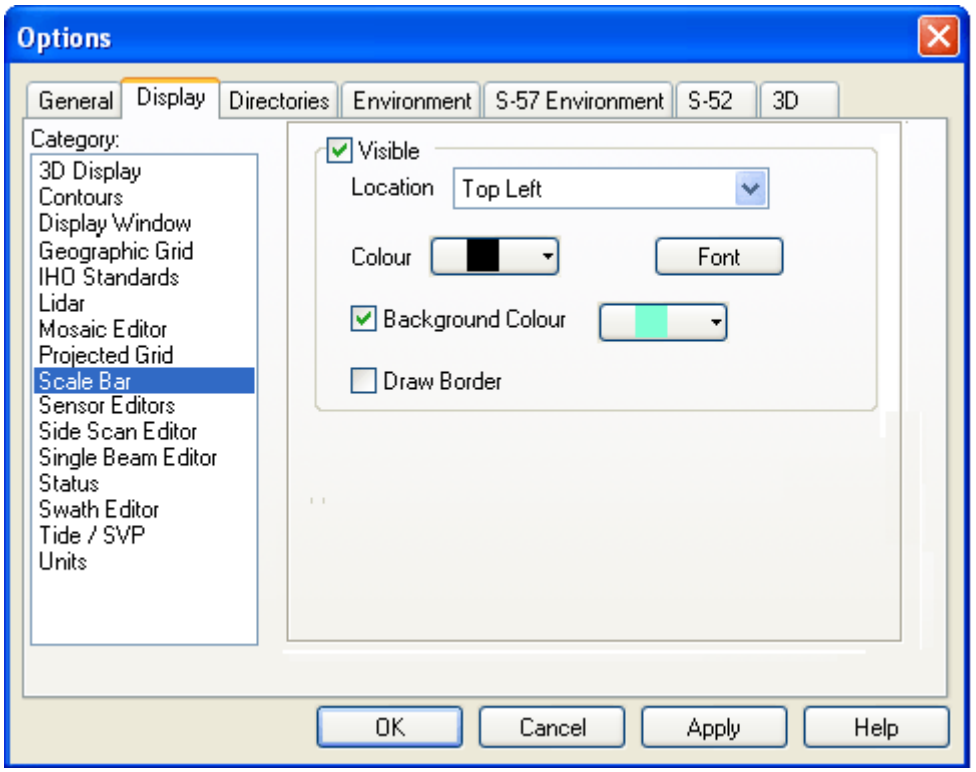
2. Select any of the *Labels* check boxes to display coordinates at those selected locations in the Display window: Top/Left/Bottom/Right.
3. Click **Colour** to select a colour for the grid labels, from the colour picker, or create a custom colour.
4. Click **Font** to open the Windows Font dialog box to select a typeface and point size for grid labels.
5. From the *Type* drop-down list, select the type of markings to make up the projected grid, e.g., full lines, ticks and crosses.
6. Set the *Length* for the markings in mm at map scale.
7. Select a colour for the grid lines.
8. Type a *Weight* value for the thickness of the grid lines.
9. Set the distance between grid markings in the display, by selecting the *Custom Spacing* check box and typing a value into the *Easting* and *Northing* fields. (Spacing of markers in mm at map scale.)

10. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

To project a grid which covers the extent of a field sheet *only*, see "Field Sheet Projection Grid" on page 178 of the Users Guide.

Scale Bar

This tab controls the options for the display of the scale bar.



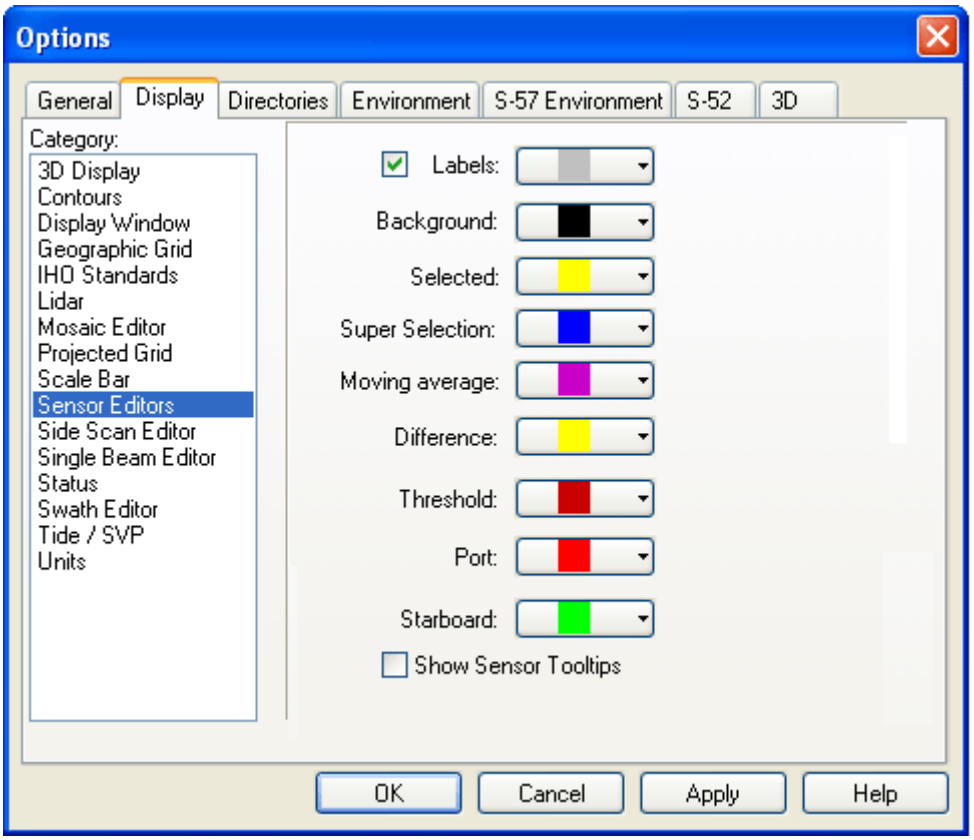
1. To show a scale bar in the Display window, select the *Visible* check box.

To change from the default settings:

2. Select the position of the scale bar in the window from the *Location* drop-down list.
3. Select a *Colour* for the scale bar from the colour picker, or create a custom colour from the Windows colour palette.
4. Click **Font** to select the font type, style and size from the Font dialog box.
5. Select the *Background Colour* check box to turn on a colour for the scale bar. Change the colour by selecting from the colour picker.
6. To draw a border line around the scale bar, select the *Draw Border* check box.

Sensor Editors

The Tools >Options - Sensor Editors tab controls some of the colour settings for editors such as Attitude Editor adn Navigation Editor..



1. Set the parameters described in the table below.

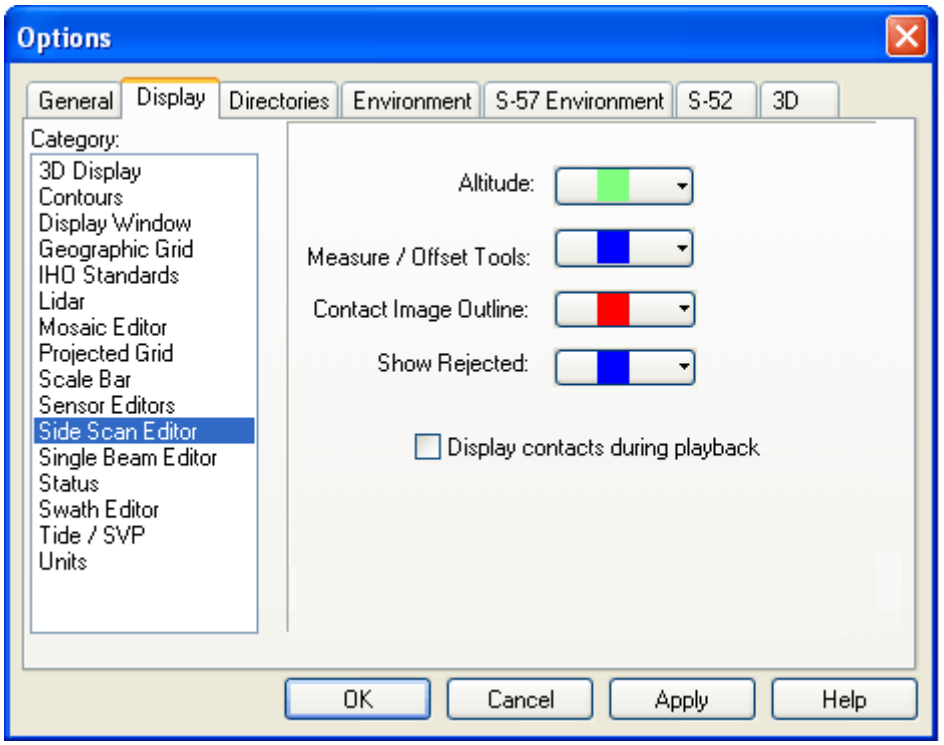
Field	Description	To assign a value...
Labels	Labels display the horizontal and vertical scale lines and annotations in the editors.	Show or hide labels (the labels are toggled to on when the Label box is checked). Select a colour for the labels from the colour palette, or create a custom colour from the standard Windows colour selector.
Background	Use this control to set the background colour in the editors.	Select a colour from the colour palette, or create a custom colour from the standard Windows colour selector.
Selected	The colour for highlighted data in the Display window and in the editors.	
Superselection	Sets the colour for superselected data in the Swath and Subset Editors.	

Field	Description	To assign a value...
Moving Average	Sets the colour for the Moving Average line in the Attitude and Single Beam Editors.	Select a colour from the colour palette, or create a custom colour from the standard Windows colour selector.
Difference	Sets the colour for Difference line in the Attitude and Single Beam Editors.	
Threshold	Sets the colour for the Threshold line in the Attitude and Single Beam Editors.	
Port	Sets the colour for the port side of the side scan coverage outline in the Side Scan display, or the port soundings in the Plan View of Swath Editor.	Select a colour from the colour palette, or create a custom colour from the standard Windows colour selector.
Starboard	Sets the colour for the starboard side of the side scan coverage outline in the SideScan display, or the starboard soundings in the Plan View of Swath Editor.	
Show Sensor ToolTips	ToolTips are used in the Attitude and Navigation Editors for displaying data values as the cursor moves over the graphs.	Show or hide tools tips by clicking the *Tool Tips* check box (checked means this feature is visible).

2. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Side Scan Editor

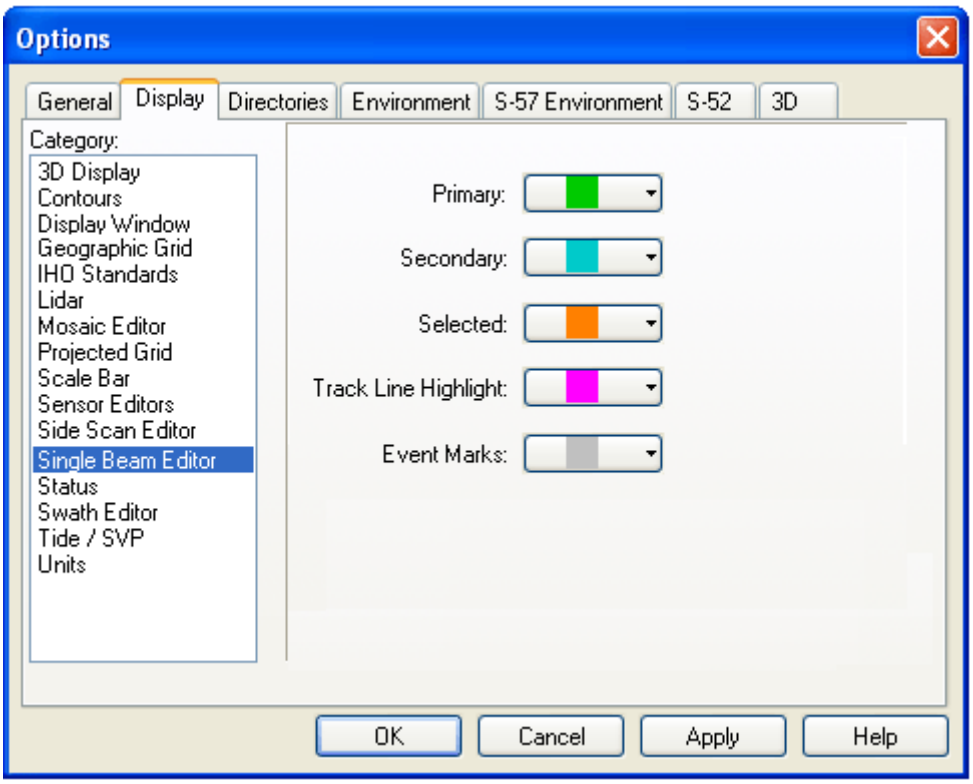
This tab controls the colours used for the Side Scan Editor display. (The *Port* and *Starboard* colour palettes are set in Tools > Options > Display > "SENSOR EDITORS" ON PAGE 111.)



1. Select a colour from the appropriate colour palette, or create a custom colour from the standard Windows colour picker:
   - *Altitude*: Sets the colour of the digitized line along the seabed that is used determine the height of the towfish from nadir when slant-range correction is performed.
   - *Measure /Offset Tools*: Sets the colour for displaying the values when using the Measure Distance and Measure Shadow tools, and the colour of the range display.
   - *Contact Image Outline*: Sets the colour for displaying the outline of a contact.
   - *Show Rejected:* Sets the colour of rejected pings (which are visible when the Show Rejected button on the Toolbar is activated)
2. Select the *Display contacts during playback* check box to make contacts visible in waterfall window during scrolling or playback.
3. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Single Beam Editor

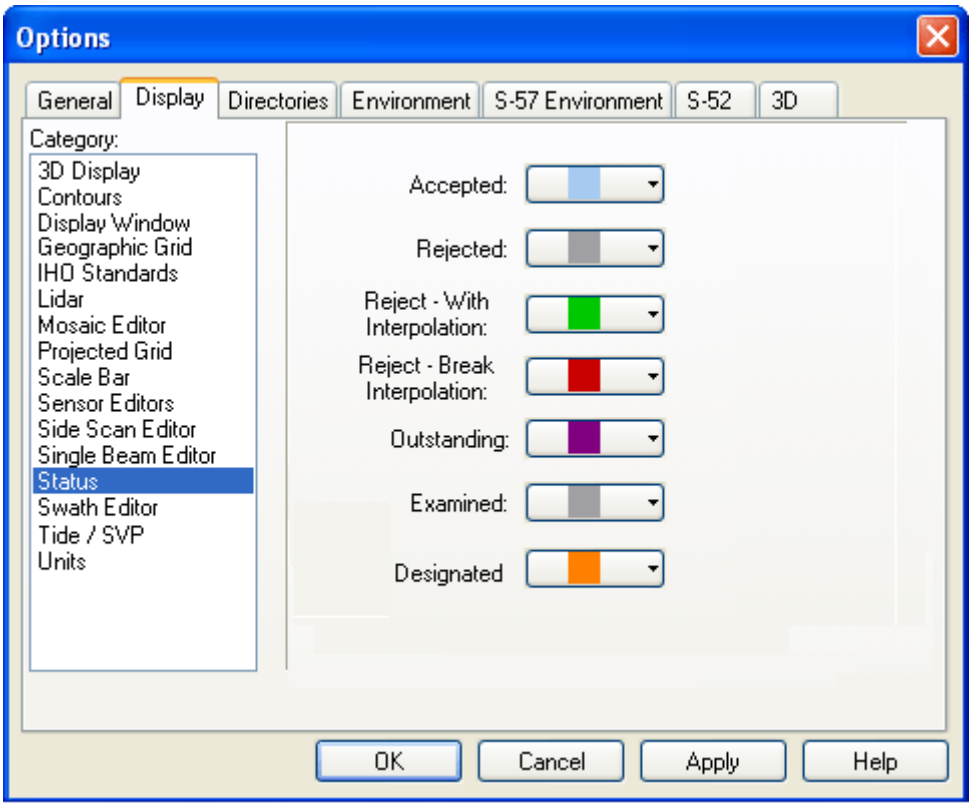
This tab controls the colours for the Single Beam Editor display.



1. Set the colours for data by selecting from the appropriate colour palette, or create a custom colour from the Windows colour picker.
   - Primary: Colour for primary frequency soundings in a dual-frequency system.
   - Secondary: Colour for secondary frequency soundings in a dual-frequency system.
   - Selected: Colour for soundings that are selected in the Single Beam Editor window.
   - Track Line Highlight: The colour in the Display window for the section of track line selected in the Display window and visible in the Single Beam Editor window.
   - Event Marks: A unique marker placed at regular intervals in the survey.
2. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Status

The Status tab controls the status colours for soundings.



1. Select a colour from the colour palette, or create a custom colour from the colour selector within the palette.

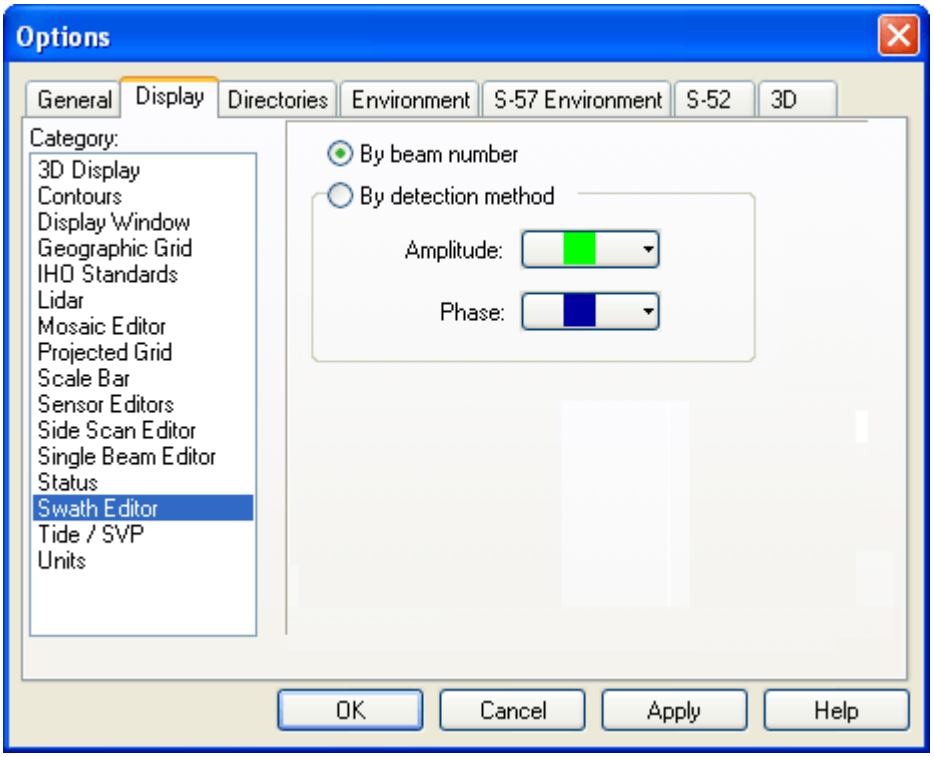
Status	Description
Accepted	Colour for data that is flagged as ready for processing.
Rejected	Colour for data that is flagged as rejected and excluded from further processing.
Reject - With Interpolation	Colour for attitude and navigation data that has been flagged as rejected but where associated soundings can still be processed.
Reject - Break Interpolation	Colour for attitude and navigation data that has been flagged as rejected and where associated soundings are also rejected.
Outstanding	Colour for soundings in the Subset Editor that have been flagged as needing further examination.
Examined	Colour for soundings in the Subset Editor that have been flagged as examined and verified.
Designated	Colour for the sounding that has been flagged in the Swath or Subset Editors as being the shoalest sounding on a feature.

2. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Swath Editor

Use the Swath Editor options to set colours for the Plan View display. Soundings can be coloured by location in the swath (port or starboard), or by detection method.

Soundings in the Rear, Side, and Profile Views are always coloured by their location in the swath.



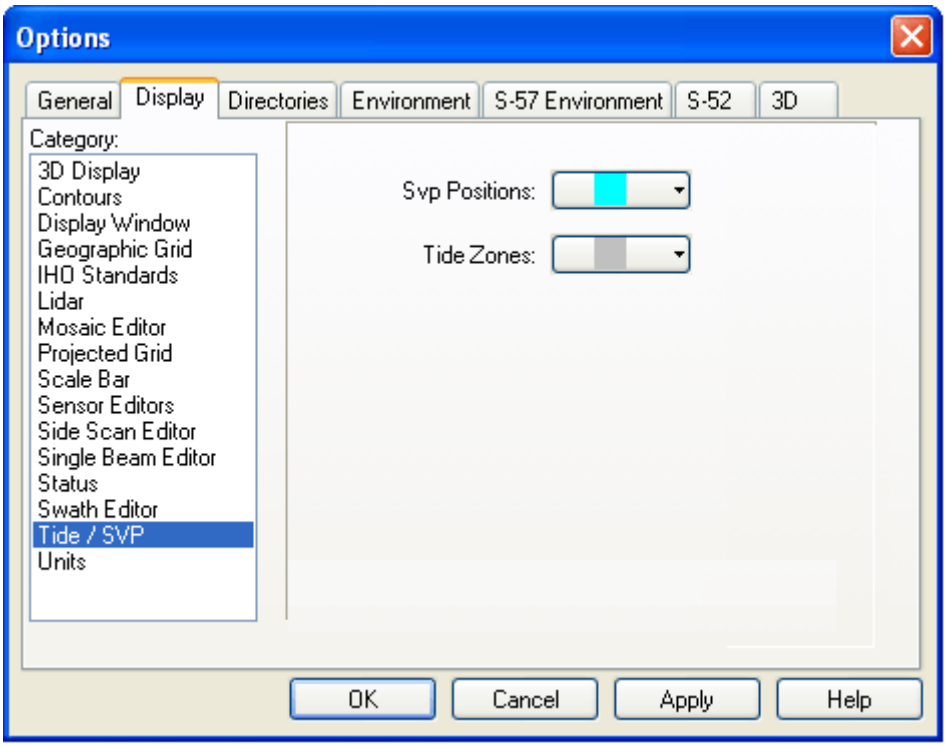
1. Click the *By Beam Number* box to enable colour options for port and starboard.

Colour options for Port and Starboard are set in the Sensor Editors page. See "SENSOR EDITORS" ON PAGE 111

2. Click the *By Detection Method* box so the amplitude and phase colour options are enabled.
3. Use the *Phase* and *Amplitude* colour palettes to select a colour, or create a custom colour from the standard Windows colour selector.
4. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Tide/SVP

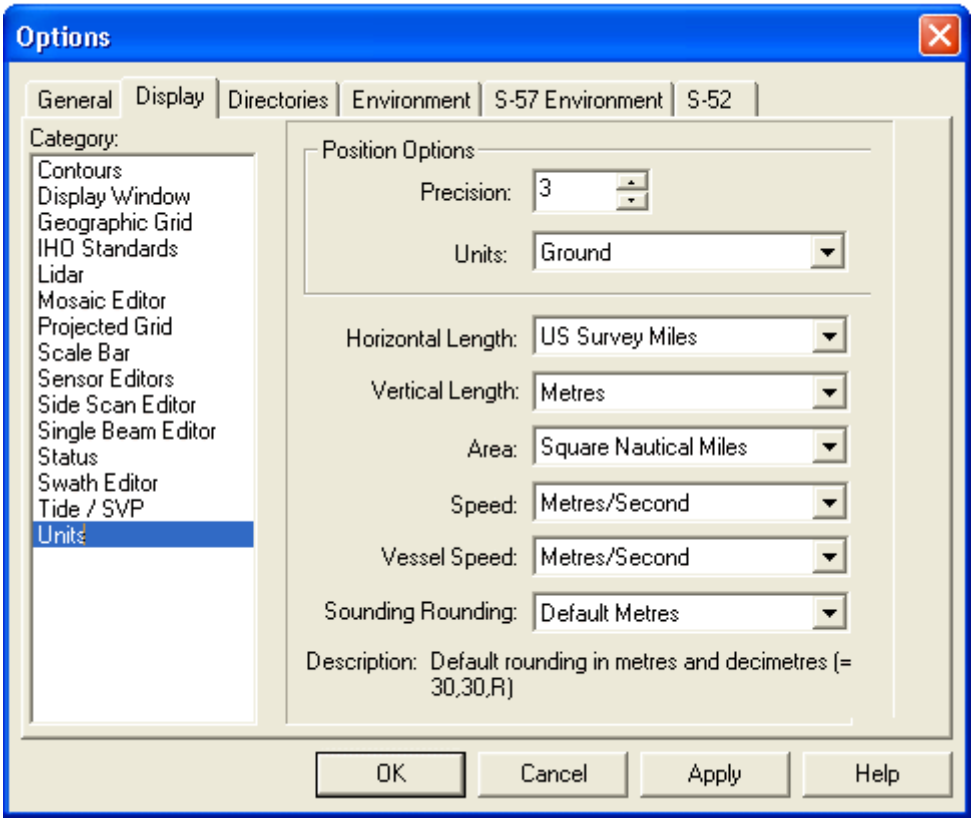
Tide/SVP options control colour options for Sound Velocity Profile location symbols and tide zone lines.



1. Select a colour from the appropriate colour palette, or create a custom colour from the standard Windows colour picker:
   - *SVP Positions* palette controls the colour for Symbols and text labels that show the positions of sound velocity profiles.
   - *Tide Zones* control the colour for outline of tide zone areas.
2. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Units

Units options control the measurement units that are used in all HIPS and SIPS applications.



To set Position options:

1. Click the up or down arrow buttons beside the Precision field, or type a value in the field.
   - Precision is the number of decimal places to the right of the decimal point that are displayed in expressing the value for the position of the cursor in the display.
2. Select the Display units from the drop-down list.

There are four types of units:

- Geographic **DD** (Decimal Degrees). Example (to 3 decimal places): 50.361N; 4.135W
- Geographic **DM** (Degrees, Minutes). Example: 50-21.650N; 004-08.423W
- Geographic **DMS** (Degrees, Minutes, Seconds). Example: 50-21-39.058N; 004-08-04.671W

- Ground (ground units). Example (in US Miles) : 548.734; 2116.214

> If you select Ground units you may set the unit of measure using the Horizontal Length field.

To set other Units options:

3. Select the Units setting from the drop-down list.
   - Horizontal Length, Vertical length and Area can be set in metric or Imperial units.
   - Speed and Vessel speed are set in units of measure per period of time.
4. Set the rounding method to be used when displaying soundings, by selecting a rounding/truncating rule from the drop-down list.

   A brief description of the selected rule is displayed below the selection.

   For more information on sounding rounding rules, see Sounding Rounding in the Tools Guide.
5. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Directories

The Directories tab sets the locations of the folders that contain data such as raw data, tide data, projects, field sheets and saved sessions.

Menu	Tools > Options

1. Select the Options command.
2. Select the Directories tab.

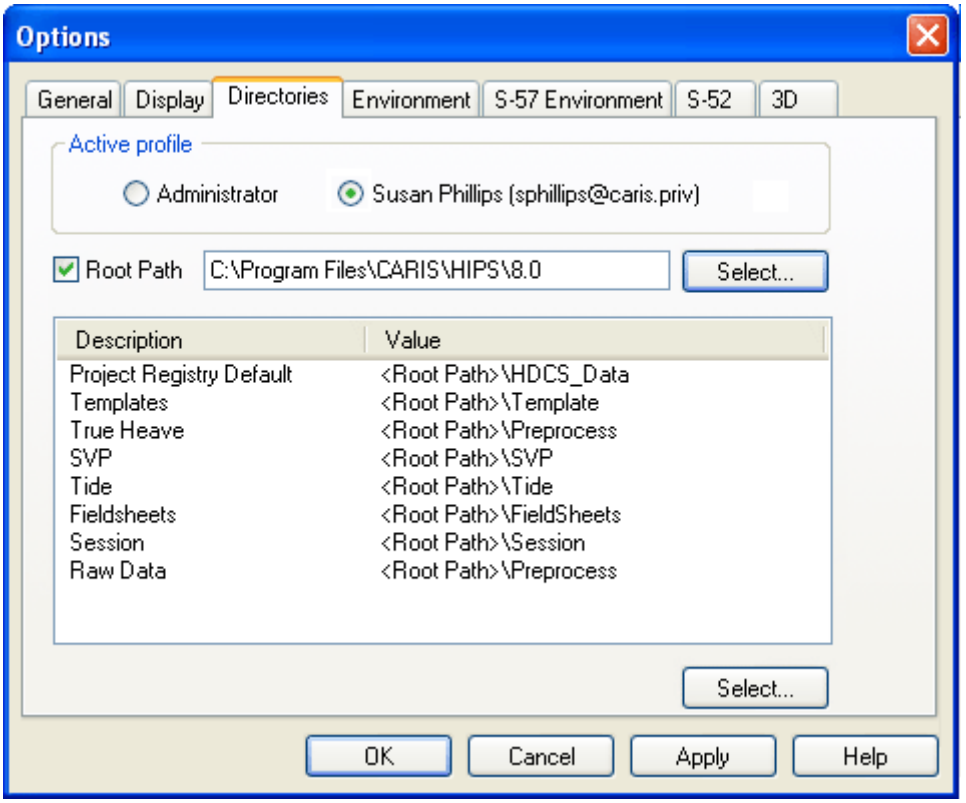
If you are running HIPS 8. for the first time, and you have chosen *not* to carry over your existing data settings that HIPS has detected, you will need to set the root path to your data.

When you set the root path, if the Field Sheets, HDCS_Data, Preprocess, Session, SVP, Template and Tide folders do not exist, they will be automatically created at that location.

The root path location is written to and read from the Windows registry, as controlled by the *Active Profile* setting. The default profile is the current user account.

When you set your user name as the *Active Profile*, all environment settings are written to and read from *your login account settings* in the Windows registry. (Changes made using this option will affect only the user who is currently logged in.)

When *Administrator* is selected, all environment settings are written to and read from the *system-wide settings* in the Windows registry. Changing these settings affects all users on the same machine using the *Administrator* profile. (Only persons with a Windows Power User Group or Administrator Group account can make changes to directories while this option is selected.)



Root path

The *Root Path* field displays the location of the HIPS and SIPS data directories, which are listed with their descriptions in the table below. The location must contain folders with the same names as these default data directories.

1. Select the *Root Path* check box. (If you do not have Administrator rights, set the *Active Profile* to your login name.)
2. Type the path for the directory or enter the path by clicking **Select** and browsing to the new location.
3. Click **Apply** to implement the settings without closing the Options dialog box or click **OK** to save the settings and close the dialog box.

Directories

You can change the path to an individual directory listed on the Directories tab.

1. Select your login name as the *Active Profile*.
2. Double-click on a directory, or select it and click **Select**.

The Browse for Folder dialog box is displayed.

3. Expand the directory tree to view the directory you want to change to.
4. Select the folder.
5. Click **OK** to close the Browse for Folder dialog box.

The new path is displayed in the *Value* column of the Options dialog box.

6. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

Environment

Menu	Tools > Options

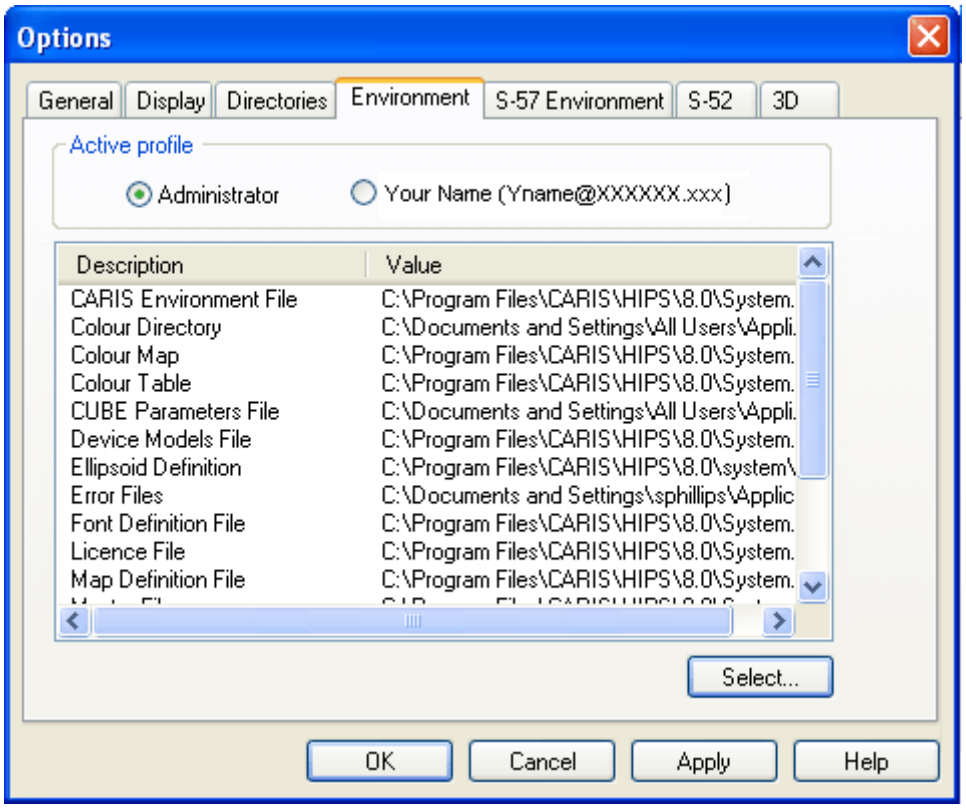
1. Select the Options command.
2. Select the Environment tab.

The Environment tab sets the locations for the files which control environment variables used by HIPS and SIPS, such as colour definitions and mapping, device definitions, feature codes, etc.

This information is written to and read from the Windows registry, as controlled by the *Active Profile* setting.

The default profile is *Administrator*. When *Administrator* is selected, all environment settings are written to and read from the *system-wide settings* in the Windows registry. Changing these settings affects all users on the same machine using the *Administrator* profile. (Only persons with a Windows Power User Group or Administrator Group account can make changes to directories while this option is selected.)

However, you can override the *Administrator* settings and select the directories you want HIPS to access. When you set your user name as the *Active Profile*, all environment settings are written to and read from *your login account settings* in the Windows registry. (Changes made using this option will affect only the user that is currently logged in.)



To change the default environment settings,

1. If you do not have Administrator rights, select your login name as the *Active Profile*.
2. Double-click on a directory, or select it and click **Select**.

The Open dialog box is displayed.

3. Click to expand the directory tree to view the directory that you want to change to.
4. Select the file or folder.
5. Click **OK** to close the dialog box.

The new path is displayed in the *Value* column of the Options dialog box.

Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

S-57 Environment

Menu	Tools > Options

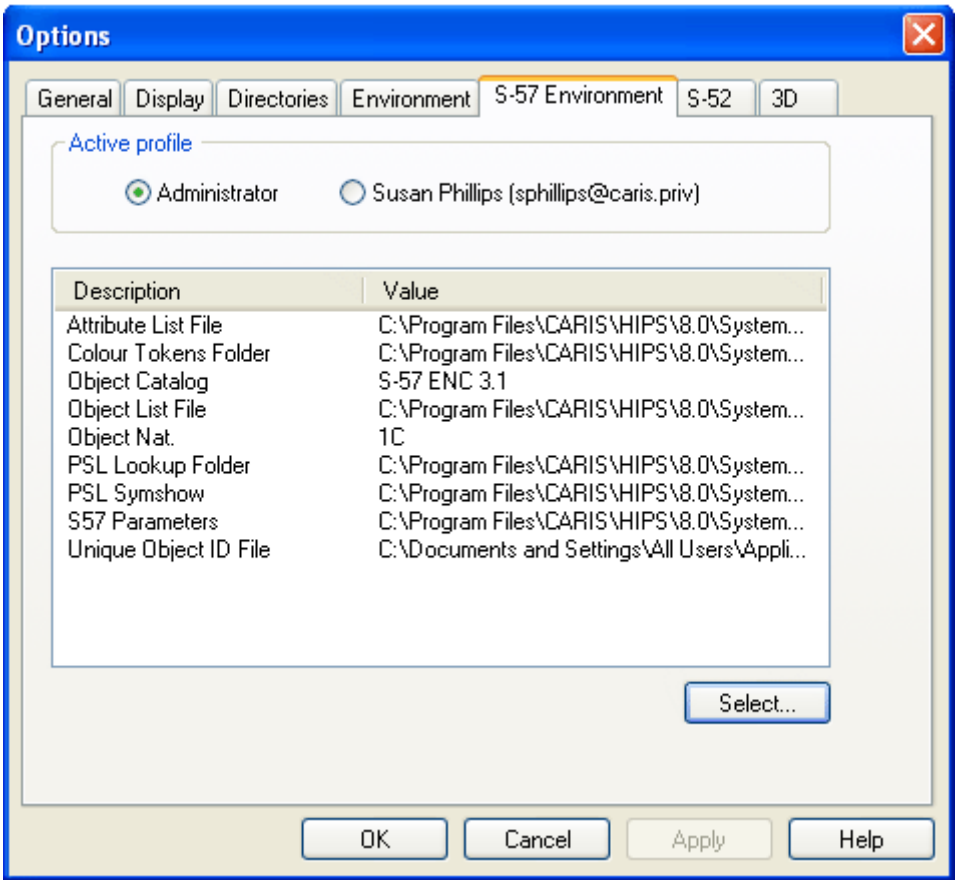
1. Select the Options command.
2. Select the S-57 Environment tab.

The S-57 Environment tab sets the files and values used for displaying S-57 data in the Display window. The default directory for S-57 display files is *...*\Program Files\CARIS\HIPS\System\S57Config\.

This information is written to and read from the Windows registry, as controlled by the *Active Profile* setting.

The default profile is *Administrator*. When *Administrator* is selected, all environment settings are written to and read from the *system-wide settings* in the Windows registry. Changing these settings affects all users on the same machine using the *Administrator* profile. (Only persons with a Windows Power User Group or Administrator Group account can make changes to directories while this option is selected.)

However, you can override the *Administrator* settings and select the directories you want HIPS to access. When you set your user name as the *Active Profile*, all environment settings are written to and read from *your login account settings* in the Windows registry. (Changes made using this option will affect only the user that is currently logged in.)



You can change the path to an individual listing on the tab.

1. If you do not have Administrator rights, select your login name as the *Active Profile*.
2. Double-click on a file or folder, or select it and click **Select**.

If you selected a file or folder the Open or the Browse for Folder dialog box is displayed.

3. Click to expand the directory tree to view the directory that you want to change to.
4. Select the folder.
5. Click **OK** to close the dialog box.

The new path is displayed in the *Value* column of the S-57 Environment dialog box.

If you select an environment value, such as Object Catalog, which does not have a file location, the Set Environment Value dialog box will be displayed.

6. Enter the new setting for that value.
7. Click **OK**.

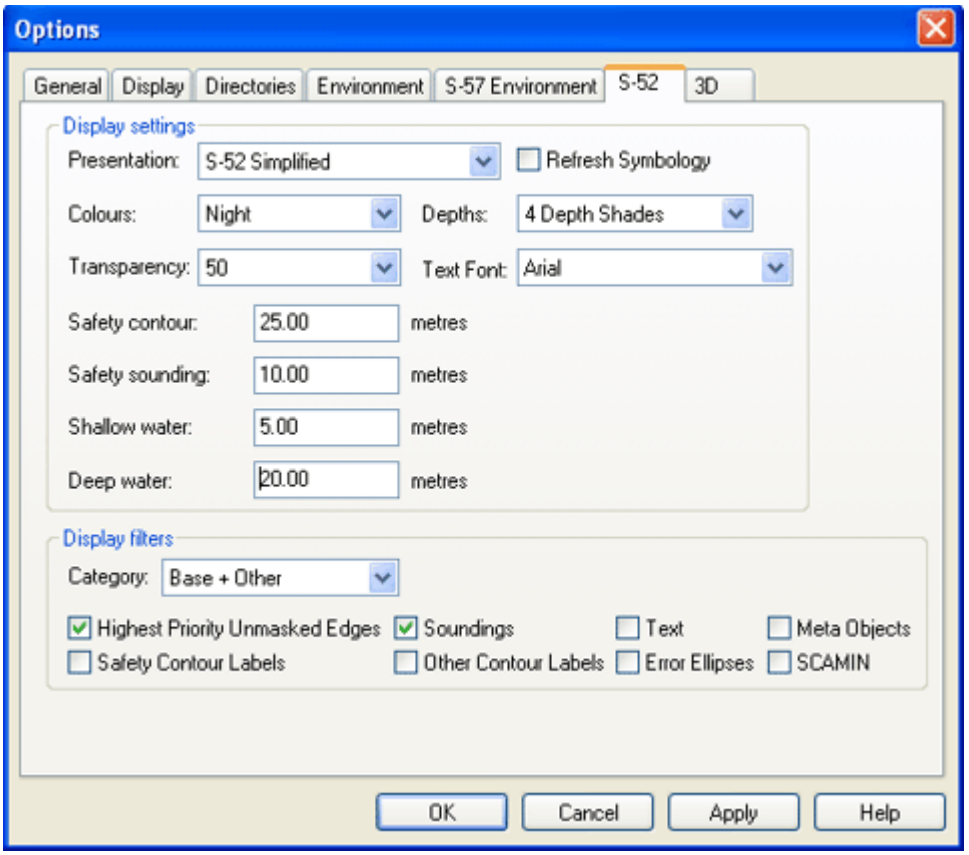
The new value will be displayed.

8. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

S-52 Display

The S-52 Display tab controls the appearance of S-57 Ed. 3.1 data shown as background data in the Display window.

1. Select the S-52 tab and set the parameters described in the table below.



Option	Description	To assign a value...
Display settings		
Presentation	Display S-57 and HOB data in one of six different formats.	Select a presentation format from the drop-down list.
Refresh Symbology	Automatically refresh the display to show the symbology associated with the selected presentation library.	Select the check box to make this option active.

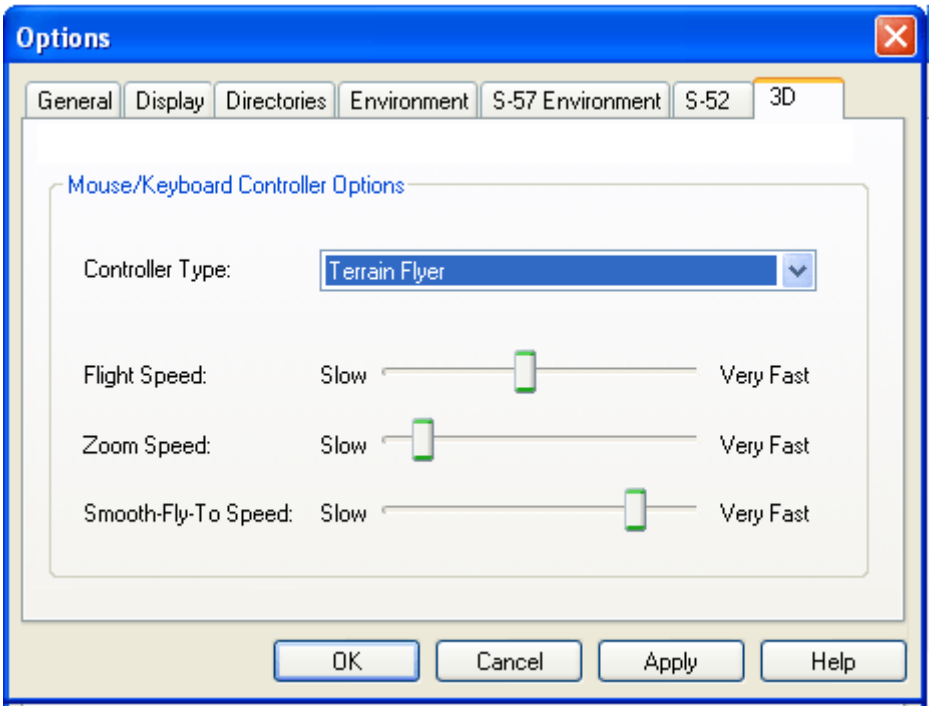
Option	Description	To assign a value...
Colours	Select the time-of-day colour scheme in which to display S-57 data: Day Bright, Day White, Day Dark, Dusk, Night.	Select the appropriate item from the drop-down list.
Depths	Select the number of depth shades to use: 2 or 4 (default). This value works in conjunction with *Safety Contour, Shallow Water* and *Deep Water* depths (see below).	
Transparency	Select a transparency setting (none, 25, 50, 75, or 100 percent) for polygon fills in the display.	
Text Font	Select a font to use in the Display window. The default font is Times New Roman.	
Safety Contour	Define which areas have sufficient depth for safe navigation. The safety contour is symbolized as a thick solid line. It also defines the boundary of shallow and deep-water areas for the purpose of area symbolization.	Type a value in the appropriate field.
Shallow Water	Define the contour boundary between the two darker colours used for water shallower than the Safety Contour.	
Safety Sounding	The safety depth is used in the symbolization of soundings. Soundings whose depth is less than the safety depth are displayed in bold text.	
Deep Water	Define the contour boundary between the two lighter colours used for water deeper than the Safety Contour.	
Display filters		
Category	Pre-defined categories of objects to be displayed	Select a category from the drop-down menu.
Highest Priority Unmasked Edges	Display only the symbolization of the highest priority, unmasked edges when multiple features share an edge. If the highest priority edge is masked, it will not display.	Select or clear the check box to turn these display options on or off.
Soundings	Control the display of soundings.	
Text	Control the display of text.	
Meta Objects	Enable the display of meta-object data that represents data quality, accuracy, etc.	
Safety Contour Labels/Contour Labels	Show labels on safety contours and/or other contours.	
Error Ellipses	Enable the display of error ellipses that represent error margins of all positioning equipment (GPD, navigation, etc.).	
SCAMIN	Select this option to filter features from the Display window display that have SCAMIN values less than the display scale. These features are however, still drawn in the selection or superselection colours if they are selected or superselected.	

2. Click **Apply** to implement the changes without closing the dialog box, or **OK** to implement the changes and close the dialog box.

3D Tab

See also "Navigate the 3D Display" on page 80 and "3D Flight Path" on page 86.

The 3D tab provides options for adjusting the settings of the keyboard and mouse controllers used to navigate through data in the 3D Display window. The following options are available:



- **Controller Type**: Select one of two types of controls to use when navigating the 3D View:
  - Terrain Flyer: allows you to navigate from the perspective of the height source.
  - First Person: allows you to navigate from a camera view of the current 3D scene.
- **Flight Speed**: Controls the speed at which you move through the display during a fly-through. Move the slider bar left or right to increase or decrease flying speed.
- **Zoom Speed**: Controls how fast the view is changed when using the zoom controls. Move the slider bar left or right to increase or decrease zooming speed.
- **Smooth-Fly-To Speed**: Controls how fast the view is changed when you double-click an area of the 3D View. Move the slider bar left or right to increase or decrease zooming speed.

5

Data Directories

This section describes the Project/Vessel/Day/Line structure of the data directories in HIPS and SIPS.

In this chapter...

Introduction

The structure of the HIPS and SIPS data directories is designed to maximize data access efficiency during processing. By definition, these directories only store raw or processed data and products, not the HIPS and SIPS applications nor their associated system files and libraries. The data directories are listed in the following table.

Data Type	Default Directory Location
Projects	..\Caris\HIPS*ver*\HDCS_Data
Raw data	..\Caris\HIPS*ver*\Preprocess
Session files	..\Caris\HIPS*ver*\Session
Field sheets	..\Caris\HIPS*ver*\Fieldsheets
Tide	..\Caris\HIPS*ver*\Tide
SVP	..\Caris\vHIPS*ver*\Svp

For consistency with older code contained within HIPS and SIPS, directory names and paths should not contain any spaces, or any special Windows characters (\, /, :, *,?,",<,>, and |).

Projects

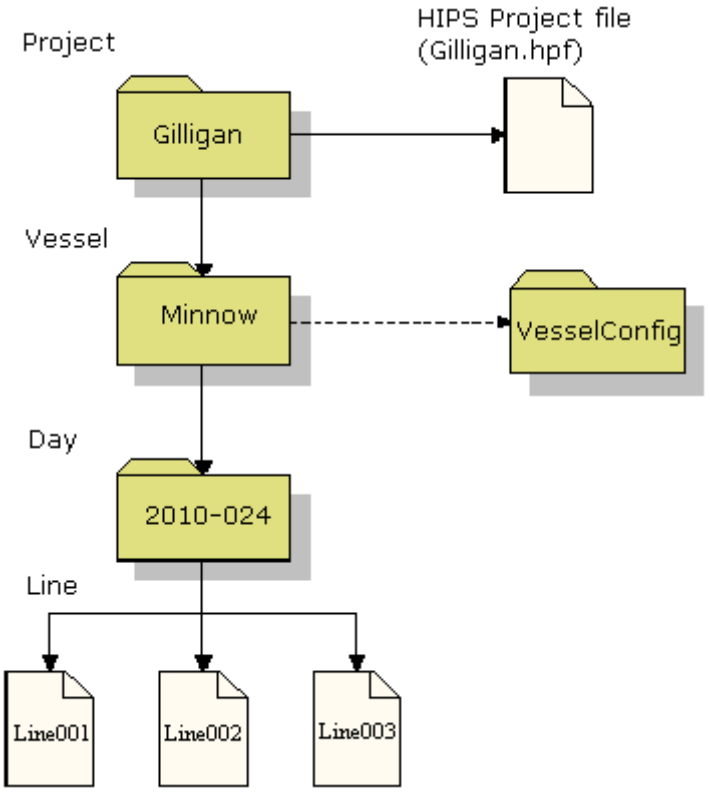
The Project directory holds all of the converted data. The Project directory contains two main components:

- HIPS and SIPS data ("HIPS AND SIPS DATA" ON PAGE 133)
- Vessel files ("VESSELCONFIG DIRECTORY" ON PAGE 134)

HIPS and SIPS Data

Converted data in HIPS and SIPS is stored in a Project/Vessel/Day/Line (P/V/D/L) structure. Each survey project is divided into one or several vessels (for example, survey launches), contributing to the same project. The data can be from different generations of surveys, or different hardware collection platforms. Each vessel folder is divided into separate survey days and each survey day contains one or more survey lines.

Below is an outline of the P/V/D/L structure for a project called Gilligan with a vessel called Minnow. The project contains three line files.



In the Project directory, in addition to the folder(s) containing the vessel(s), there is also a HIPS Project file (HPF) that contains the projection information used by the HIPS and SIPS

interface to define the default projection for that project. When HIPS and SIPS accesses the navigation data (which is stored in un-projected latitude and longitude), the data is projected using the projection stored in this HPF file. The HPF is given the same name as the project.

For information on creating a new project see "CREATE A NEW PROJECT" ON PAGE 53.

The name of the vessel in the P/V/D/L path provides the link to the actual HIPS Vessel File and therefore must be spelled the same as the HVF in the VesselConfig directory. The data cannot be processed if the HVF is not present or if the vessel name in the P/V/D/L path is misspelled.

The survey day in the P/V/D/L structure is composed of two components separated by a hyphen—the four-digit year and the three-digit Julian date. The date used in the Day directory name does not actually play a role in data processing—it is used as a convenient mechanism for organizing survey data.

When a new project is created, this P/V/D/L directory structure is built and the HPF is generated. The vessel file must exist in the VesselConfig directory at the time the project is defined, however it can be modified at any time (providing the name is not changed).

VesselConfig Directory

The VesselConfig directory contains the HIPS Vessel File (HVF) used in the vessel component of the P/V/D/L path. The name of this directory must not be changed and it always has to be located inside the Raw Data directory on the same level as the project directories.

For more information about the HVF see "VESSEL FILES" ON PAGE 22.

Raw Data

The raw data directory is used to store un-processed files that are used as input into HIPS via the Conversion Wizard. Un-processed files can be stored in any order and in any location on your system. However it is recommended that you store these files in a folder structure that mimics the P/V/D/L structure of the Projects folder.

Not only does the P/V/D/L structure provide a consistent path for data retrieval. You can also take advantage of a feature in the Conversion Wizard that lets you open for conversion at any level of the P/V/D/L folder structure and maintain that structure through conversion.

For example, a new project called "Gilligan" is created by the New Project wizard without adding a vessel or survey days to the project definition.

Raw data is then converted to HIPS and SIPS format through the Conversion Wizard. The File Selection Type is set to "Project" in Step 2 of wizard. The converter then knows that data is stored in the P/V/D/L structure and that you are loading from the Project level. All folders on the next level are interpreted as vessel names and the level after that as survey days.

Each vessel name must exist in the VesselConfig directory, otherwise the converter will report errors. In this example, there is only one vessel folder, called "Minnow" and it contains several survey days. There happens to be a HVF in the VesselConfig directory called "Minnow," so the converter creates the vessel folder beneath the project name "Gilligan" in the Project directory and also all of the survey days that are necessary. If the survey days or the vessel are already present, the converter uses them.

Finally, all of the lines found are converted.

To convert raw data that is not stored in the P/V/D/L structure, simply set the file selection type to "Raw" and select the files individually.

For more information on converting data to HIPS/SIPS format see “Rename Day and Line Folders” on page 69.

SVP and Tide

SVP

The SVP directory contains all of the sound velocity profile files. They can be stored in subdirectories of this directory if desired.

Tide

The Tide directory contains all of the tide files. They can be stored in subdirectories if desired.

6

HIPS Status Flags

Within HIPS and SIPS data structure each sensor data value has a series of status flags. Each profile in the depth and side scan formats, and each survey line also has status flags.

The status flag settings are determined during data cleaning and processing. They are used to control the generation of new data layers such as BASE surfaces, tiles, and selected soundings.

Status Flags and Values

Status Flag	Value
Accepted	The default status of sounding.
Rejected	True if the sounding is rejected for any reason.
Examined	Indicates that the sounding was verified.
Designated	Indicates that the sounding is the shoalest in a cluster of soundings.
Outstanding	Indicates that the sounding needs further examination.
Rejected by Swath Editor or Single Beam Editor	True if sounding was rejected in the Swath Editor or Single Beam Editor, or by the swath or single beam filters.
Rejected by Hydrographer	True for soundings rejected manually by the hydrographer within the Subset Editor.
Rejected by Surface Cleaning	True if sounding was rejected during surface cleaning
Rejected by Depth Gate	True for soundings rejected by the depth gate during conversion.
Rejected by Disabled Beam	True for soundings rejected at conversion time because of a disabled beam flag in the HVF or due to a pre-flagged bad sounding in the original raw data format.
Rejected by TPU	True for soundings rejected during Total Propagated Uncertainty filtering.
Rejected by surface filter.	True for soundings rejected during surface filtering.
Rejected by Auto Classification	True if the sounding fails the auto classification tests filter contained in the HIPS v4.3.3 subset mode. This flag is not used in v5.x software.
Rejected by Bad Navigation	True if the profile was rejected for bad navigation.
Rejected by Bad Gyro	True if the profile was rejected for bad gyro.
Rejected by Bad Heave	True if the profile was rejected for bad heave.
Rejected by Bad Pitch	True if the profile was rejected for bad pitch.
Rejected by Bad Roll	True if the profile was rejected for bad roll.
Rejected by Bad Tide	True if the profile was rejected for bad tide.

7

Contact File Formats

Contacts are representations of features on the sea bottom that are visible in the sonar data. They are added to the data using the Side Scan Editor. Information about the contacts in a project can be exported into the file formats described here.

In this chapter...

Introduction

Contacts are created in the Side Scan Editor waterfall view. An contact file in ASCII format is created for the selected survey line and stored in its line folder within the project directory structure. For information on creating and editing contacts, see CONTACTS ON PAGE 81 OF THE HIPS AND SIPS EDITORS GUIDE.

When you export contacts, all of these files together produce a single set of output files that represent all contacts from all of the survey lines in your project.

The Contact export function from SIPS produces four files:

- **filename_ContactLine.txt** contains information identifying the survey line and indexes to the other files.
- **filename_ContactSingle.txt** contains all the information for single point contacts.
- **filename_ContactMulti.txt** contains all information for single point contacts.
- **filename_ContactMultiPoints.txt** contains all location information for multipoint contacts.
- **filename_ContactTiff.gat** contains all image files created during export.

These files are saved in the folder, and with the filename you set during export. See CONTACTS ON PAGE 502 OF THE HIPS AND SIPS USER GUIDE for information on exporting contact data for the project.

ContactLine

The filename_ContactLine.txt file contains the names of the HIPS track lines and the corresponding index number. Each line in the file is a comma- delimited string terminated by the newline character (\n). Each line has the following format:

Field Name	Field Description	Description
Line Index	4-digit integer	The index number for the line.
Project Name	256 characters (maximum)	The name of the HIPS project that the line belongs to.
Vessel Name	256 characters (maximum)	The name of the HIPS vessel that the line belongs to.
Day Name	256 characters (maximum)	The name of the HIPS day that the line belongs to.
Line Name	256 characters (maximum)	The name of the HIPS line that the contact refers to.

ContactSingle

The filename_ContactSingle.txt file contains the list of single point contact features from the export. Each line in the file is a comma (',')delimited string terminated by a new line character ('\n'). Each line in the file has the following format:

Field Name	Field Description	Description
Contact Index	4-digit integer	The index number for the contact. Index numbers are assigned sequentially from 0 when the export is performed. Guaranteed to be unique for all exported single contacts only.
Key	12 characters	The key for the contact. This is created by concatenating the line name and the contact number together. The first 8 bytes are the first 8 bytes in the line name, and the last 4 bytes are the system generated number assigned to the contact.
Line Index	4 digit integer	The line record number from the corresponding Filename_ContactLine.txt file.
Contact Number	4 digit integer	The system generated contact number assigned to the contact when it was created in the SIPS software (same as the last 4 bytes of the 'key' field).
Creation Date	10 characters	The date the contact was created. Has the mm/dd/yyyy format
Creation Time	10 characters	The time the contact was created. Has the following format: HH:MM:SS.S
Created User ID	3 characters	The user ID entered in the SIPS software at the time of contact creation (usually user initials)
Modified Date	10 characters	The last date the contact was modified. It may be the same as the Creation Date if the contact has not been modified since creation. It has the following format: mm/dd/yyyy
Modified Time	10 characters	The time of the last modification done to the contact. The time may be the same as the Creation Time if the contact has not been modified since it was created. It has the following format: HH:MM:SS.S
Modified User ID	3 characters	The user ID of the user that last modified the contact. The ID may be the same as the Created User ID if the contact has not be modified since it was created.
Contact Prefix	8 characters	The prefix assigned by the SIPS software when the user created the contact. This is normally used to generate the key for the contact.
Feature Code	12 characters	The CARIS Feature code used to represent the point contact.
Contact Type	1 character	This identifies the contact record as either a single point or multi point contact. Single point contacts are represented by a '1' and multipoint contacts are represented by a '2'.
Profile Number	4 digit integer	The profile number that the contact was picked from in the SIPS software.
Across Distance	6.2 Floating point	The across-track distance recorded by the SIPS software that the point contact was picked from.
Latitude	13.7 Floating point	The latitude of the point contact.
Longitude	13.7 Floating point	The longitude of the point contact.

Field Name	Field Description	Description
Target Height	6.2 Floating point	The height of the target (in metres).
Target Width	6.2 Floating point	The width of the target (in metres).
Target Length	6.2 Floating point	The length of the target (in metres).
Image Height	4 digit integer	The height of the contact image as defined by the user in the SIPS software.
Image Width	4 digit integer	The width of the contact image as defined by the user in the SIPS software.
Status	1 digit integer	The status of the contact. 0 if the contact is Accepted, 1 if the contact is Rejected.
Remarks	85 (maximum) characters	Remarks entered by the hydrographer about the created contact.

ContactMulti

The filename_ContactMulti.txt file contains the list of multipoint contact features from the export. Each line in the file is a comma (',') delimited string terminated by a newline character ('\n'). Each line in the file has the following format:

Field Name	Field Description	Description
Contact Index	4-digit integer	The index number for the contact. Index numbers are assigned sequentially from 0 when the export is performed. It is guaranteed to be unique for all exported multi point contacts only.
Key	12 characters	The key for the contact. It is created by concatenating the line name and the contact number together. The first 8 bytes are the first 8 bytes in the line name, and the last 4 bytes are the system generated number assigned to the contact.
Line Index	4 digit integer	The line record number from the corresponding Filename_ContactLine.txt file.
Contact Number	4 digit integer	The system generated contact number assigned to the contact when it was created in the SIPS software (same as the last 4 bytes of the ‘key’ field).
Creation Date	10 characters	The date the contact was created. It has the mm/dd/yyyy format
Creation Time	10 characters	The time the contact was created. It has the following format: HH:MM:SS.S
Created User ID	3 characters	The user ID entered in the SIPS software at the time of contact creation (usually user initials)
Modified Date	10 characters	The last date the contact was modified. The data maybe the same as the Creation Date if the contact has not been modified since creation. It has the following format: mm/dd/yyyy
Modified Time	10 characters	The time of the last modification done to the contact. The time maybe the same as the Creation Time if the contact has not been modified since it was created. It has the following format: HH:MM:SS.S
Modified User ID	3 characters	The user ID of the user that last modified the contact. The ID maybe the same as the Created User ID if the contact has not be modified since it was created.
Contact Prefix	8 characters	The prefix assigned by the SIPS software when the user created the contact. This is normally used to generate the key for the contact.
Feature Code	12 characters	The CARIS Feature code used to represent the point contact.
Contact Type	1 character	This identifies the contact record as either a single point or multi point contact. Single point contacts are represented by a ‘1’ and multipoint contacts are represented by a ‘2’.
Target Height	6.2 Floating point	The height of the target (in metres).
Target Width	6.2 Floating point	The width of the target (in metres).
Target Length	6.2 Floating point	The length of the target (in metres).

Field Name	Field Description	Description
Image Height	4 digit integer	The height of the contact image as defined by the user in the SIPS software.
Image Width	4 digit integer	The width of the contact image as defined by the user in the SIPS software.
Status	1 digit integer	The status of the contact—0 if the contact is Accepted, 1 if the contact is Rejected.
Remarks	85 (maximum) characters	Remarks entered by the hydrographer about the created contact.

ContactMultiPoints

The filename_ContactMultiPoints file contains the list of points used to construct the geometry of the multi point contacts listed in the Filename_ContactMulti.txt from the export. Each line in the file is a comma (',')delimited string terminated by a newline character ('\n'). Each line in the file has the following format:

Field Name	Field Description	Description
Record number	4-digit integer	The record number. It is unique throughout the file.
Contact Record Number	4-digit integer	The contact record number that this point belongs to. This corresponds to the Contact Index in the corresponding Filename_ContactMulti.txt file.
Profile Number	4-digit integer	The profile number that the point was computed from in the SIPS software.
Across Distance	6.2 floating point	The across-track distance recorded by the SIPS software that the point contact was picked from.
Accumulated Distance	6.2 floating point	The accumulated distance. This is the distance from the first point in the set, to this point.
Latitude	13.7 floating point	The latitude of the point.
Longitude	13.7 floating point	The longitude of the point.

8

Tide File Formats

HIPS supports a standard Canadian Hydrographic Service tide format called COWLIS as well as two NOS/NOAA formats. HIPS also supports a basic format consisting of just the required date, time, and tide values.

HIPS does not use predicted tide tables. The time zone of the tidal observation data must match the time zone of the bathymetry to which it will be applied.

As an alternative, a Computed GPS Tide calculation can be used with data in HIPS

In this chapter...

Tide files (*.tid)

TID files are ASCII files consisting of date, time, and tide values collected from a single tide station. These files can be created or edited in a text editor (such as Notepad), or in the Tide Editor.

The following tide data file formats are supported by HIPS:

- CHS Cowlis
- CHS TMS 50
- CHS TMS 1000
- NOS Preliminary Tide Data
- NOS Final Tide Data
- NHS Tide file

Basic Tide Format

The basic tide format used by HIPS begins with a single line containing at least 8 dash characters, followed by tidal observation records consisting of date, time, and tide. Here is a simple example:

```
--------
2000/11/01 00:00   0.522
2000/11/01 01:00   0.317
2000/11/01 02:00   0.395
2000/11/01 03:00   0.751
2000/11/01 04:00   1.296
2000/11/01 05:00   1.848
2000/11/01 06:00   2.339
2000/11/01 07:00   2.589
```

To apply tide data, see "CORRECT FOR TIDE" ON PAGE 139 in the User Guide. See also "TIDE EDITOR" ON PAGE 767 in the Editors guide.

COWLIS

```
---------------------- LIBEX file dump ----------------------
----------------------- STN?????.OBS -----------------------
------------------ Time Zone:  GMT ( 0.0) ------------------

--------------------- Invariant Fields ---------------------
Name             Type Size    Units Value
------------------------------------------------------------
station_id       CHAR    5
station_name     CHAR   16          Rimouski, Quebec
data_product     CHAR    3          TMS1000
start_time       INTG    4  seconds 93/06/29 18:45:00
end_time         INTG    4  seconds 91/11/16 20:45:00
file_date        INTG    4  seconds 95/12/20 15:24:24
max_water_level  REAL    4   metres    1.640
min_water_level  REAL    4   metres    0.050
------------------------------------------------------------

---------------------- Variant Fields ----------------------
Name             Type Size    Units
------------------------------------------------------------
time             INTG    4  seconds
water_level      REAL    4   metres
std_dev          REAL    4   metres
------------------------------------------------------------
1993/06/29 18:45:00   1.95  0.030
1993/06/29 19:00:00   1.84  0.030
1993/06/29 19:15:00   1.74  0.030
1993/06/29 19:30:00   1.63  0.030
1993/06/29 19:45:00   1.55  0.030
1993/06/29 20:00:00   1.48  0.030
1993/06/29 20:15:00   1.41  0.030
1993/06/29 20:30:00   1.37  0.030
1993/06/29 20:45:00   1.34  0.030
-------------------- End Of LIBEX File ---------------------
```

NOS Preliminary Tide Data

```
********************** PRELIMINARY DATA **************************

     THIS RAW DATA HAS NOT BEEN SUBJECT TO THE NATIONAL OCEAN SERVICE'S
     QUALITY CONTROL OR QUALITY ASSURANCE PROCEDURES AND DOES NOT MEET
     THE CRITERIA AND STANDARDS OF OFFICIAL NATIONAL OCEAN SERVICE
     DATA.  IT IS RELEASED FOR LIMITED PUBLIC USE AS PRELIMINARY DATA TO
     BE USED ONLY WITH APPROPRIATE CAUTION.

********************** PRELIMINARY DATA **************************

      Water Level -  Acoustic (A1)
      Station    --   Unique seven character identifier for the station
      DCP        --   A one character identifier for the data collection
                      platform at a station
      SE         --   A two character identifier for the data sensor
      Date Time  --   Date and time the data were collected by the DCP
      WL_Value   --   Water level height
      Sigma      --   Standard deviation of 1 second samples used to
                      compute the water level height
      Out        --   Count of number of samples that fall outside a
                      3-sigma band about the mean
      Flat       --   A flag that when set to 1 indicates that the flat
                      tolerance limit was exceeded
      ROFC       --   A flag that when set to 1 indicates that the rate
                      of change tolerance limit was exceeded
      Temp       --   A flag that when set to 1 indicates that the
                      temperature difference tolerance limit was exceeded
      Limit      --   A flag that when set to 1 indicates that either the
                      maximum or minimum expected water level height limit
                      was exceeded

      Data are in meters above MLLW
      Times are on UTC (GMT)

9453220 1 Yakutat, AK  from  19990614 to 19990618
  ------------------------------------------------------------------------
Station  DCP  SE  Date       Time   WL_Value   Sigma  Out Flat RofC Temp Limit

9453220   1   A1  1999/06/14 00:00     1.881   0.014   0    0    0    0    0
9453220   1   A1  1999/06/14 00:06     1.814   0.025   0    0    0    0    0
9453220   1   A1  1999/06/14 00:12     1.746   0.018   0    0    0    0    0
9453220   1   A1  1999/06/14 00:18     1.692   0.014   0    0    0    0    0
9453220   1   A1  1999/06/14 00:24     1.632   0.013   0    0    0    0    0
9453220   1   A1  1999/06/14 00:30     1.560   0.015   0    0    0    0    0
  ------------------------------------------------------------------------
```

NOS Final Tide

```
 NOS SIX MINUTE WATER LEVEL HEIGHTS

      Data are verified

      Station   --   Unique seven character identifier for the station
      Date Time --   Date and time the data were collected by the DCP
      WL_Value  --   Water level height
      Sigma     --   Standard deviation of 1 second samples used to
                     compute the water level height
      Infer     --   A flag that indicates that the water level value
                     has been inferred.
      Flat      --   A flag that when set to 1 indicates that the flat
                     tolerance limit was exceeded
      RofC      --   A flag that when set to 1 indicates that the rate
                     of change tolerance limit was exceeded
      T_Flag    --   A flag that when set to 1 indicates that the
                     temperature difference tolerance limit was exceeded

      Data are in meters above MLLW
      Times are on UTC (GMT)

9452210 Juneau, Gastineau Channel, Stephens Pass, AK, USA  from  19980525 to
19980530
  ------------------------------------------------------------------------
Station Date       Time    WL_Value   Sigma  Infer Flat RofC T_Flag

9452210 1998/05/25 00:00     2.473     0.019     0    0    0     0
9452210 1998/05/25 00:06     2.330     0.022     0    0    0     0
9452210 1998/05/25 00:12     2.200     0.019     0    0    0     0
9452210 1998/05/25 00:18     2.064     0.020     0    0    0     0
9452210 1998/05/25 00:24     1.938     0.019     0    0    0     0
  ------------------------------------------------------------------------
```

NHS (Norwegian Hydrographic Service)

This is an example of an NHS tide file.

```
#Site name: Stavanger
#Provider: Norwegian Hydrographic Service
#Latitude: 58.9700
#Longitude: 5.7300
#Datum: EUREF89
#Time interval: 600 seconds
#Reference level: CD (Chart Datum)
#Series1: Water level observations
#Series2: Predicted tide
#Series3: Residuals (observed-predictions)
#Unit: cm

2011-12-24T00:00+01                              97.0     82.0      15.0
2011-12-24T00:10+01                              97.0     81.0      16.0
2011-12-24T00:20+01                              96.0     80.0      16.0
2011-12-24T00:30+01                              94.0     79.0      15.0
```

Tide Zone Definition Files

The following is an example of a Zone Definition File (.zdf).

```
[ZONE_DEF_VERSION_3]

[ZONE]
PIS1,10
43.069551, -70.687251
43.061704, -70.717396
43.067896, -70.717241
43.071497, -70.712564
43.072329, -70.710498
43.075112, -70.710772
43.078966, -70.71016
43.081576, -70.708724
43.082372, -70.690817
43.069551, -70.687251

[ZONE]
PIS2,11
43.08703, -70.720529
43.07693, -70.724628
43.072765, -70.724696
43.071497, -70.712564
43.072329, -70.710498
43.075112, -70.710772
43.078966, -70.71016
43.081576, -70.708724
43.083356, -70.715428
43.086439, -70.715696
43.08703, -70.720529

[TIDE_ZONE]
PIS1,419870,PRIM,-12,1.06,0.0,0.2
PIS2,419871,PRIM,-12,1.05,0.0,0.2

[TIDE_STATION]
419870,43.067896,-70.717241,2.0,0.1,D:\HIPS\Tide\419870.tid
419871,43.072329,-70.710498,1.0,0.15,D:\HIPS\Tide\419870.tid

[TIDE_AVERAGE]
PIS1,419870,419871
PIS2,419870,419871

[OPTIONS]
Outage, 600
Interval, 10
```

Tide Zone Data

The Zone Definition File has the following components:

- The mandatory header section must consist of this text string: [ZONE_DEF_VERSION_3]. This specifies the version of the Zone Definition File.
- The section labelled [ZONE] contains the name of the zone(s) and the coordinates that define the boundary of the zone(s). All tide zone files must contain this section.

  There are two fields in the first line:

  - <Zone Label> contains name of the zone (the name must not be longer than 256 characters).

- number of points that define the boundary of the zone. (These are listed starting in the next line of the section.)

The remaining lines in this section list the geographic coordinates of these points, (latitude, longitude) in decimal degrees.

The last line in the list must contain the same coordinates as the first line to close the polygon.

If there is more than one zone being defined, this section is repeated with the definition information for each zone.

Tide zones should not overlap each other.

- The section labelled [TIDE_STATION] contains the definition of the tide stations collecting the tide observations. There are six fields in each record of this section:
  - *station label* (the name of the tidal station) - The name must not be longer than 256 characters.
  - *latitude* in decimal degrees - Valid ranges are from -90.0 to +90.0. The negative range represents the Southern Hemisphere.
  - *longitude* in decimal degrees - Valid ranges are from -180.0 to +180.0. The negative range represents the Western Hemisphere.
  - *max amplitude* (in metres) expected from the tidal station - This value will be used to compute a scaling factor during the Tidal TPU computation.
  - *uncertainty* error value associated with the data from the station (in metres)
  - [optional] full file path and name, or just the name of the tide file associated with the station ID. If this is omitted, HIPS will look for an observation file in the same directory as the *.zdf, with the file name <Station_Label>.tid.
- The section labelled [TIDE_ZONE] contains specific attributes that define a zone's tidal parameters. There are seven fields in this section:
  - tide *zone label* - this must match the name of the zone(s) defined in the [ZONE] section.
  - tide *station label* - name of the tidal station associated with this entry.
  - *priority* designation of the tidal station entry: either the primary (PRIM), secondary (SEC), tertiary (TER) or preliminary (PRELIM) station for this zone.
  - *time correction* - the tide offset for this zone (in minutes)

- *range correction* - a multiplier (for example, 1.06) used to scale the tidal value read from the observation file
- *tidal shift* - a number in metres added to the values after range correction has been applied.
- *uncertainty* value for the tidal zone (in metres) used to compute the Tidal Zone Error.

- The section labelled [TIDE_AVERAGE] assigns tide stations to zones for tide-weighted averaging. Each record has at least two station fields because each zone can be assigned one or more tide stations for the weighted average calculation.

  The section has the following fields:

  - tide *zone label* - the zone (as defined in the [ZONE] section) to which the averaging should be applied
  - tide *station label*, (as defined in the [TIDE_STATION] section). Enter as many as needed for averaging.
- The last section labelled [OPTIONS] contains options used during tide zoning or tide averaging.
  - The limit value field contains the outage time in minutes before switching from the current station to the next priority station
  - final interval in seconds of tide data loaded into the track line.

For information on applying the data in a ZDF to survey lines see "CORRECT FOR TIDE" ON PAGE 139 in the User Guide.

GPS Tide format

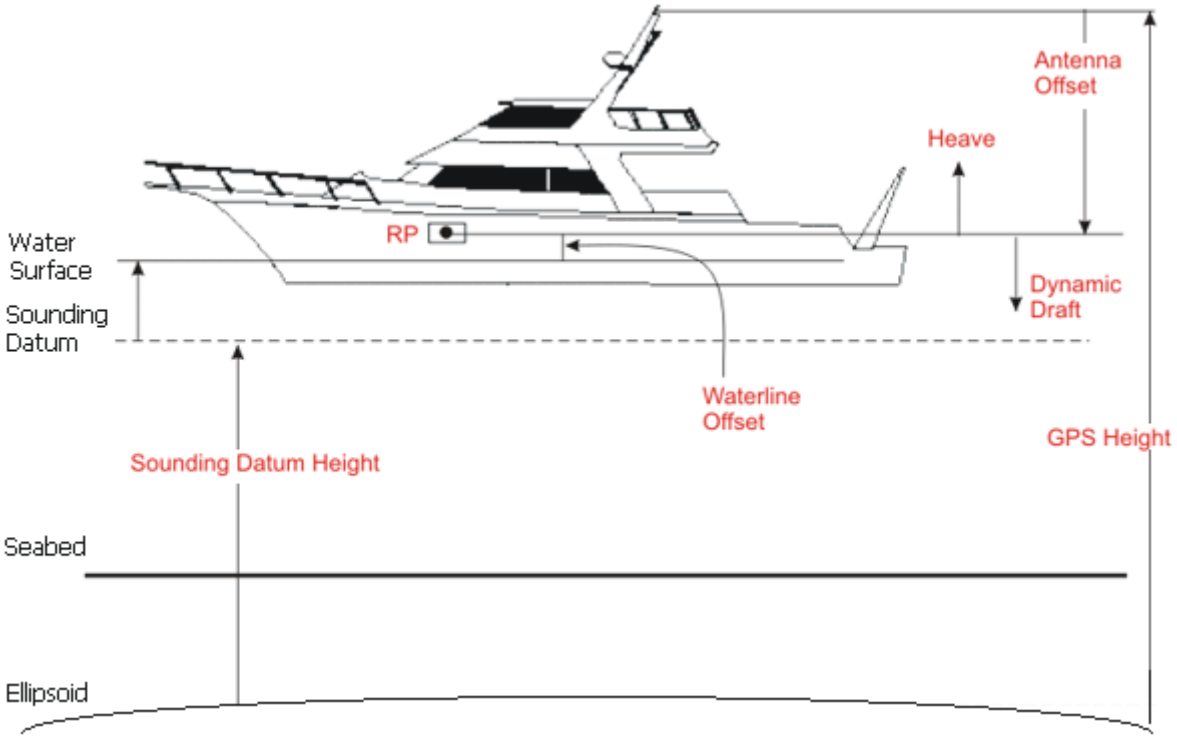
The Compute GPS (Global Positioning System) Tide function provides an alternative to normal tidal observation for reducing soundings to the sounding datum

It is based on the recorded GPS ellipsoid height of the navigation antenna and uses the recorded vessel motion, if available, to reduce the ellipsoid height measurements to water level.

The formula for calculating GPS tide is:

```
GPS Tide = GPS Height - Datum Height + Antenna Offset - Heave
+ Dynamic Draft + Height Offset - Waterline Offset
```

The image below demonstrates the values in the GPS tide formula. The arrows indicate the positive sense of the values.



This diagram and equation show the formula for GPS tide where GPS Height needs to be motion corrected. However, in some systems, GPS Height may already be motion corrected. Applying sensor values (such as dynamic heave) again will only distort the final GPS Tide. The Compute GPS Tide command lets you include or omit selected sensor values.

To compute GPS tide, see "GPS TIDE" ON PAGE 145 of the User Guide.

Sounding datum models

When applying the sounding datum height(s) (distance from the ellipsoid to the sounding datum) to a track line, these methods may be used:

- apply a single height to a track line, or,
- apply a selected surface layer, with a set elevation attribute, or,
- apply a gridded binary (.bin) file, or,
- apply a sounding datum model file in ASCII format, that contains a grid of sounding datum heights (with either Ground or Geographic coordinates).

Sounding datum heights can be applied for Computing GPS tide.

ASCII datum model files do not need to follow a specific format or have a specific extension. However, when an ASCII datum file is selected as the datum model, a *.info must also be opened to control the parsing of the ASCII data. (See "INFO FILE" ON PAGE 160.)

As well, a coordinate system must be selected to identify the position information in the ASCII file.

XYZ and BIN files used in the Compute GPS Tide function can be opened as background data. (See "OPEN BACKGROUND DATA" ON PAGE 46.)

When an XYZ is opened in HIPS, the selection of *.info and coordinate system is saved in a file with the same name of the .xyz file, but with a "_rxl" suffix.

For example, if you select "mydata.xyz", then "mydata.xyz_rxl" will be created in the same directory as the original XYZ file. If you open the same .xyz file again, the information from this file is automatically used.

9

Support Files

In this chapter...

INFO file

Files with a INFO extention, such as the sample file below, contain the locations of the positional (Lat/Long) and other attributes in the ASCII format files.

Info files are used by HIPS to parse the information from the XYZ file when opening as background data (see "Open Datum model file" on page 47) or for such processes as Compute GPS Tide (see "Sounding datum models" on page 157).

"File structure" on page 160

"Position components" on page 162

File structure

Files in ASCII format can have their data arranged in fixed columns or in free format. An info file defines which parts of the ASCII file contain the data that is needed by HIPS and SIPS.

In XYZ files the data includes coordinates as well as a depth or height value. These numeric values, which can be called fields, or attributes, can be separated in each line by a space or other delimiterdelimiter.

The first part of the file defines what character is used in the ASCII file as a delimiter or spacer between the fields of data in each line. Then it specifies the number of spaces or lines to be skipped between the beginning of the file and the start of the essential data, for example, if some lines contain a file header that is not needed for the HIPS process.

Next, the*.info file locates the essential position information used by HIPS when reading ASCII sounding datum files: the X, Y,Z coordinates. For fixed-width formatted files, this is done by defining the starting position and length of each column containing coordinate data. (This function is optional for delimited files.)

There are options to define a multiplier or offset if it is needed to transform a value when it is used by HIPS. For example, the value may be stored with an implied decimal point, and the multiplier will need to be applied to convert the ASCII value.

The sample file `xyzformatinformation.info` (displayed below) is included in the installed Template directory.

See "POSITION COMPONENTS" ON PAGE 162 for a description of its contents.

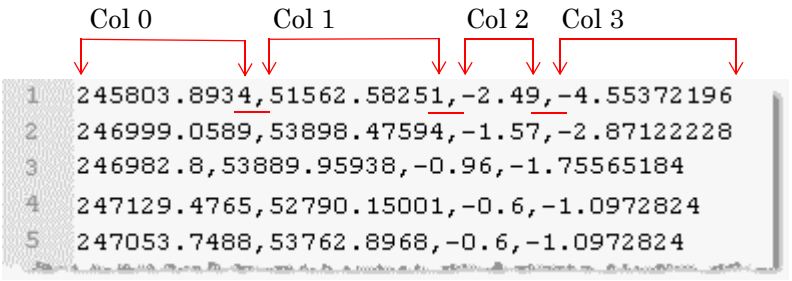
```
<?xml version="1.0" encoding="UTF-8"?>
<Format_Information version="1.2">
    <!-- The Delimiter value if this file has one -->
    <!-- Available Delimiter values: TAB or any letter/number/symbol -->
    <Delimiter value=" "/>
    <!-- The number of lines to skip at the head of the file -->
    <Skip_Lines value="0"/>
    <!-- The information required to decode the x, y, and z coordinates -->
    <Position>
        <!-- The multiplication value for the x coordinate -->
        <XMultiplier value="1.0"/>
        <!-- The multiplication value for the y coordinate -->
        <YMultiplier value="1.0"/>
        <!-- The multiplication value for the z coordinate -->
        <ZMultiplier value="1.0"/>
        <!-- The information required to decode the x coordinate -->
        <X_Coord>
            <!-- The zero based column index of the x coordinate -->
            <Col_Index value="0"/>
            <!-- The starting position of the x coordinate. -->
            <Start_Pos value="0"/>
            <!-- The width of the x coordinate. -->
            <Width value="0"/>
        </X_Coord>
        <!-- The information required to decode the y coordinate -->
        <Y_Coord>
            <!-- The zero based column index of the y coordinate -->
            <Col_Index value="1"/>
            <!-- The starting position of the y coordinate. -->
            <Start_Pos value="0"/>
            <!-- The width of the y coordinate. -->
            <Width value="0"/>
        </Y_Coord>
        <!-- The information required to decode the z coordinate -->
        <Z_Coord>
            <!-- The zero based column index of the z coordinate -->
            <Col_Index value="2"/>
            <!-- The starting position of the z coordinate. -->
            <Start_Pos value="0"/>
            <!-- The width of the z coordinate. -->
            <Width value="0"/>
        </Z_Coord>
    </Position>
```

```
    </Position>
    <!-- The information required to decode the attributes -->
    <Attributes>
        <!-- Available Data Types                          -->
          <!-- 4 byte real value (FLOAT)                  -->
          <!-- 8 byte real value (DOUBLE)                 -->
          <!-- 2 byte unsigned integer value (USHORT)     -->
          <!-- 2 byte signed integer value (SHORT)        -->
          <!-- 4 byte signed integer value (INT)          -->
          <!-- 4 byte unsigned integer value (UINT)       -->
          <!-- 1 byte unsigned char value (UCHAR)         -->
          <!-- Hour time value (TIME_HOUR)                -->
          <!-- Minute time value (TIME_MINUTE)            -->
          <!-- Second time value (TIME_SECOND)            -->
          <!-- Year date value (DATE_YEAR)                -->
          <!-- Month date value (DATE_MONTH)              -->
          <!-- Day date value (DATE_DAY)                  -->
          <!-- String value (STRING)                      -->
          <!-- Red portion of a colour (COLOUR_RED)       -->
          <!-- Green portion of a colour (COLOUR_GREEN)   -->
          <!-- Blue portion of a colour (COLOUR_BLUE)     -->
          <!-- Alpha portion of a colour (COLOUR_ALPHA)   -->

        <!-- Available Attribute Types  -->
          <!-- Depth TPE - Expecting values to be scaled to 95% CI (DEPTH_TPE)-->
    </Attributes>
</Format_Information>
```

Position components

In info files the delimiter can be a TAB character or any letter, number or symbol. In the XYZ example below, the values are separated by commas, so, in the info file the *Delimiter* would be expressed as ",".



Since this comma-delimited file does not have a heading, in the info file the number of *Skip Lines* is set to "0".

The Position information section first defines a multiplier for each coordinate. If no adjustments need to be made to the coordinate information then this value is set to “1”.

Then the location of the values of the X, Y and Z coordinates are given.

- If the ASCII file is free form format, with fields of varying lengths separated by delimiters, a *Col_Index* value and a delimiter value must be specified.
- If the file is in fixed column format, the Start position and the width of the value field are defined.

Column Index

The column index value, *Col_Index*, assigns a column number to each field or attribute in the file. This number corresponds to the columns in the ASCII file. The columns are numbered from left to right, starting with 0. So X (Longitude) would be column 0, Y (Latitude) would be column 1 and Z (Primary Elevation) would be column 2.

In the example above, commas are the delimiters, and four columns (0-3) are identified (as highlighted in the example).

Start and Width

Alternatively, you can identify the data boundaries for each attribute column by using the *Start_Pos* and *Width* fields. These fields are also used for XYZ files in fixed column format.

Using the start and width values, each character in a line is numbered and the number of characters in each attribute value is used to identify a column. The characters in the line are numbered from left to right, starting with 0 and continued until the end of the line. For example a line with 6 attribute columns might have 70 characters.

In the example above, the first attribute column would have a start value of 0 with a width value of 11 because there are 11 characters in the X (Longitude) value. The second column (Y or Latitude) would start with the next consecutive number, making the start value 12. It has a width value of 11, taking up characters 12 to 23 in the array of numbers. The start value of the third column (elevation) would then be 24 and the width value would be 5.

- **x values**: Start_Pos = 0; Width = 11
- **y values**: Start_Pos = 12; Width = 11
- **z values**: Start_Pos = 24; Width = 5

The start position and width values can also be used to omit character columns of information from the attribute.

For example, to omit coordinate quadrant information where:

- the quadrant is the last character:

```
/-=-=-=-=-=|=-=-=-=-=-=-|-=-=-=
51-24-18.34N003-34-23.91E 10.23
```

  x values: Start_Pos = 0; Width = 11; **y values**: Start_Pos = 12; Width = 12

- the quadrant is the first character:

```
/-=-=-=-=-=|=-=-=-=-=-=-|-=-=-=
N51-24-18.33E003-34-23.91  9.81
```

  x values: Start_Pos = 1; Width = 11; **y values**: Start_Pos = 12; Width = 12

If data is in a delimited file where the coordinates have a fixed precision, including quadrant information, this can be extracted using the Start_Pos and Width relative to the delimiter character. For example, the following data,

```
/-=-=-=-=-|=-=-=-=-=-|-=-=-
51.394526N  3.555878E  0.00
```

could be read with an INFO file set with a delimiter of a single space character (' ') and the following values for the coordinates:

- **x values**: Col_Index = 1, Start_Pos = 0; Width = 9;
- **y values**: Col_Index = 0, Start_Pos = 0; Width = 9;
- **z values**: Col_Index = 2, Start_Pos = 0; Width = 0;

Note that the width value does not include the quadrant letter, so only the non-letter characters of the coordinates will be read.

Supported sonars

The file devicemodels.xml lists the sonar models supported by HIPS and SIPS. The sonar information page on the CARIS website, (http://www.caris.com/tpu/idx_sonar.cfm) lists the sonar specifics that are included in the devicemodels file. The file is located in the system directory.

This file can be modified, but users are cautioned that because of the important role of the devicemodels.xml file particularly in computing TPU, this should only be done by advanced users. (Contact CARIS Customer Support for assistance.)

Illustrated below is a section of the devicemodels.xml file showing some of the data it contains.

Glossary

altitude

The height of the side scan sonar transducer above the sea floor. The transducer is typically mounted on a towed body or the surface vessel, but can also be mounted on an ROV or AUV.

Attitude Data

Commonly used to refer to the orientation of the vessel in three dimensions as represented by the Gyro, Heave, Pitch, and Roll sensors. The Attitude Editor displays this data as well as other sensors that consists of simple “time vs. sensor value” data.

background data

Georeferenced vector and raster data providing visual context to the bathymetry and side scan data being processed. Examples include CARIS files, BSB raster charts, GeoTIFF orthophoto images, S-57 electronic chart data.

backscatter

Intensity of sounding returns collected by swath multibeam sounding systems. Backscatter data creates an image of the sea floor that can indicate the bottom type.

BAG

The Bathymetric Attributed Grid (BAG) is an open-source binary file format for transferring gridded bathymetry and uncertainty values between software applications and agencies. The file contains five elements: metadata (in XML format), elevation, uncertainty, tracking, and certification. For more information on BAG, go to http://www.opennavsurf.org/.

BASE surface

The Bathymetry Associated with Statistical Error (BASE) surface. A georeferenced TIFF representation of the seabed derived from processed bathymetry and computed uncertainty (error) values. The algorithm applies soundings to the grid based on beam footprint size. A customizable weighting system allows more emphasis in the mean calculation to be placed on the inner nadir beams or on soundings with lower uncertainty values.

beam

A single depth measurement is produced from a beam. Many beams make up a profile or a ping.

Beam Averaged

A single backscatter return value (intensity, dB) is logged with each beam, taken as an average intensity centred on the bottom detect of the entire time series to produce an image of the seafloor. The intensity for each beam can be directly georeferenced using the positioned beam footprint, but spatial resolution is lost by reducing the full time series to a single value.

Beam Pattern Correction

Beam pattern correction uniformly removes along-track banding inherent to the sonar beam. This effect is produced by each transducer uniquely.

Beam pattern correction relies on a user-generated beam pattern file to identify and remove this effect.

BIOT model

Theory for acoustic propagation in a porous and elastic medium. This model may be used if the sediment is known to be particularly porous. Advanced Geocoder parameters relating to this model include porosity, tortuosity, and permeability.

cable out

Length of cable (tow wire) deployed from a towpoint to the towfish. Used in the calculation of layback.

CARIS file

Now called CARIS map format, this records vector map data features such as lines, symbols, text, soundings, etc. It consists of a set of files.

CATZOC

The zone of confidence (CATZOC) attribute. The CATZOC attribute is part of the S-57 Quality of Data (M_QUAL) object class. It indicates that data meets the minimum criteria for seafloor coverage, and position and depth accuracy as defined by the attribute classification structure. There are five CATZOC classifications: A1, A2, B, C, and D.

contacts

Point and line features identified in side scan sonar data. Attributes describing the location, size, and description or the target are recorded. Image snapshots are also generated.

CUBE surface

A Combined Uncertainty and Bathymetry Estimator (CUBE) surface contains multiple hypotheses representing potential depth variances on the seafloor. As soundings are propagated to nodes—based on distance and uncertainty—a hypothesis is developed. If the there is a significant variation of depth at a node, a new hypotheses is created. A node can contain more than one hypothesis.

d value

Shows the confidence in the grain size assessment and sediment analysis completed by Geocoder. Smaller values indicate more confidence in the assessment, with values below 0.5 being very good and values above 1.0 being potentially inconclusive. Appears when using Advanced Sediment Analysis.

day

One of the days for which there is survey data. Expressed as a Julian day.

decimate

Decrease the size of the bathymetric data set to be exported to the work file.

delta draft A “time vs. delta-draft” data structure that can be loaded into HIPS and used to model the dynamic squat and lift of the vessel. Also used to store the recorded depth of towfish and ROV/AUV mounted multibeam sonars.

density In Mosaic Editor: a unitless advanced Geocoder parameter measuring the ratio of sediment density to water density.

A BASE Surface attribute: The number of soundings contributing to a node

Despeckle Despeckling uses a calculated value based on neighbouring intensity levels to replace the current pixel’s intensity if it is outside the specified range. The value calculated from the neighbouring intensities can be derived by one of two methods mean or median.

disambiguation The process in CUBE of selecting one hypothesis over other hypotheses to represent the surface. Hypotheses can be selected or "nominated" by density, locale, locale and density, or by the nearest value to a previous CUBE Surface.

DpTPU Depth Total Propagated Uncertainty. The difference between the observed or computed depth value of a sounding and its true depth value (at a 95% confidence level).

ellipsoid The ellipsoid and datum to which logged positions in the survey refer must be stored in the HIPS vessel file, regardless of whether projection coordinates or geographic coordinates are stored in the logged file. Any ellipsoid may be used, so long as it is defined in the file referenced by the environment variable uslXdatum.

field sheet A collection of data products, within a defined geographic area, derived from the processed bathymetry and side scan data. A common coordinate system reference is used. Some example products include BASE surfaces, mosaics, tiles, selected soundings, contours, and plot layouts.

filtering The process of detecting outliers in the data and setting the status flags to Rejected. Data points are not removed from the HIPS/SIPS format.

frequency Number of acoustic waves produced per second (Hz).

Gain A measure of increase in amplitude of a signal.

Gain Correction Gain Correction adjusts signal intensities using independent port and starboard Gain factor settings. Gain correction can also be applied uniformly to both sides.

gamma An advanced Geocoder parameter indicating the spectral exponent of bottom relief.

Generic Data Parser A program for converting recorded ASCII data sources into the HIPS/SIPS format. New survey lines can be generated for single beam bathymetry, or the program can update a sensor within an existing HIPS or SIPS project.

GPS Tide Instantaneous water level height above the sounding datum derived from the observed GPS ellipsoid heights of the navigation antenna. Reduced for sensor offsets, vessel motion, known sounding datum height above the ellipsoid, and other parameters.

grain size An advanced Geocoder parameter indicating the size of a particle in phi.

holiday Formed when enough significant data gaps are clustered together within a specified radius.

HOB The Hydrographic Object Binary (HOB) file is a spatially referenced dataset that is used to support the internal structure of S-57 data in CARIS products. The HOB file does not require a CARIS vector map and contains the point, line, and area geometry for hydrographic objects.

HVF HIPS Vessel File. A vessel configuration file in XML format that consists of a list of sensors with their physical and calibration measured offsets, plus any error values. These are applied to the observed data during processing. The HVF supersedes the Vessel Configuration File (VCF).

hypothesis A representation of depth in a BASE Surface. The Hypotheses that are displayed in the Surface are selected or "nominated" through disambiguation. Hypotheses that were not selected remain as alternative hypotheses and can be nominated in the Subset Editor.

HzTPU Horizontal Total Propagated Uncertainty. The difference between the observed or computed position value of a sounding and its true position value (at a 95% confidence level).

index contour A contour line accentuated by a heavier line weight to distinguish it from intermediate contour lines. Index contours are usually shown as every fifth contour with their assigned values, to facilitate reading elevations.

interface backscatter Scattering of the acoustic energy (or acoustic impedance) that occurs at the sediment-water interface where the seafloor acts as a reflector and scatterer of the incident acoustic energy.

Kirchkov backscatter	Scattering of acoustic energy due to seafloor roughness.
LADS	Laser Airborne Depth Sounder (LADS) is a LIDAR system developed by Tenix Corporation.
layback	If a towed sensor is used during a survey, the position of that sensor can be calculated as a horizontal “layback” from the position of the towing vehicle. The sensor layback is computed from the tow wire length and sensor depth.
LIDAR	Light Detection And Ranging. LIDAR uses laser technology to calculate bathymetry.
line	A single pass of the survey vessel over some or all of the area being surveyed, during which time referenced sensor data is continuously collected. Often the line is approximately straight.
loss	An advanced Geocoder parameter measuring the ratio of the imagined wave number to the real wave number for the sediment.
Merge	The process of calculating final positions and depths for soundings, based on all relevant inputs such as observed depths, navigation information, vessel dynamics such as gyro, heave, pitch and roll, and tide. Merging is carried out after these inputs are loaded and checked.
mosaic	A geo-referenced raster image composited from imagery on one or more survey lines within a field sheet.
outliers	Unwanted data resulting, for example, from incorrect sea floor detection.
permeability	An advanced Geocoder parameter measuring the ability of a material (e.g. rock or sediment) to transmit fluids. A factor in the Biot model.
phi	A unitless number used to represent particle grain size in the Sediment Analysis tool.
ping	A single output pulse of a sonar system.

Plot Composer A comprehensive plotting utility that can be used to efficiently produce paper products that illustrate raster and vector geospatial information. The application cane be opened from the CARIS > Utilities folder on the Windows Start menu.

point cloud A set of vertices in a three-dimensional coordinate system. In HIPS and SIPS these vertices are usually defined by X, Y, and Z coordinates, and represent data in 3-D display.

porosity An advanced Geocoder parameter measuring the fraction of voids in a medium (e.g. rock or sediment), or the water space between grains of sediment. A percentage that is a factor in the Biot model.

profile / swath A set of soundings, approximately perpendicular to the ship's track, which is produced by the swath or sweep sonar over an instantaneous or very short time period.

product surface A shoal-biased bin generated from a BASE Surface. Data is down-sampled so that finer details of the seafloor are not visible, but the shoals are still maintained. Product surfaces can be used to create navigation products, such as Electronic Navigational Charts.

project A survey area with data collected by one or more survey vessels over one or more days.

raw side scan Time indexed imagery profiles where the across-track scale is time in milliseconds.

roughness An advanced Geocoder parameter measuring the spectral strength (cm^4) of bottom relief at wave number 1. Stronger returns would indicate a rougher bottom.

S-44 S-44 is the international standard developed and maintained by the International Hydrographic Organization (IHO) that sets the minimum standard for hydrographic surveys. The standard classifies surveys into survey orders (Special Order, Orders 1a, 1b, 2) based on an area's importance for safety of surface navigation.

S-57 S-57 is the international standard developed and maintained by the International Maritime Organization (IMO). It is used by hydrographic data producers to describe how real-world entities are stored digitally for transfer among different computer platforms between the various hydrographic offices.

session	Saving a session will record all the data: survey line names, background raster images and field sheets, that are currently open in the HIPS and SIPS interface. This enables you to re-open an integrated data set from a previous working session.
SHOALS	Scanning Hydrographic Airborne Lidar Survey (SHOALS) is a LIDAR system owned and operated by the Joint Airborne Lidar Bathymetry Center of Expertise.
side scan	The emission of sonar pulses in a wide angle perpendicular to the seafloor to port and starboard that are received and logged as a time series of intensities in order to form an image. This data is logged separately from the bathymetry data. A swath multibeam system forms two additional receive beams in addition to the bathymetry profile.
slant range	Raw travel time used to compute sounding depth (accompanied by receive angle).
Slant Range Corrected Side Scan	Time-indexed imagery profiles generated from raw side scan data using the measured altitude of the transducer. The across-track scale is distance in metres.
sounding	A measured depth of water.
Sounding datum height	Distance from the ellipsoid to the sounding datum.
Sound Velocity Correction	The process of applying rigorous refraction corrections to the raw travel time/angle bathymetry data using recorded sound velocity profiles.
Status Flag	The indicator of the acceptance or rejection of a data point during cleaning.
subset	A rectangular area which encloses some or all of a survey project represented in the Display window. It is used during sounding cleaning to limit the number and extent of soundings being processed during one session.
surface cleaning	A statistical process of detecting bathymetric outliers within an area. A least square polynomial regression algorithm is used.

tiles

A representation of the sea floor consisting of interlocking tiles of varying sizes. Tiles can make large data sets more manageable by subdividing them by user-defined criteria.

Tile positions are defined by a Morton Number scheme. Tiles can carry a variety of attributes generated from the data within the area of the tile.

time series

A series of intensity values (dB) logged with each beam that is added based on the time and range of detection point to assemble a trace similar to a side scan image. Each individual time series is associated with a portion of the bathymetric profile.

This detection method allows for a higher across-track spatial resolution of seafloor features (with spatial frequencies higher than the beam spacing) since a portion of the time series is preserved for each beam.

Time-Varying Gain (TVG)

The attenuation of acoustic energy that occurs due to absorption and spreading as the sonar beam travels back to the receiver, resulting in a non-uniform gain across the swath. Since signal returns are received over a predictable and constant time period, a correction can be used to adjust the signal intensity by applying a non-uniform, time dependent gain.

TIN

A triangulated irregular network (TIN) is a digital terrain model which consists of a series of triangles with the data points as vertices. A TIN uses the actual elevation for each data point.

tortuosity

A unitless advanced Geocoder parameter indicating the characteristic of flow through porous media, or twisting of the pore space. This is a factor in the Biot model, and smaller numbers (1 is the minimum value) indicate a straighter path of potential flow, while higher numbers would have a more twisted path.

total backscatter

Combination of backscatter that occurs due to the interface change (Interface Backscatter), sediment heterogeneities (Volume Backscatter), and roughness of the sediment (Kirchkov Backscatter).

TrueHeave

A heave filtering function developed by Applanix. TrueHeave employs a bi-directional heave filter to remove artifacts from heave data. Values are computed from real-time data and have to be imported separately to the track line.

TPU

Total Propagated Uncertainty. TPU is derived from a combination of all individual error sources and is used to calculate horizontal and vertical uncertainties for soundings.

vessel

A survey platform, whether it be a ship, a towfish, an ROV/AUV, or an aircraft.

velocity	A unitless advanced Geocoder parameter measuring the ratio of sediment sound speed to water sound speed.
volume backscatter	Scattering of the transmitted acoustic energy into the seafloor by heterogeneities in the sediment structure.
weighted grid	A georeferenced TIFF representation of the mean sea floor depths derived from processed bathymetry, that was used in HIPS before the introduction of the BASE surface.

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