HYPACK® 2012 Release: Changes since HYPACK® 2011

by Judy Bragg

There has been a lot of developments in the HYPACK® software since the 2011 release. There are some major changes, particularly where programs have been rewritten or new windows added to existing modules, as well as many more minor changes. The following highlights of the enhancements you can expect to see in the HYPACK® 2012 release.

HYPACK® SHELL

HYPACK® AS A VIEWER

Anyone, whether they own a HYPACK® license or not, can now use the HYPACK® shell to view project data. You can change display options, and enable and disable files to view your data as you choose.

A dongle is required by HYPACK® to activate the program modules associated with the license purchased. The dongle is also encoded with permit numbers required to display S63 or ARCS electronic charts.

PROJECT MANAGER

RENAME PROJECT

From the Project Manager, you can rename any project other than the one that is currently open. When you rename a project, the Windows® folder and the ProjectName.ini file will be renamed at their current location and the name in the Project Manager list will be updated accordingly.

HIDE VS DELETE PROJECT

HYPACK® 2012, for the first time, allows you to *permanently* delete a project from your hard drive through the Project Manager menu. It also maintains the routine, available in previous releases, for removing the project from the Project Manager list, *but not from your hard drive*.

When you have selected the project in the Project Manager list:

[Hide Project] appends "(deleted)" to the project name and removes the project from the list in the Project Manager. *It does not delete the project or any files within the project.*

FILE-DELETE PROJECT permanently deletes the project folder and all of its contents from the Project Manager.

Beware! The program will confirm with you that you want to delete the project, but after that, there is no way to restore it to HYPACK® *or your hard drive*.

Export to Google Earth™ KMZ File

HYPACK® 2011 exported KML files for display in Google Earth™. HYPACK® 2012 now exports KMZ files for this purpose. You can export KMZ files from the HYPACK® shell or through the EXPORT program.

A **KML** file, with external file references, works great on the computer where the file was generated, but what happens when you wish to send it to another computer? Most likely, the file references will break and the person receiving your KML document will see less than was intended.

The **KMZ** file is actually a ZIP file renamed with the KMZ extension. All files referenced by the KML document are included in the KMZ so they are always available. Google Earth™ can accept this format directly making it a very convenient way to share your data. As a side bonus, the data is compressed which lowers band width and storage concerns, for example, when sending your files via e-mail or storing them on servers.

64-Bit Versions of Select Modules

64-bit programs take advantage of the added power of 64-bit machines to process large data sets. HYPACK® 2012 includes 64-bit versions of the following modules:

Note: To run the 64-bit modules, you must install HYPACK® on a computer with 64-bit capability.

- **MAPPER**
- **SORT**
- **CLOUD**

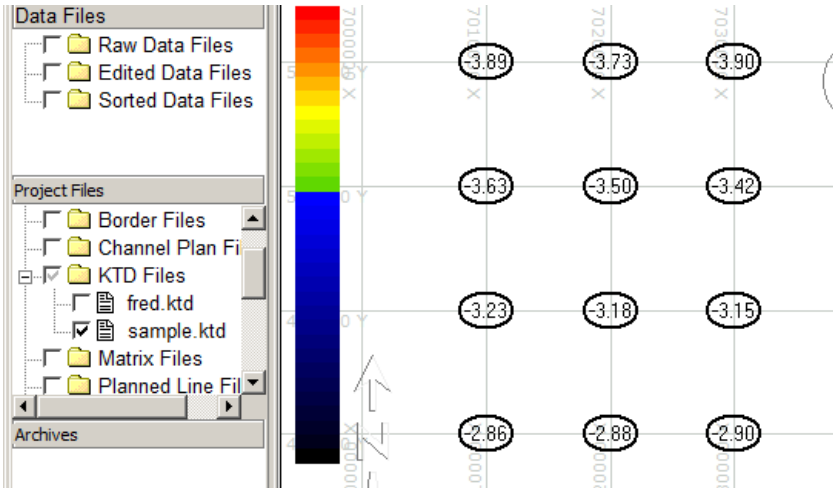
Though all of these modules have been modified, you will see no difference between the 32-bit and 64-bit interfaces in HYPACK® 2012.

As 64-bit version of the **HYSWEEP® EDITOR** (MBMax), with an entirely new interface, is in development but it is not ready for release at this time. A preview version of this program is included in this release so you can begin to become familiar with the module, but since it has not been thoroughly tested for accuracy, it will not allow you to save your data. Please feel free to give it a try and send us your feedback.

KTD Display in HYPACK® and HYPLOT

When a KTD file is enabled in your project, the correction values are drawn and circled at each node location in the area map. You can set the circle color in the General tab of the Control Panel.

FIGURE 1. *Sample KTD File in the HYPACK® Area Map*



PREPARATION

New Module! CREATE CUSTOM CHART SYMBOLS IN THE S52 EDITOR

The S52 EDITOR provides the tools for you to create your own raster chart symbols. These symbols are stored in the \Hypack 2012\bin\symbols folder where they are integrated into the point symbol lists presented in the DG2 EDITOR and in the TARGET EDITOR.

FIGURE 2. *Sample Symbol in the S52 EDITOR*

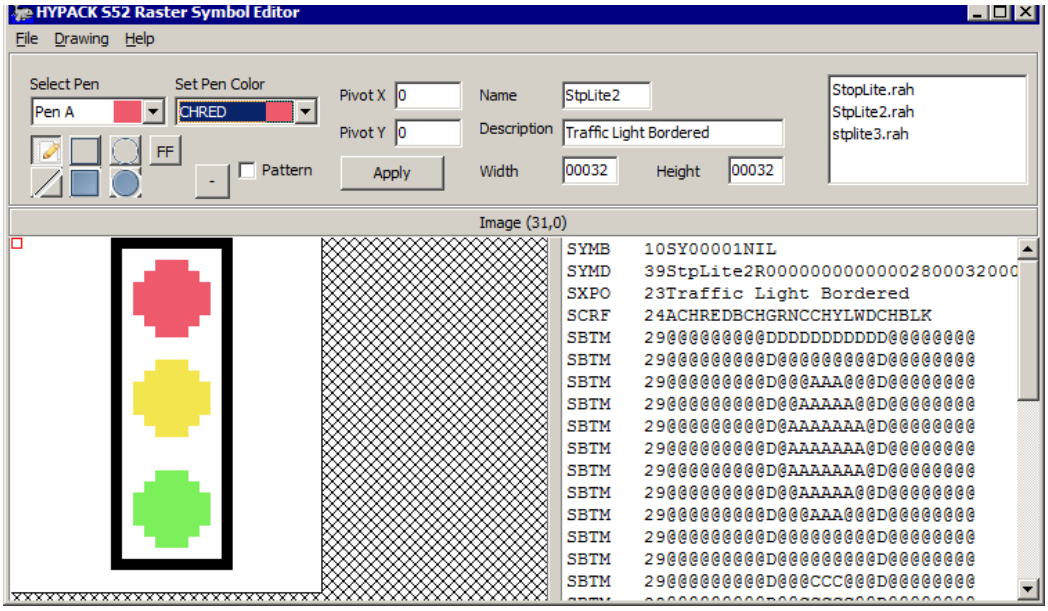
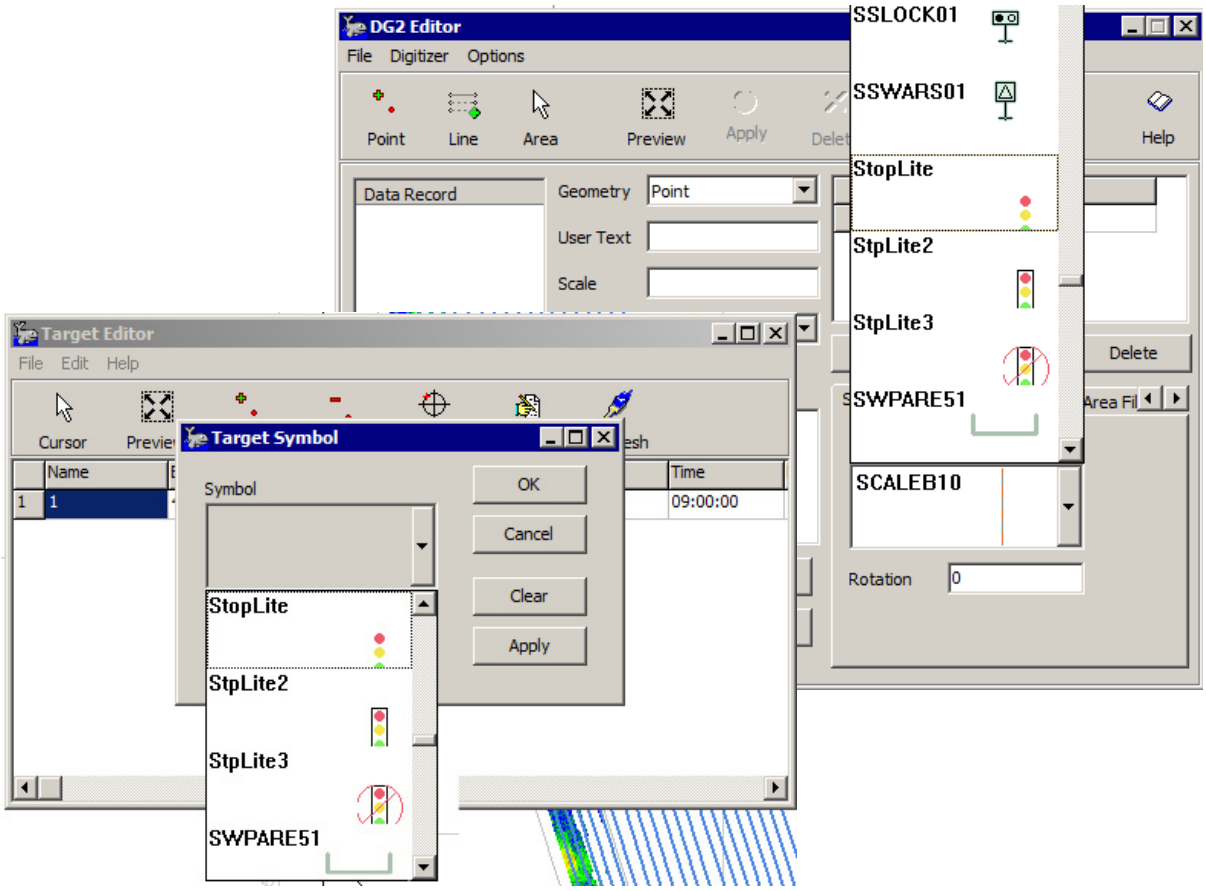


FIGURE 3. *Custom Symbols Available in the TARGET EDITOR (left) and the DG2 EDITOR (right)*



IMPORT DATA TO TARGET, BORDER AND LINE EDITORS

The TARGET EDITOR, BORDER EDITOR and LINE EDITOR each include routines which extract data from ASCII text files and use it to populate the input fields of the EDITOR. Each line (or record) in the text file must contain the data for one record in the editor and present the data in the same order.

FIGURE 4. *Target Import Dialog*

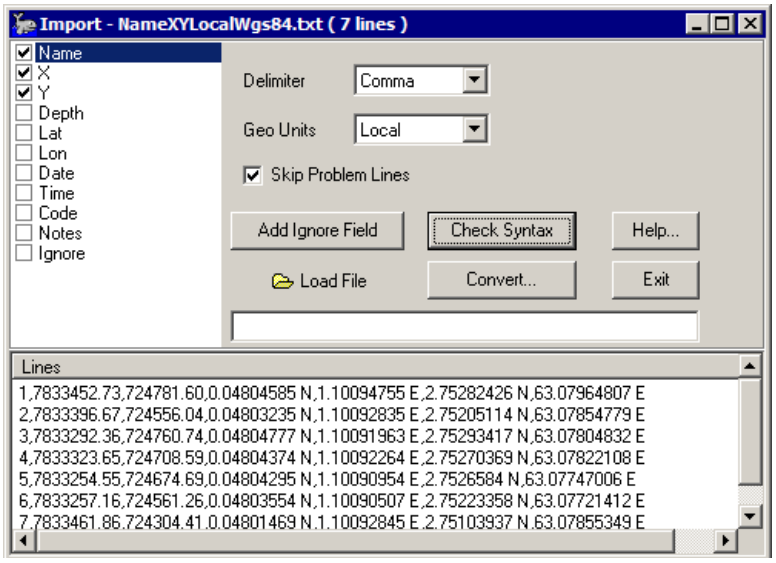


FIGURE 5. *Line Import Dialog--importing the second through fifth fields of each record: the waypoint positions*

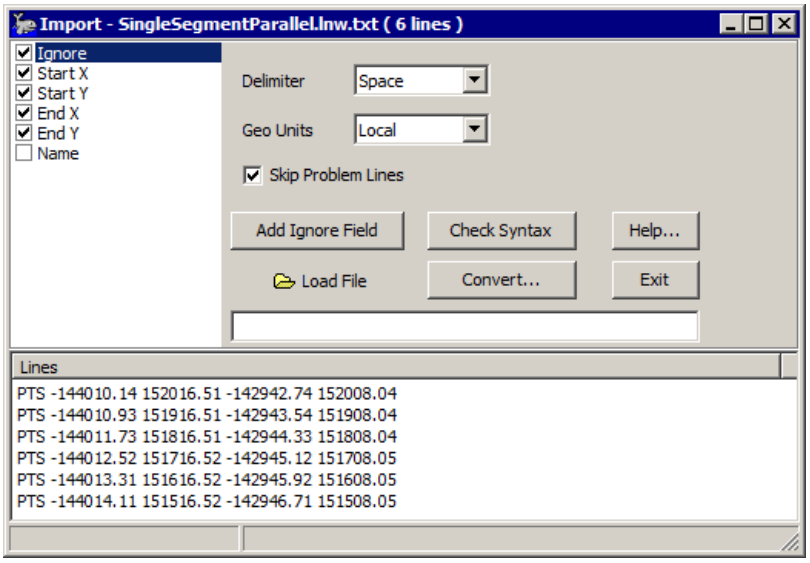
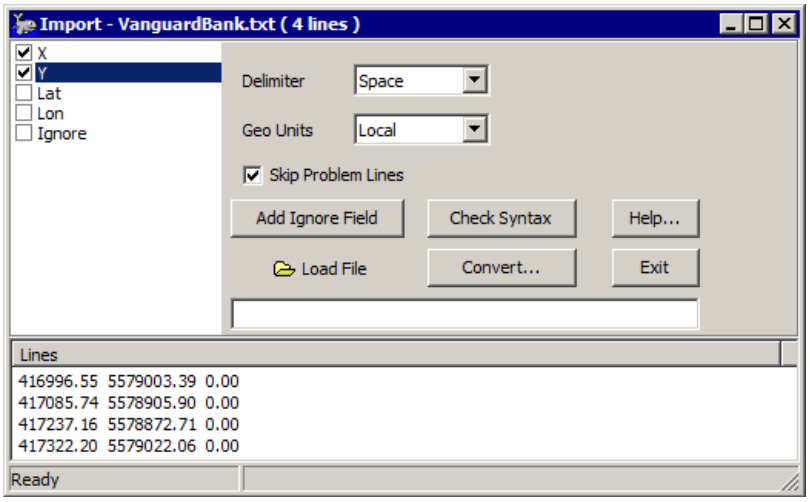


FIGURE 6. *Border Import Dialog--importing the first two fields of each record: the XY positions*

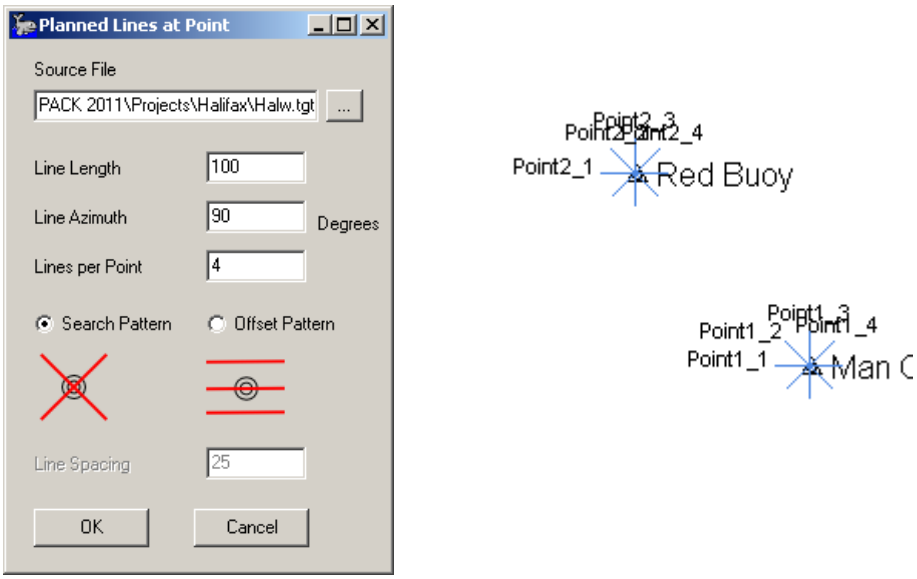


LINE EDITOR

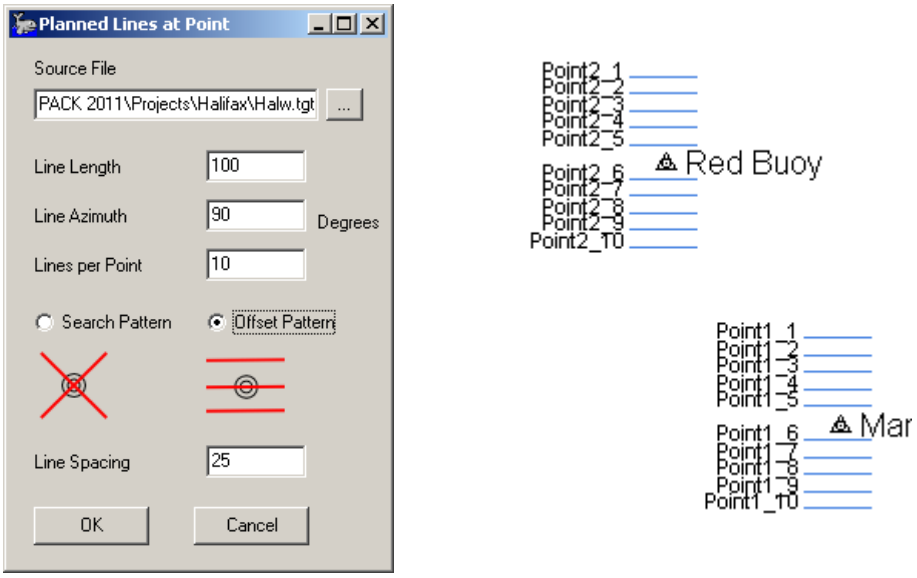
GENERATING PLANNED LINES AT PREDEFINED LOCATIONS

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

Planned Line at Point dialog--Search Pattern



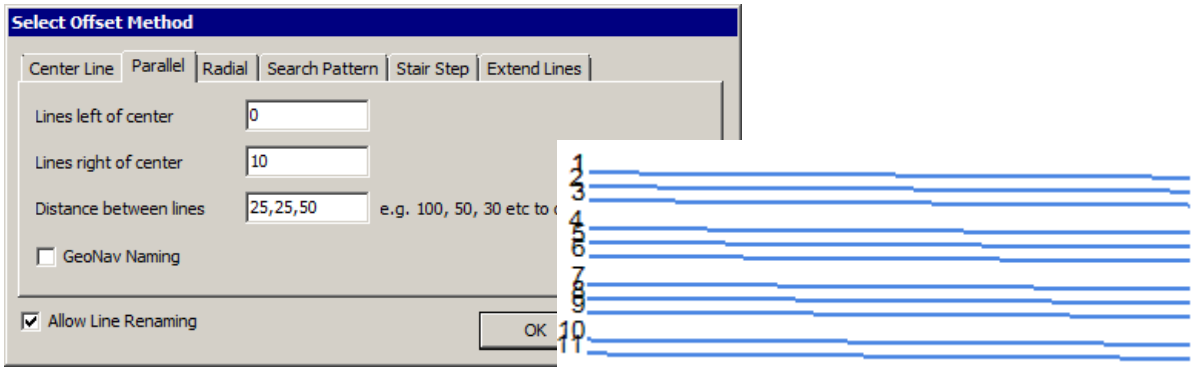
Resulting Line File--Search Pattern (left) Offsets (right)



Parallel Line Patterns

When you are generating offsets to a base line, the Parallel line pattern can space all of the lines uniformly, when only one distance is entered, or space them in a patterned sequence set by entering a comma delimited list of distances.

FIGURE 7. *Entering a Pattern of Distances (left), and the Results (right)*



Import Coordinates from Text

See "Import Data to TARGET, BORDER and LINE EDITORS".

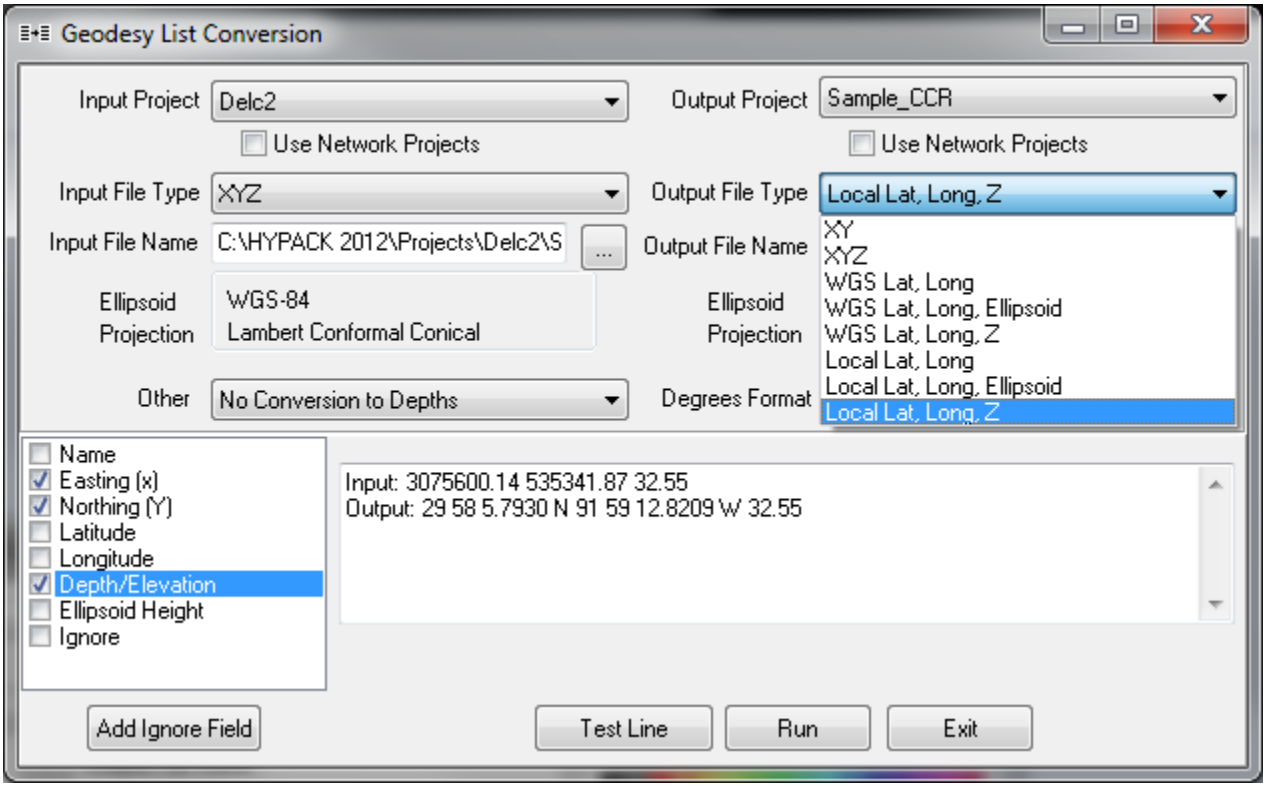
DG2 EDITOR Options

- **New Lat./Lon. Input Option:**
  To define the points that describe your feature position in the DG2 EDITOR, you will use the cursor, type the data to a spreadsheet or import a coordinate file. Depending on the selected feature type, multiple coordinate pairs will create one point object for each coordinate pair, a line that connects each location, or an area defined by the locations indicated.
  In HYPACK® 2012, you can choose to enter and display your coordinates in local XY or lat./lon. format through the OPTIONS-UNITS menu option which alternates between the two options each time the item is selected.
- **Support for Custom Symbols** from the S52 EDITOR. (See "New Module! Create Custom Chart Symbols in the S52 EDITOR".)

New Module! GEODETIC LIST CONVERSION

GEODESY LIST CONVERSION reads XY or Lat, Lon data and converts it to an XY or Lat, Lon of different or like geodetic parameters and survey units. In addition, the program can read, convert, and output depth or ellipsoid height.

FIGURE 8. Geodesy List Conversion



ADDITIONAL GEOIDS, DATUMS AND PROJECTIONS

- Maine 2000 zones
- Polyconic Projection
- VN-2000 Datum (Vietnam)
- Moyotte Island and Corse Geoids (France)

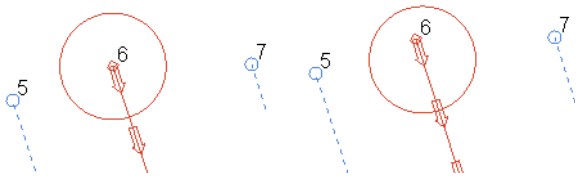
DATA COLLECTION

HYPACK® SURVEY

SHIFTING THE START LINE GATE

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

FIGURE 9. *Start Line Gate = 25 (left), with Offset=10 (right)*



- **If the Start Line Gate is set to "0.0",** the feature is disabled and the SURVEY program will only "Start Line" and "End Line" if you manually intervene.
- **If the Start Line Gate is set to a value other than zero**, the program will start line automatically when the distance from the tracking point to the starting point of the planned line is less than the absolute value of the Start Line Gate. This "trigger area" is shown as a circle at the beginning of the planned line.

  New in HYPACK® 2012, a positive **Offset** shifts the circle down line by the specified amount, while a negative offset shifts it backward along the line.

Records Raw RTK Tide Data

KTC Strings store the values used to calculate RTK tide corrections in the Raw data files. The record format is as follows:

TABLE 1. *Kinematic Tide Components*

Format	KTC dn t n Wht Lht U K A T	
Where	dn	device number
	t	time tag (seconds past midnight)
	Wht	WGS84 Ellipsoid Height
	Lht	Local Ellipsoid Height
	U	Undulation
	K	K value
	A	Antenna Offset
	T	Final Tide
Sample Line	`KTC 0 57453.529 6 -28.360 -28.360 -29.994 0.585 0.000 2.218`	

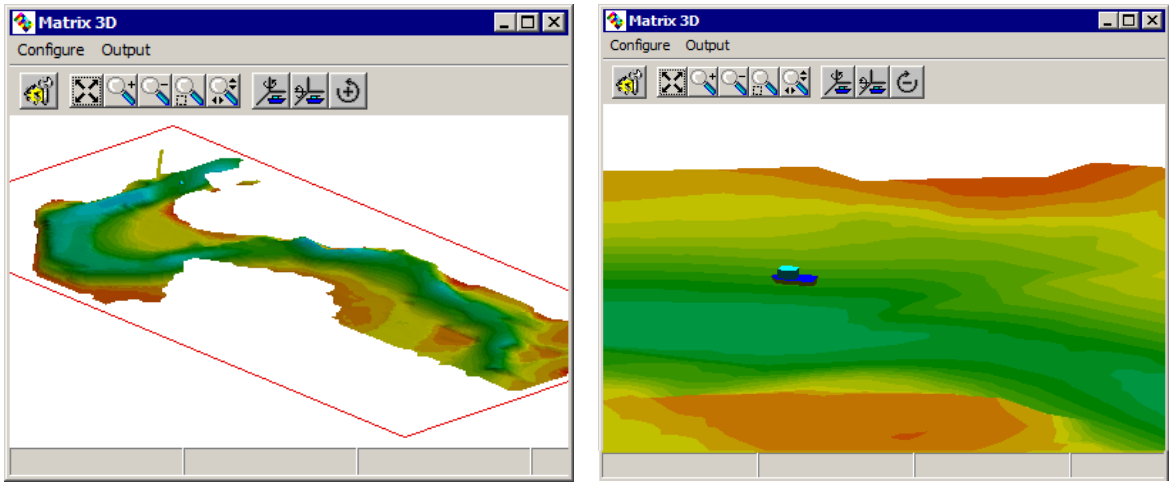
Maximum Depth Alarm

A 'Max Depth' alarm displays when the measured depth is greater than the value defined in the Navigation Parameters dialog.

Real Time Matrix 3D View

The 3D Matrix window shows a 3-dimensional model of the data in the currently active matrix file with a boat traveling above it. The boat position relative to the matrix file updates in real time according to your vessel position.

FIGURE 10. Sample 3D Matrix Windows



Use the tools on the tool bar and the options in the setup dialog to optimize the display.

SIDE SCAN SURVEY

SIDE SCAN SURVEY now logs Cable Out and Towfish Parameters to HSX:

CAB strings record the Cable Out:

TABLE 2. Cable Out Format

Format		CAB dn t c l
Where	**dn**	device number or 99
	t	time tag (seconds past midnight)
	c	cable out
	l	layback
Sample Line		

SVM Strings record other data commonly recorded by towfish sensors.

TABLE 3. Other Towfish Sensor Data

Format		SVM dn t p fdep temp sal sv
Where	**dn**	device number or 99
	t	time tag (seconds past midnight
	p	pressure in decibars
	fdep	towfish depth in survey units
	temp	temperature in Celsius degrees
	sal	salinity in PSU
	sv	sound velocity in m/sec
Sample Line		

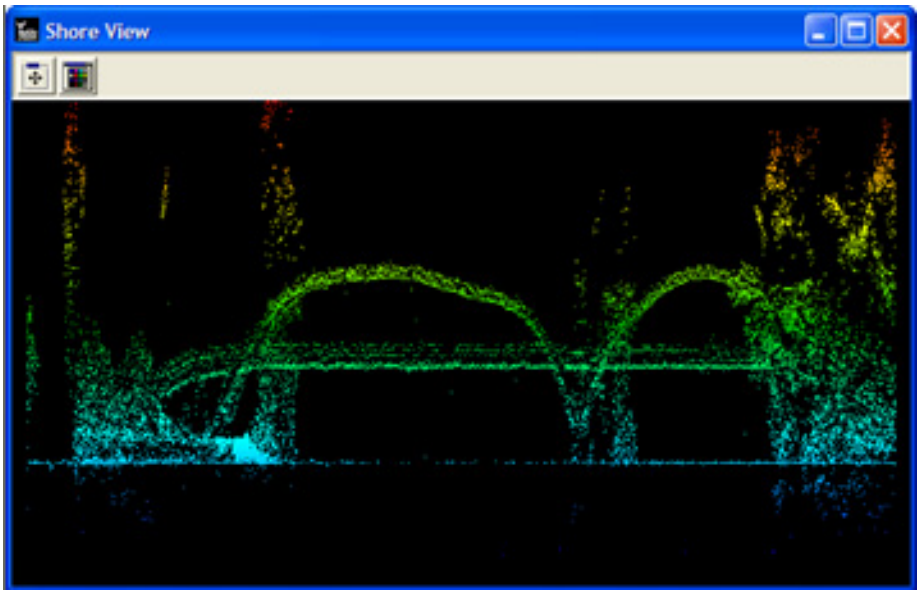
If any value is not present, ’0’ appears in its place.

HYSWEEP® SURVEY

Shore View Window

The Shore View Window is a horizontally scrolling topographic display for Lidar data.

FIGURE 11. *Sample Shore View Window*



Surface Sound Velocity Alarm

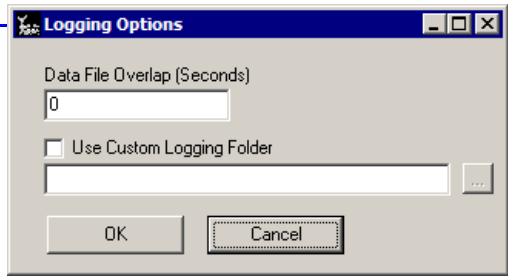
SV Profile alarm shows if the difference between the sound velocity correction from the sensor and the first value in the sound velocity profile is greater than the user-defined amount.

Alternate Logging Location for HSX data.

Raw data is logged, by default, to the project's Raw folder. However, you can specify an alternate location in the Logging Options dialog.

1. **Select FILE-LOGGING OPTIONS** to access the dialog.

FIGURE 12. *Logging Options Dialog*

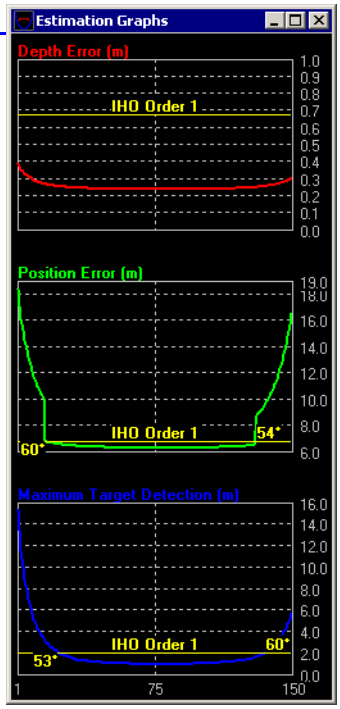


2. **Select the 'Use Custom Logging Folder' option**.
3. **Click [...] and navigate to the location where you want to store your raw data.**

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

TPU Calculation

FIGURE 13. *Sample TPU Display*



TPU Calculation accounts for Range Uncertainty when it's available.

DREDGEPACK®

Creating Custom Dredge Shapes in the DredgeBMP Program

You can customize your cutter or hopper dredge display by creating dredge shapes that look more like your vessel side and end view. The DREDGE_BMP utility imports your BMP file and generates the initialization file which correctly positions the shape and the cutting tool in your Profile window.

The Custom Dredge Shape:

DREDGEPACK® requires bitmaps of the port or starboard side view and the front or rear end view of your vessel. You can:

- **Import photos**, saved in BMP format. In this case, we suggest that you replace the background with white space.
- **Use a graphics program to create a scale drawing** of your dredge's side view (port or starboard) and end view (front or rear) and save them as *.BMP files.

The Dredge Type Initialization File:

Each Dredge Shape type has two *.INI files, one for the parallel to vessel (profile) view and one for the perpendicular to vessel (end) view. They tell DREDGEPACK® about the *.BMP file and how to position it in your Profile Window. The initialization files are stored in the \Hypack 2012\Shapes folder.

Dredge Shape Type	Profile View	INI File
Cutter Suction	Perpendicular to Vessel	Cuttercross.ini
Cutter Suction	Parallel to Vessel	Cutterprof.ini
Hopper (Center)	Perpendicular to Vessel	HopperCrossC.ini
Hopper (Center)	Parallel to Vessel	HopperProfC.ini
Hopper (Right)	Perpendicular to Vessel	HopperCrossR.ini
Hopper (Right)	Parallel to Vessel	HopperProfR.ini
Hopper (Left)	Perpendicular to Vessel	HopperCrossL.ini
Hopper (Left)	Parallel to Vessel	HopperProfL.ini

The following is a sample INI file	General] Level=85 ArmX=336 ArmY=78 ORIENTATION=2 TYPE=0 BMPFILE=c:\Hypack 2012\shapes\cut-terprof.bmp

Each graphic is measured in pixels that correspond to your Dredge Shape Type using an X,Y coordinate system where 0,0 is the upper left corner. Level, ArmX and ArmY are all based on this system. It is not the same as your hardware offset measurements.

Level is the BMP Y coordinate corresponding to the water level when the draft is 0.

ArmX and **ArmY** describe where the drag arm is attached to the vessel.

Orientation indicates which profile your graphic represents:

- **0:** Rear profile
- **1:** Front profile
- **2:** Left profile
- **3:** Right profile

Type indicates the type of dredge represented in your graphic.

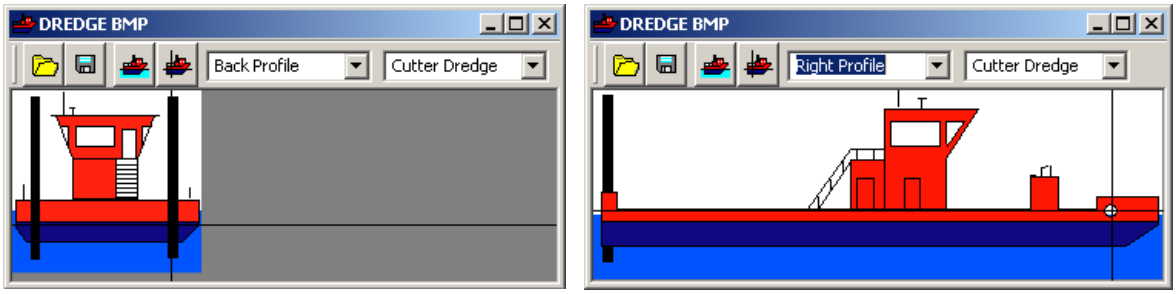
- **0:** Cutter dredge
- **1:** Hopper dredge

BMP File names the file, including the path, of the graphic file. You would use the side view graphic for Profile Views that are parallel to your vessel and the end view graphic for the perpendicular to vessel Profile View.

To edit the initialization files that correspond to your Dredge Shape Type, use **the Dredge BMP routine**.

1. **Open the Dredge BMP utility**. This is an added utility—the dredge_bmp.exe—that you must run through the HYPACK® Tools menu.
2. **Click the File Open icon and select one of the BMP files resembling your dredge**. The image will display in the Dredge BMP window.

FIGURE 14. *Dredge BMP Displays--Back (left) and Right Side (right)*



3. **Use the drop-down lists to describe the profile you have loaded.** This tells DREDGEPACK® what image it can display for each profile view of cutter and hopper dredges.
4. **Set your water level when draft is zero.** Click the Set Level icon then click the position of the waterline at zero draft on the BMP image.

1. **Define the cutting tool attachment position.** Click the Set Arm icon then click the position where the cutting tool attaches to the dredge.

1. **Save your initialization file.** Click the File Save icon and name your configuration. The information will be saved to your project file with an INI extension.

SINGLE BEAM EDITING

SINGLE BEAM EDITOR (SBMAX)

DELETE ABOVE/BELOW LINE

To delete all points above or below a user-defined line in the Profile window:

1. **Click the Edit Above Line or Edit Below Line icon**.
2. **Holding the left mouse button down, use the cursor to draw a line to define where data should be removed.** (Your line will draw in yellow.) When you release the mouse, the data above or below your line will be deleted according to which icon you chose.

FIGURE 15. *Sample Edit Above the Line (Before)*

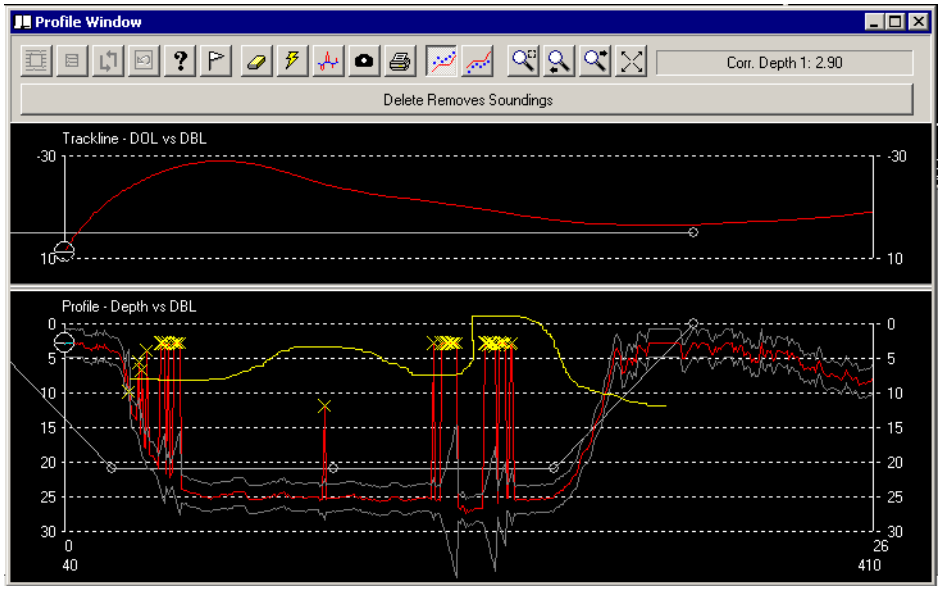
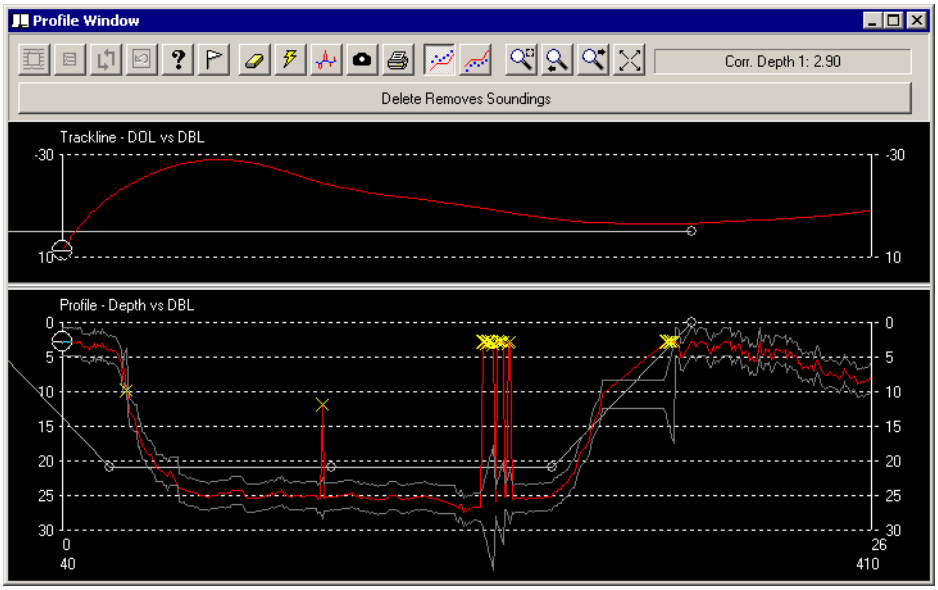


FIGURE 16. *Sample Edit Above the Line (After)*



APPLY FILTERS INSIDE USER-DEFINED BOX.

Previous versions of HYPACK® have enabled you to automatically apply filter criteria to all data currently loaded to the SINGLE BEAM EDITOR (SBMax) or to the line currently displayed.

In HYPACK® 2012, you can affect only a select area of the line currently displayed. When you have set your Search and Filter criteria, use your cursor in the Profile display to draw a box around the area where you want to apply the filters then click the Filter Line icon.

Dynamic Draft Corrections

The Draft Adjustments routine does the same thing in the SINGLE BEAM EDITOR as the drafttable driver does in real time in SURVEY.
A table defines the draft values and their corresponding vessel speeds. SINGLE BEAM EDITOR will use these values to store a draft correction value appropriate to the vessel speed with each sounding *in the edited output only*. It interpolates draft values according to the selected interpolation method and within the defined speed range.

The Draft Adjustment routine, supports Shallow Water and Deep Water curves and interpolates when the depths are between the Shallow and Deep Depth Limits. Shallow depths can affect how the wake forms around the vessel and it has been shown that it can significantly affect the draft. If you are working in varying depths, enter different drafts for shallow and deep water.

- **If you enter both shallow water and deep water draft values:**
  - **When the depth is less than the shallow water definition**, the driver uses just the shallow water table.
  - **When the depth is greater than the deep water definition**, the driver uses just the deep water table.
  - **When the depth is between the shallow and deep water definitions**, the driver interpolates between the two table values.
- **If you only enter values in the shallow water column,** just use the shallow water values.
- **If you only enter values in the deep water column,** just use the deep water values.

Note: If there are soundings taken at speeds greater than those defined in the Draft Table, the driver will assign draft correction value that corresponds to the fastest speed in the draft table.

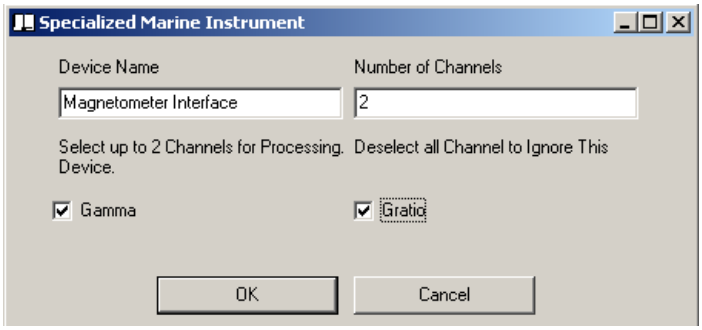
Loading Special Marine Instruments Data

HYPACK® processes data from magnetometers and other environmental sensors in the SINGLE BEAM EDITOR.

When HYPACK® stores more than two values from a device as depths, it records an SMI record which can be processed in the SINGLE BEAM EDITOR two values at a time. When you load data containing SMI records to the SINGLE BEAM EDITOR, the Specialized Marine Instrument (SMI) dialog appears after the Read Parameters dialog in the file loading sequence. In this dialog, you specify the device and which two of its recorded values you wish to process. When you click [OK] the data will load to the editor interface.

In the following figure, the magnetometer driver only recorded two values. Other devices may record several values. In this case, all of the data types would be listed in the SMI dialog and you would choose one or two for processing.

FIGURE 17. *Specialized Marine Instrument Dialog -- The Magnet.dll Recorded Gamma and Gratio*



Note: To see both sets of selected data, remember to check both Depth 1 and Depth 2 in the Profile tab of the View Options dialog.

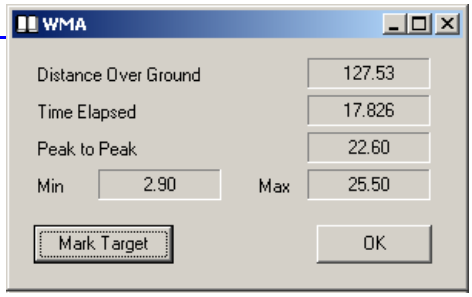
WHOLE MAGNETIC ANALYSIS (WMA) WITH MAGNETOMETER DATA

When you are editing magnetometer data in the SINGLE BEAM EDITOR, you can see the minimum and maximum gamma values in the Profile window, but that doesn't tell us enough about the size of the detected object.

To gain more information:

Whole Magnetic Analysis enables you to view additional data and mark targets at magnetometer target locations.

FIGURE 18. *Sample WMA Window*

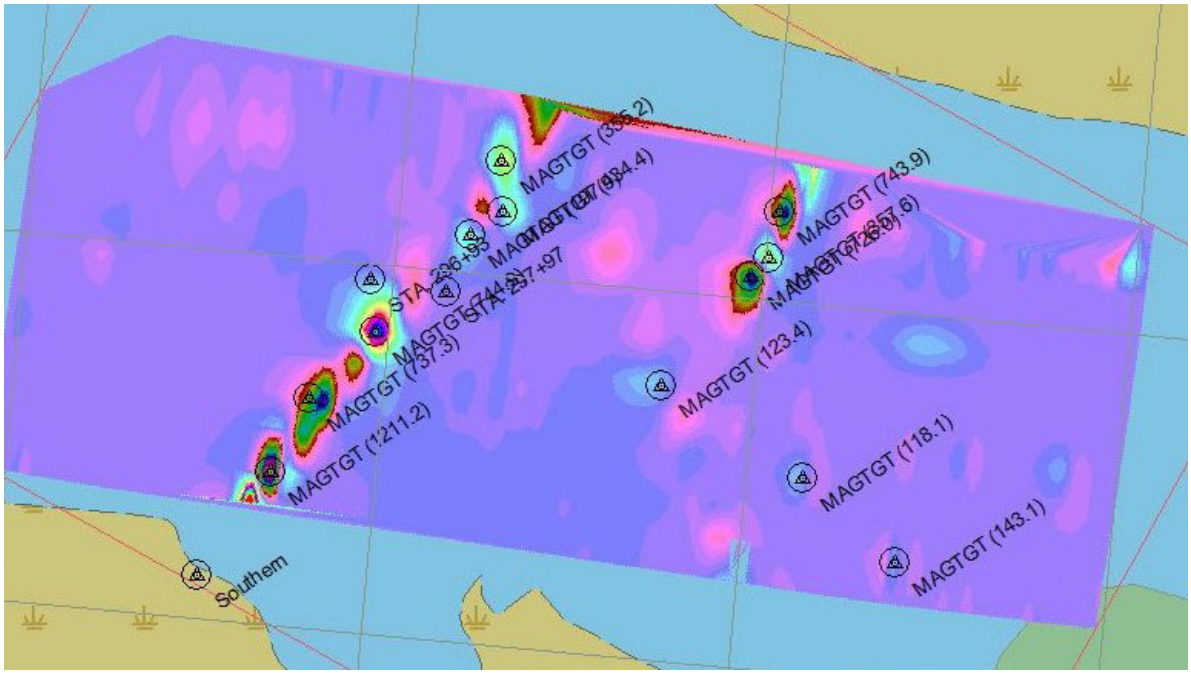


When you mark targets from the WMA window, a target named 'MagTgt' followed by the Peak-to-Peak value is generated midway between the flags. Each target record includes:

- The magnetometer return at the target location (stored as 'depth')
- The distance over ground, time elapsed, and peak to peak values stored (in that order) in the Notes field.

You can view your targets in the area map of the HYPACK® shell or any other program that supports target display.

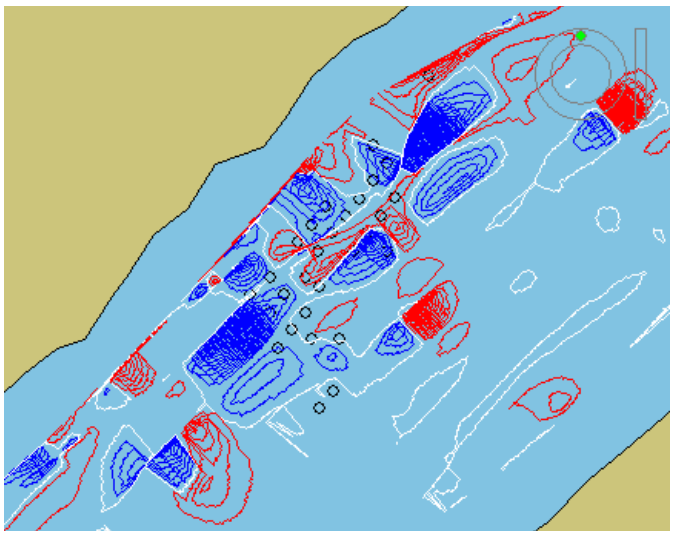
FIGURE 19. *Magnetometer Targets Displayed in HYPACK®*



Full directions are included in the HYPACK® 2012 User Manual and Help files in the SINGLE BEAM processing section under ‘Other Data in the SINGLE BEAM EDITOR’.

We can also use the SINGLE BEAM EDITOR to calculate and output data where the depths represent the difference between the median and the minimum and maximum gamma readings. When you then use this data to generate and display contours, it clearly shows your target areas.

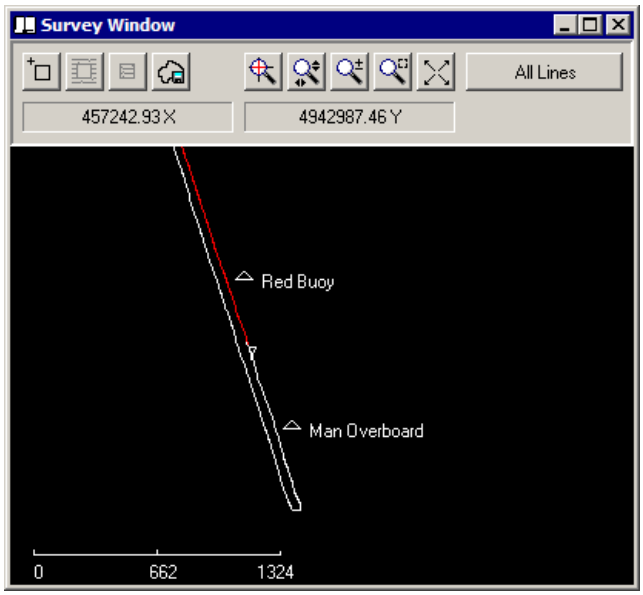
FIGURE 20. *2-dimensional Contours of your Magnetometer Data*



SURVEY WINDOW DISPLAYS TGT FILES.

Targets enabled in the HYPACK® Area Map are automatically shown in the Survey window.

FIGURE 21. *Targets in the SBMax Survey Window*

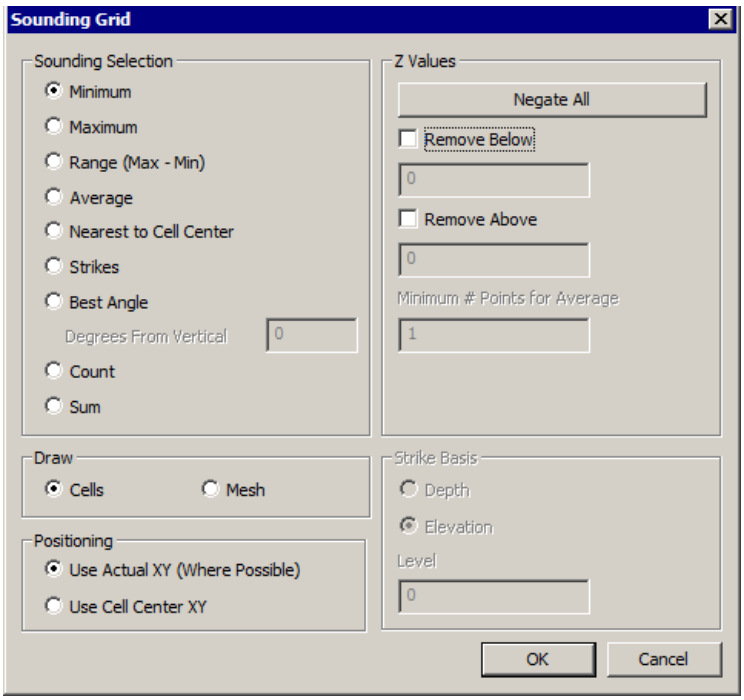


MAPPER (32- AND **New!** 64-BIT)

Added Sounding Selection 'Count' and 'Sum' options.

- **Count** exports number of samples per cell.
- **Sum** export the total sum of the depths in each cell.

FIGURE 22. *Data Selections Window in MAPPER*



SORT (32- AND **New!** 64-BIT)

2-DIMENSIONAL VS 3-DIMENSIONAL SORT

SORT provides a choice between 2-dimensional (2D) and 3-dimensional (3D) sorting.

2D SORT is the process that has been available in previous HYPACK® releases. The program saves the minimum data point then eliminates all other points that fall within a user-defined *horizontal* distance. It repeats this process until all soundings have either been saved or deleted. The 2D process is satisfactory with data sets where the terrain is fairly level, but eliminates valuable data on steep and vertical surfaces.

3D SORT uses a similar process but eliminates points within the user-defined distance *in any direction*. In this way, steep and vertical surfaces are more accurately represented in the output data set.

FASTER SORT METHODOLOGY FOR LARGE DATA SETS

For data sets in excess of 500,000 data points, SORT divides the data into segments and processes one segment at a time. This speeds the process because the program is no longer has to search so many points during each cycle of the sort.

MANUAL TIDES PROGRAMS MERGED

Single and multi-day versions have been consolidated into one program. One MANUAL TIDES program now generates tide correction files for individual days or multiple consecutive days.

- **Single Day mode** requires time (hh:mm) and water level (survey units) data for the period of your survey.
- **Multiday mode** requires the same time and water level data, as well as the date for each record (mm/dd/yyyy)

The program can read up to 14400 records.

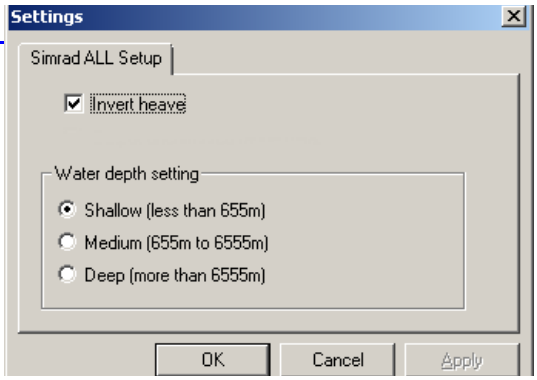
SIDE SCAN PROCESSING

SIDE SCAN REFORMATTER

HSX CONVERSION MODIFICATIONS

- **Imagenex 83P Data:**
  Check the **Output Attitude Data** setup option when you want to include the heave, pitch and roll data from the 83P output.
- **Klein 3000 SDF Data:**
  Added **Apply Roll Vector from SDF:** Typically, this option will be checked. Clear this option when you want to output uncorrected bathymetric data. In this case, the HYSWEEP® EDITOR will then use the HCP records which contain the average roll for the ping.
- **Simrad ALL Data:**
  The following settings are used to convert Simrad ALL data to HYPACK® HSX format:

FIGURE 23. *Setup to Convert Simrad ALL Data*



Invert heave: Reverses the sign for the heave values. Normally, you will not check this option.

Output uncorrected range data: Generates HSX data that has not been corrected for heave, pitch and roll. You will apply HYPACK® corrections in post-processing. Without this option selected, the converter will output HSX data corrected with Simrad heave, pitch and roll data and 'flagged' to prevent you from double-correcting in post-processing.

Water depth setting: The HYPACK® post-processing programs expect depths at different ranges to be measured with different degrees of accuracy: centimeters, decimeters and meters for shallow, medium and deep water respectively. Select the

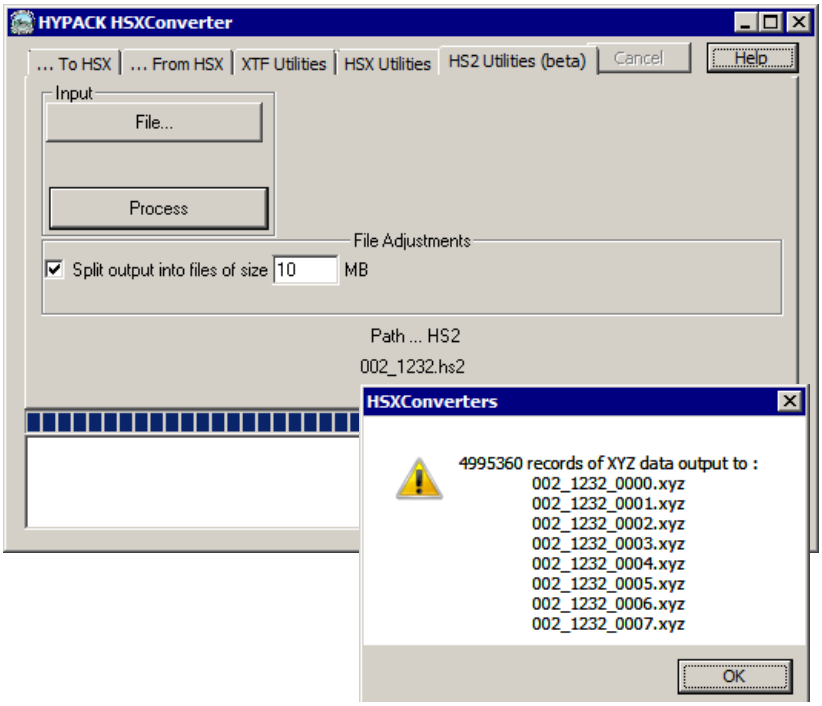
depth range included in your conversion data so the correct multiplier is used for the conversion.

HS2 Utilities

In the HS2 Utilities tab of the SIDE SCAN REFORMATTER, you can convert multibeam data to XYZ format or side scan data to XY, Altitude format.

Choose to output an XYZ file for each HS2 file or limit the size so the program will output multiple files, none of which exceed the user-defined size.

FIGURE 24. *HS2 Utilities Tab*



SIDE SCAN TARGETING AND MOSAICKING

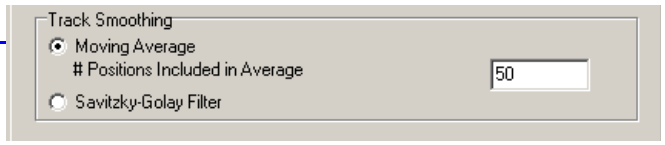
Auto-smoothing of Heading, Trackline and Altitude

The Heading, Tracklines and Towfish Altitude windows each have a smoothing icon which smooths sharpness from its graph. In each case, you can smooth the entire data set or confine the smoothing to a select segment of the line by dragging a box around the data before clicking the smoothing icon.

Each time you smooth the line in any of the three windows, the counter in the status bar of that window increments. This count is maintained only for the current session. A similar count is maintained for each vertical adjustment in the Towfish Altitude window.

- **Tracklines** are smoothed according to the options selected in the Advanced tab of the View Options (F9) dialog.

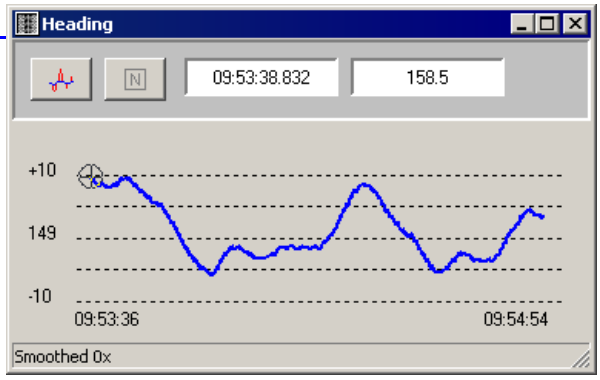
FIGURE 25. Track Smoothing Options



- **Moving Average** (recommended) does a great job of smoothing, although fine direction changes may be lost.
- **Savitzky-Golay Filter** is more appropriate for a boat than a towfish.

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

FIGURE 26. Sample Heading Window



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

- **Fish Attitude Smoothing**:
  The towfish altitude is indicated by the blue line in the Towfish Altitude window. Smoothing rounds sharp angles in the profile.

MULTIPLE UNDO'S

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

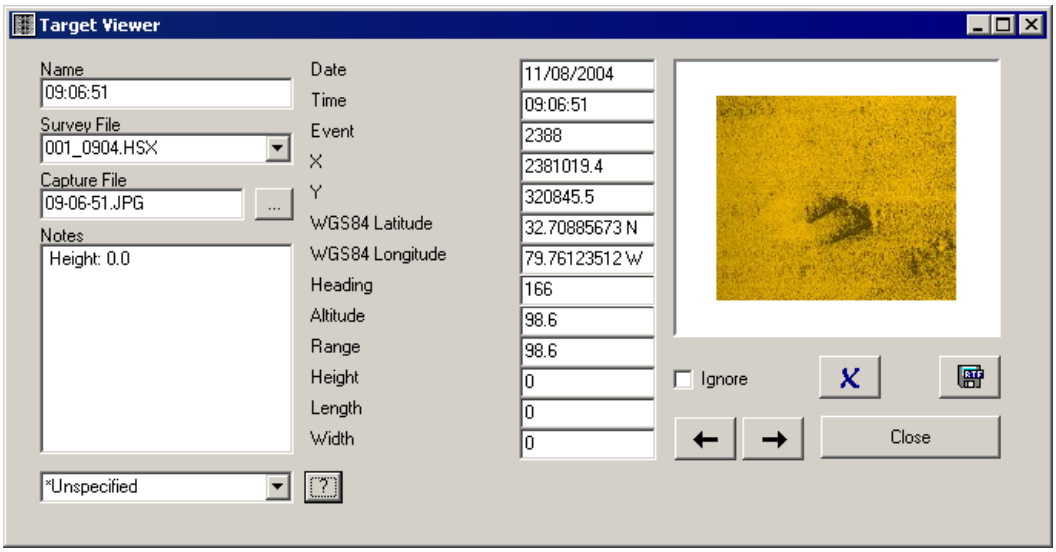
TARGET VIEWER

In HYPACK® 2012, the TARGET VIEWER runs as a stand-alone program.

The TARGET VIEWER displays all information about each target in one window. This is mostly *for display purposes only*; only the data in the left section can be edited in the TARGET VIEWER.

From the HYPACK® menu, select SIDE SCAN-TARGET VIEWER and the program will automatically load the first enabled target file in the Project Files list. If no target file is enabled or if you want to choose a different file, select FILE-OPEN and select the target file you want to review.

FIGURE 27. *Sample TARGET VIEWER Display*



MULTIBEAM PROCESSING

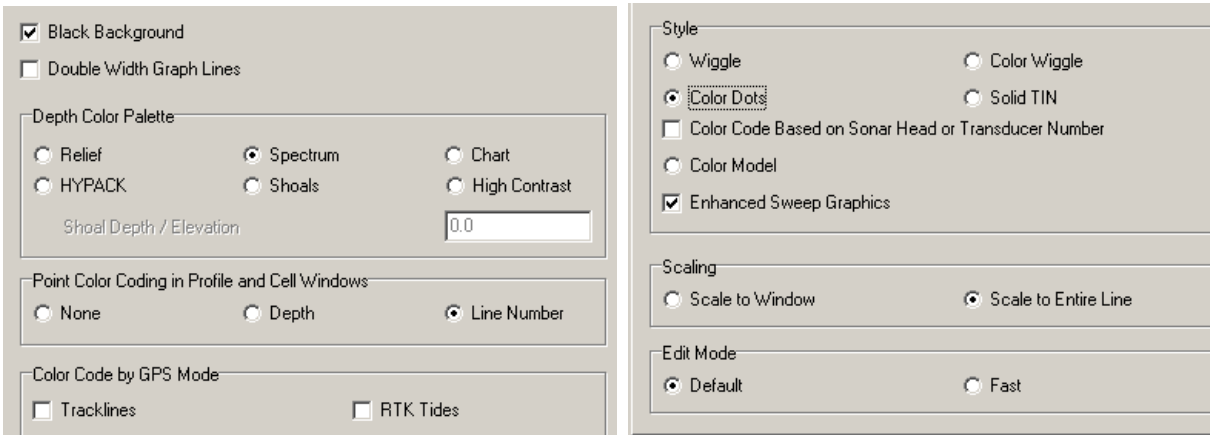
HYSWEEP® EDITOR

NEW DISPLAY OPTIONS

- **Color Dots** displays a series of circles color-coded according to the depth.
- In the Sweep Window tab, when the **Color Dots** option is selected, **Color Code Based on Sonar Head or Transducer Number** draws soundings from each transducer in a different color.
- Use the **Color Code by GPS Status** check boxes in the Colors tab to color-code track lines in the Survey window and RTK tide data in the Tides and Draft Corrections window based on the GPS Status at that time. (GPS modes vary widely between devices so there is no set color-mode correlation.)

All display styles are now available in Enhanced Graphics mode.

FIGURE 28. *View Options—Colors Tab (left) Sweep Tab (right)*



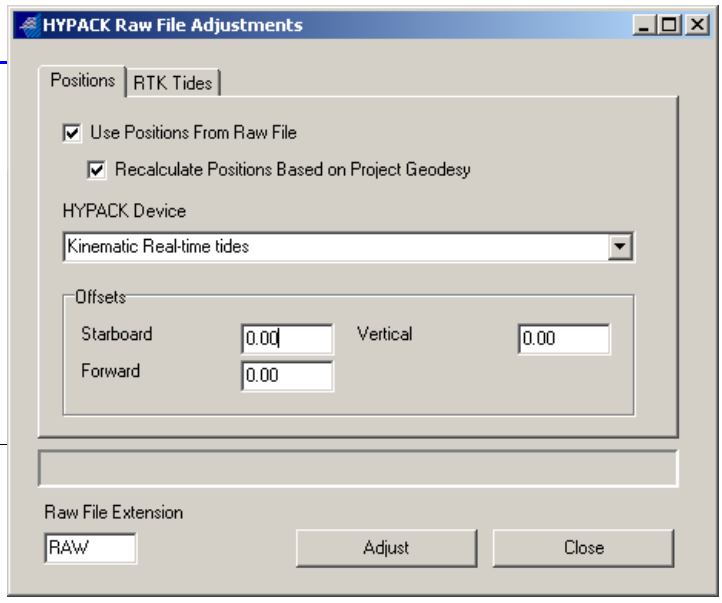
RAW FILE ADJUSTMENTS: RECALCULATE POSITIONS USING PROJECT GEODESY

If your hardware configuration includes more than one positioning device (mobile), HYSWEEP® SURVEY automatically reads the position from the first positioning device in the configuration. This routine enables you to recalculate the positioning based on the positions from other positioning devices in the configuration.

New in HYPACK® 2012, it can also correct positioning errors caused by incorrect geodesy settings during data collection by recalculating your positions based on the RAW data and current geodetic parameters.

In Phase 1 editing of your raw data, **select TOOLS-HYPACK RAW FILE ADJUSTMENTS.**

FIGURE 29. *Raw File Adjustments Dialog - Positions Tab*



In the Positions tab,

- **Check the 'Use Positions from Raw File' option.**
- If your survey computer was configured with incorrect geodesy settings, check '**Recalculate Positions Based on Project Geodesy**'.

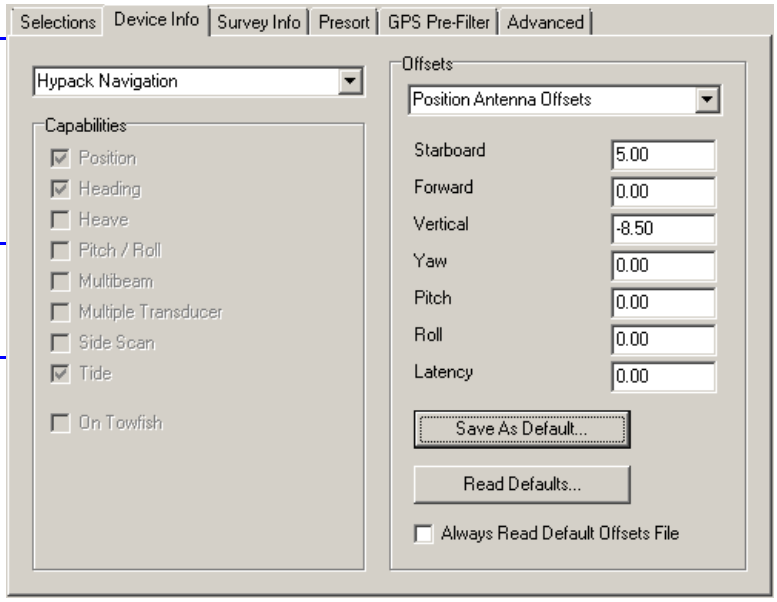
NOTE: You must now have the correct geodetic parameters entered in your project.

- **Enter the device and its correct offsets** from the vessel origin.

SAVE/READ OFFSET CONFIGURATION FILES.

When you load your data to the HYSWEEP® EDITOR, the Device Information tab displays settings for each device in your project. You can select the device of interest from the drop-down box at the left. and view the record capabilities that were set in the hardware configuration at the left, and view or modify the Offsets at the right. Any changes you make here will be applied to all currently selected files.

Device Information Window



The drop-down list under 'Offsets' provides separate options for position and RTK Tide antenna offsets. This enables you to use separate systems for position and tide.

NOTE Editing the offsets will affect only the edited data. It will not affect raw data.

New in HYPACK 2012: If you will be running multiple sets of data using the same offsets, you can save your current offset settings for easy reload.

[Save As Default] provides a dialog where you can name your offsets configuration to an *.INI file.

- **To automatically reload the current default offsets** next time you load files, check '**Always Read Default Offsets File**'.
- **To manually load a set of offsets** saved to an *.INI file, click **[Read Defaults]**, and select the file with the correct defaults saved.

TRUE HEAVE: CAN SELECT MULTIPLE FILES.

If you have logged POS/MV Group 111 data or F180 CSV data during survey, the editor programs include a specialized routine that applies that true heave data to your sounding data.

New in HYPACK® 2012, when you load your POS/MV True Heave file, you can now load multiple files by holding the Ctrl key while selecting the ones you need.

POSPAC/F180 IMPORT

If you are using the Applanix POS MV with POSPac for positioning and as your motion sensor, you can improve the accuracy of your survey data.

The POSPac Adjustments routine in the editor program can use the POSPac file (*.OUT or SBET file) to recalculate one or more of the following:

- GPS Latitude, Longitude and elevation
- Pitch and Roll
- Heading

- Tide

Since the data in the POSPac file is quite accurate and post-processing calculations can be better than those done in real-time, this routine typically improves the accuracy of your survey data.

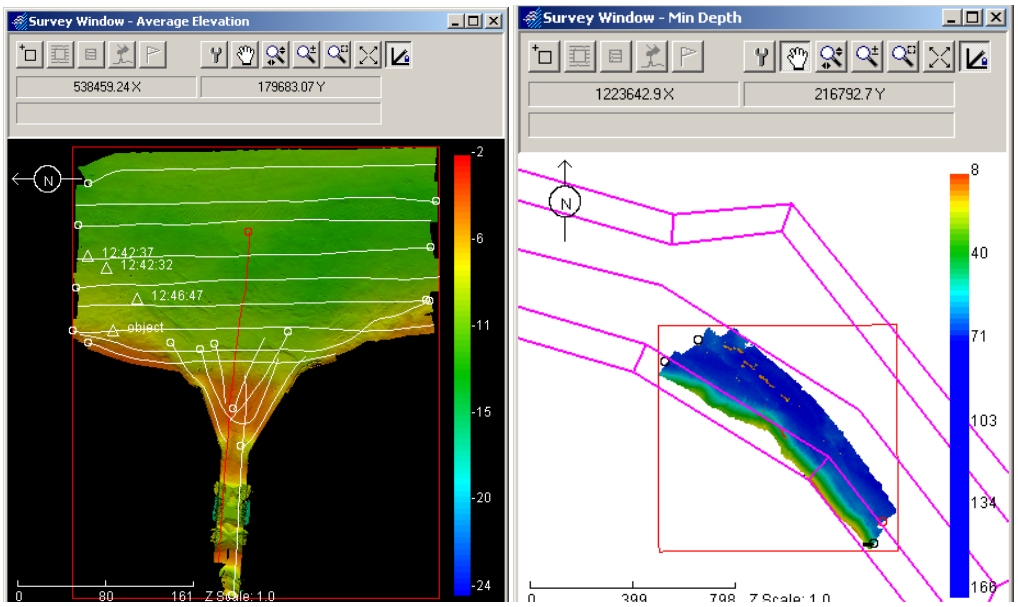
Display Target and Channel Files in The Survey Window

In the File menu, additional options overlay target and channel files on the Survey window display.

To show target files, select FILE-OPEN TARGET FILE. A File Open dialog will appear for you to select the TGT file for display.

To show channel files, select FILE-OVERLAY CHANNEL FILE. A File Open dialog will appear for you to select the CHN file for display.

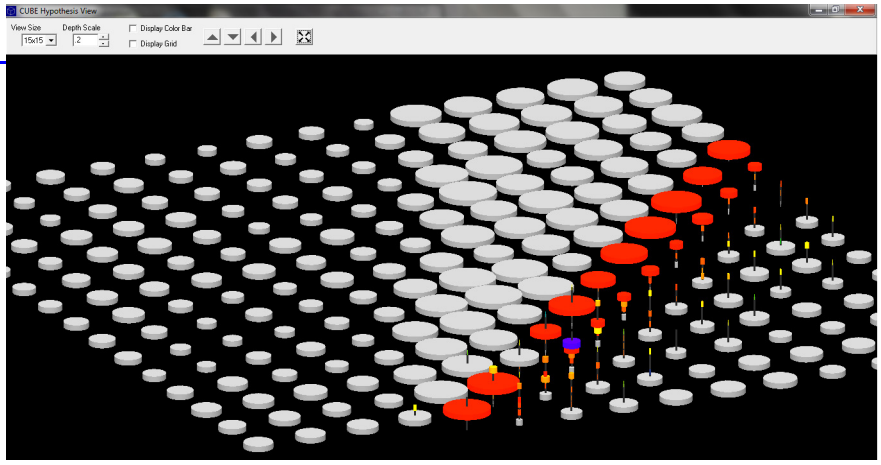
FIGURE 30. *Displaying Targets (left) and Channel File (right)*



CUBE Hypothesis Window

The Hypothesis window displays a rectangular area of nodes in your data where you can select a hypothesis for each node. The display shows a select area of nodes so you can closely examine each node and its hypotheses in the context of the surrounding nodes in order to quickly make your best decision.

FIGURE 31. *Sample Hypothesis View Window*



The window displays the hypotheses as disks along the vertical axis on the node. Each disk at any location represents a hypothesis for that location. The size of the disk indicates the number of points in the hypothesis' uncertainty. The color indicates the uncertainty or, if it's grey, the selected hypothesis.

View Size: Choose the size of the display measured in the number of nodes in each horizontal direction. The same area will be represented by a square drawn in the Grid Window. You can use the **arrow buttons** to shift the display horizontally, and the **Zoom Extents** button to view the entire data set.

Depth Scale adjusts the vertical scale to optimize your view of the individual hypotheses.

Display Color Bar shows a legend indicating colors and their corresponding level of uncertainty.

Display Grid overlays a 3-dimensional grid to lend perspective and spatial orientation to the display.

FINAL PRODUCTS

CROSS SECTIONS AND VOLUMES

MODIFIED VOLUMES CALCULATIONS FOR COMPLEX TEMPLATES

CROSS SECTIONS AND VOLUMES has been modified so many methods will now work with non-standard templates. You can have one cross sectional design template with four points and the next section with six points and the next section with five points.

CROSS SECTIONS AND VOLUMES now examines the template information to try to determine what regions of the template should be allocated to the left slope, center (left and right of center for Philadelphia) and right slope. Center channel and side slope regions are defined as follows:

Average End Area 1, 2, 3 and No Segments; Philadelphia Pre- and Post-dredge; and GLDD, Norfolk, and Savannah methods define their side slopes and center channel regions according to the following template rules:

- **If there are no template points or only one template point** in a planned line, then all regions (left and right slopes, and center channel) are equal to 0.
- **If there is only one template point that has the largest z-value**, everything to the left of the deepest template point is assigned to the left slope region and everything to the right of the deepest template point is assigned to the right slope region.

FIGURE 32. *One template point with largest Z-value in the center results in left and right slopes, but no center channel*

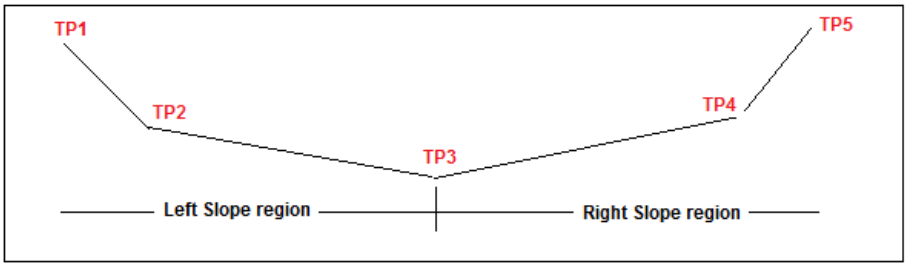
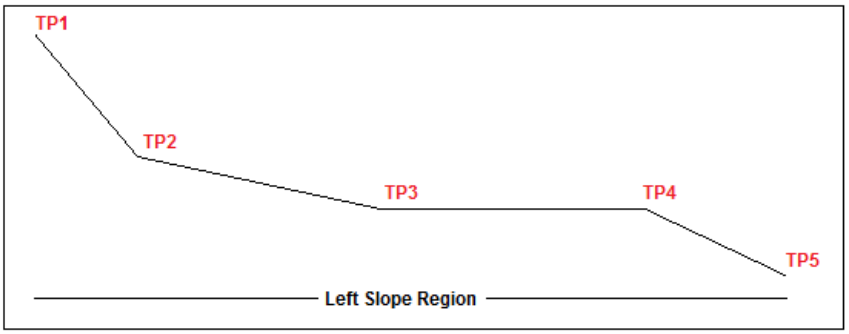


FIGURE 33. *One template point with largest Z-value on the end defines a left or right slope.*



- **If there are two or more template points with the largest z-value**, the center channel is composed of the region between the first and last template point with the largest z-value. Anything to the left of the first template point with the largest z-value gets assigned to the left slope region. Anything to the right of the last template point with the largest z-value gets assigned to the right slope region.

  TIP: If you want to calculate a separate volume for a turning basin, create separate reporting zones in ADVANCED CHANNEL DESIGN.

FIGURE 34. *Two or more template points of equal depth represent the center channel*

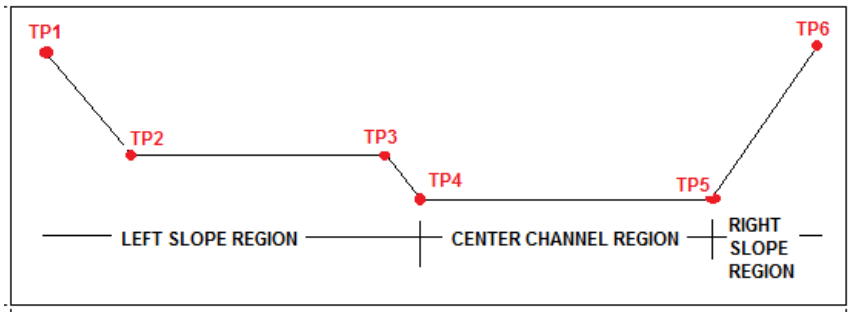
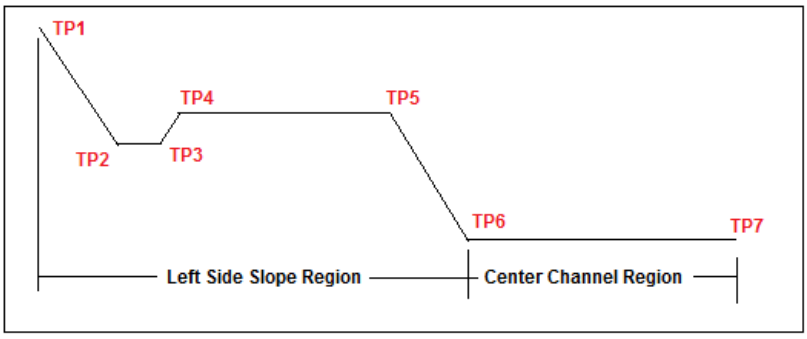
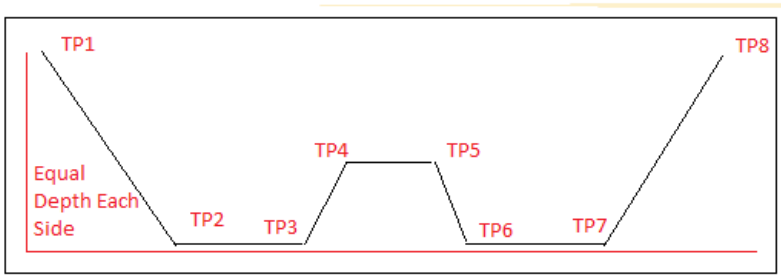


FIGURE 35. Two or more template points of equal depth represent the center channel



- **When these rules cannot be applied, use the Average End Area-No Segments volume calculation method.** In the following figure, the channel has two segments of equal depth. Since neither is deeper than the other, the program can not declare a center channel.

FIGURE 36. One Channel Design where the Center Channel Can Not be Defined

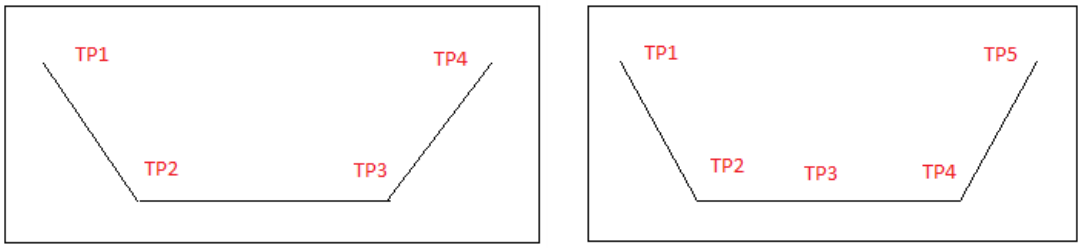


NOTE: You may also consider the Standard HYPACK or Zone Listing methods if an Average End Area method is not required.

For the remaining volumes calculation methods the following rules apply:

- **Every template has to have the same number of points** unless you are using the Average End Area No Segments calculation method**.**
- **The Standard HYPACK® and Beach methods** support up to 21 points in each template.
- **The Custom Average End Area methods** (Norfolk, Savannah, GLDD...) support only four points in each template.

FIGURE 37. Simple Templates - No Center Line Defined (left), Center Line Defined (right)



DIGITIZE POINTS TO XYZ FILES

In the View tab, the **Points Tools** enable you to use either the cross hair or annotation cursor to digitize data in your display. You can then save the data to an XYZ file.

- **In cross hair mode**, the program stores the XYZ of *your cursor position*.
- I**n annotation mode**, the program stores the XYZ of the *base survey data* at your cursor position.

TIN MODEL

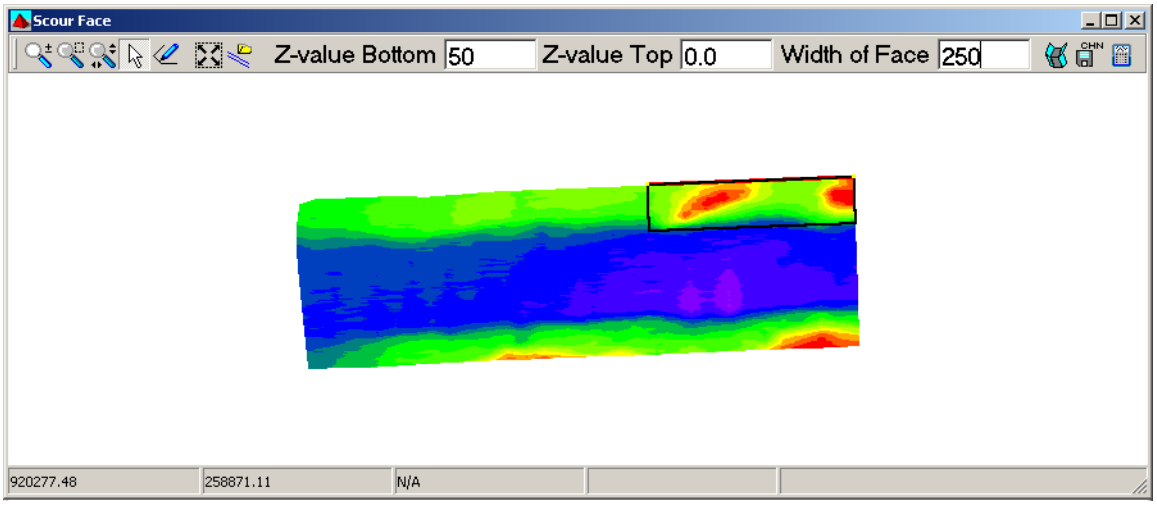
SCOUR HOLE CALCULATIONS

The TIN MODEL provides tools with which you can create a single CHN face representing the channel design surface then calculate the amount of fill required to bring the TIN model surface up to that design surface.

In the Scour Face dialog, you will define the top edge of the scour face and enter the depth at the top and bottom edges, and the horizontal distance between them.

Using this data, the program calculates the slope of your design surface and draws the channel face on the model for your verification, saves the face to a channel file *.CHN) and calculates the fill volume. The resulting volumes calculations are displayed in the dialog and stored to the tin_report.txt file in your project folder.

FIGURE 38. Previewing the Scour Face CHN



TIN-to-Level Resolution

TIN-to-Level volumes calculations are now presented at 0.01 resolution.

EXPORT

Export Google Earth™ KMZ File. (See "Export to Google Earth™ KMZ File".)

HYPLOT

Color Soundings By File

- In addition to color options previously available, **Color By File** allows you to set specific colors for each catalog or individual file. Files loaded as part of a catalog will all inherit the color of the catalog.
  To color individual files, you must first load them to the project separately.

Modified the Russian Border

- **Swap X, Y Labels** option sets X as the vertical axis and Y as the horizontal axis.
- **User-defined font size** for labels defined in the Label Options area of the Russian Border Options dialog.

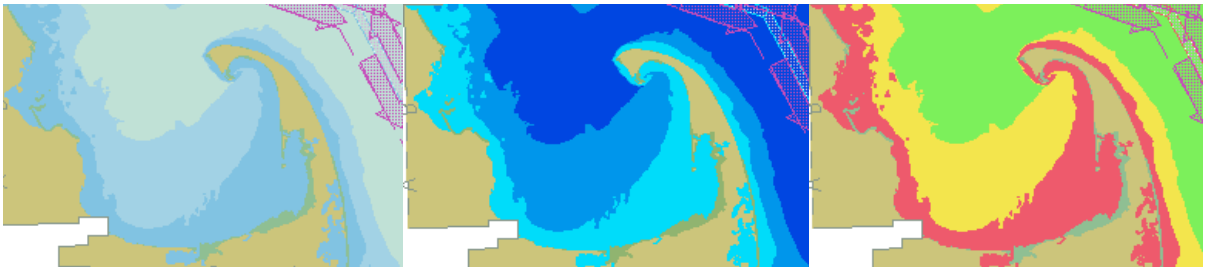
ENC EDITOR

New Depth zone color schemes

In the S57 Display Options dialog (F9), the scheme field defines the color combinations used for the chart safety contours. HYPACK® supports three schemes:

- **S52:** The industry standard where the colors progress from darkest to lighter shades of blue as depths increase.
- **Bathy Blue:** The reverse of S52 where the deepest water is the darkest color.
- **Red Yellow Green:** Displays three categories of depth areas:
  - unsafe (red),
  - safe with caution (yellow)
  - safe (green)

FIGURE 39. S57 Color Schemes: S52 (left), Bathy Blue (center), Red Yellow Green (right)

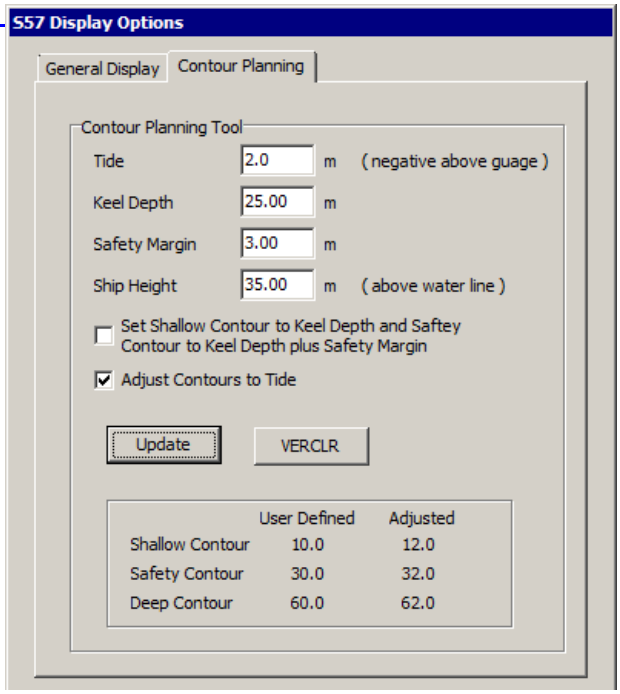


Note: These schemes are also supported in the Charts tab of the HYPACK® Control Panel and displayed by HYPLOT.

PLANNING TOOL UPDATES SAFETY CONTOURS BASED ON TIDE AND KEEL DEPTHS.

The Contour Planning tab of the S57 Display Options dialog (F9) provides options that adjust the display by additional user-defined variables related to your vessel and tide conditions. It also enables you to search for features, such as bridges, that may be too low for your vessel to safely pass under.

FIGURE 40. Contour Planning View Options



- **Tide:** Tide level expected when you will be on the water.
- **Keel Depth:** Distance from the water surface to the tip of the keel.
- **Safety Margin:** Enables you to adjust the contours to allow for this amount of clearance beneath the keel.
- **Ship Height:** Distance from the water level to the highest point on your vessel.
- **Set Shallow Contour to Keel Depth and Safety Contour to Keel Depth + Safety Margin**

To calculate the adjusted contour levels without affecting the chart display enter your variables and click [Update]. The lower part of the dialog compares your contour depths as defined in the General Display tab and their adjusted values based on your contour planning options.

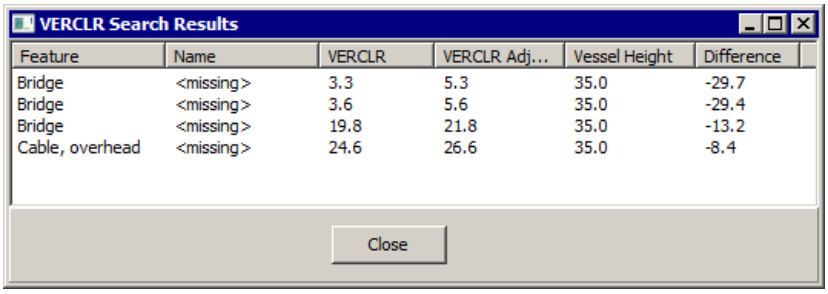
To update the adjustments *and* adjust your chart display based on the current settings, click [Apply].

To check for objects with insufficient vertical clearance for your vessel to pass under, we use the VerClr (vertical clearance) attribute of objects in your S57 chart. The VerClr

attribute tells you how far the object is above the water line. **Click [VerClr]** to display a listing of any objects found in the chart whose VerClr attribute is less than the Ship Height value.

Beware! This only works if your chart features have the correct VerClr attributes. This list ignores all features whose VerClr attribute is "N/A".

FIGURE 41. *Sample Vertical Clearance Report*

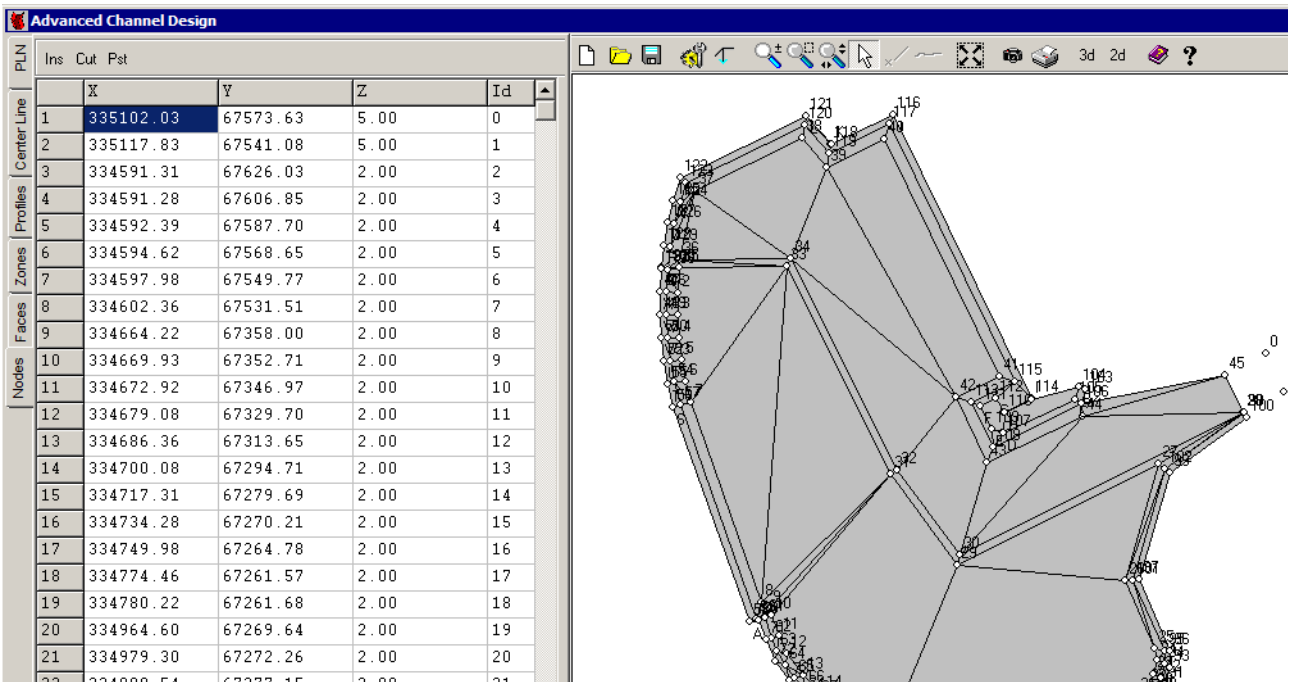


UTILITIES

New! ADVANCED CHANNEL DESIGN

HYPACK® 2012 introduces a completely new ADVANCED CHANNEL DESIGN program that combines the features of the CHANNEL DESIGN and ADVANCED CHANNEL DESIGN programs of previous releases. Though you can enter channel plan and channel template data using methods similar to the earlier programs, or read either existing PLN or CHN files, ADVANCED CHANNEL DESIGN 2012 stores all channel data only in a channel (*. CHN) file.

FIGURE 42. *ADVANCED CHANNEL DESIGN 2012 Interface*



	X	Y	Z	Id
1	335102.03	67573.63	5.00	0
2	335117.83	67541.08	5.00	1
3	334591.31	67626.03	2.00	2
4	334591.28	67606.85	2.00	3
5	334592.39	67587.70	2.00	4
6	334594.62	67568.65	2.00	5
7	334597.98	67549.77	2.00	6
8	334602.36	67531.51	2.00	7
9	334664.22	67358.00	2.00	8
10	334669.93	67352.71	2.00	9
11	334672.92	67346.97	2.00	10
12	334679.08	67329.70	2.00	11
13	334686.36	67313.65	2.00	12
14	334700.08	67294.71	2.00	13
15	334717.31	67279.69	2.00	14
16	334734.28	67270.21	2.00	15
17	334749.98	67264.78	2.00	16
18	334774.46	67261.57	2.00	17
19	334780.22	67261.68	2.00	18
20	334964.60	67269.64	2.00	19
21	334979.30	67272.26	2.00	20

With ADVANCED CHANNEL DESIGN 2012, you can generate the following files:

- **Channel files (*.CHN)** describe your channel template. The channel file contains (at minimum) lists of XYZ, ID points (nodes) and information about how they are connected to outline the channel faces. In other HYPACK® modules, channel files are used to:
  - **Display the extents of the channel in real time** in the SURVEY programs, in DREDGEPACK® and in 3DTV.
  - **Provide guidance while editing,** in the HYSWEEP® EDITOR.
  - **Provide context in TIN MODEL and HYPLOT displays**.
  - **Calculate TIN-to-CHN volumes** in the TIN MODEL program.
  - **Calculate volumes by zone** in CROSS SECTIONS AND VOLUMES.
  - **Export to DXF** for display as a chart.
  - **Export the Node coordinates** to an XYZ file.
- **3D Line Files:** ADVANCED CHANNEL DESIGN 2012 uses CHN files with either user-defined line parameters or 2-dimensional planned line files to generate 3-dimensional planned line files where each line contains template information based on where it intersects the channel file.
- **Zones:** The CHN may also describe user-defined areas called ‘zones’. Zones are used in the TIN MODEL program to generate TIN-to-Channel volumes for each zone defined in the channel file. ADVANCED CHANNEL DESIGN 2012 can also generate **border files** (*.BRD) and **zone edge listings** (*.ZEL) that record the perimeters of each zone.
  - **BRD file**s can limit volumes calculations to a bordered area in both TIN MODEL and CROSS SECTIONS AND VOLUMES.
  - **ZEL files** are required if you want to calculate volumes by zone in CROSS SECTIONS AND VOLUMES.

- **Exported data:** In addition, ADVANCED CHANNEL DESIGN 2012 also exports:
  - **Channel Nodes to an XYZ File**
  - **Screen Captures** of the map area, 2-dimensional sections and 3-dimensional displays.

CLOUD

Color Configuration

You can set CLOUD to color-code your soundings based on your choice of the following values:

- **Depth**
- **File**: (Assign a color for each file loaded, regardless of depth.)
- **Intensity**: This color set is applied to HS2 files only. Files of other formats will be colored by depth.
-

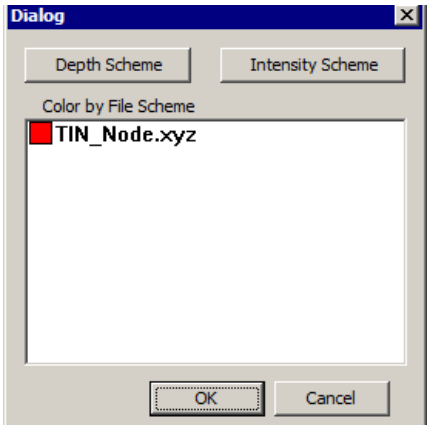


FIGURE 43. *Color By Depth (left), Color By File (center), Color By Intensity (right)*

Runs as a Viewer Without a Dongle

In HYPACK® 2012, whether you own a HYPACK® license or not, you can now run CLOUD without a dongle and use it to view project data.

Without a dongle, all of the CLOUD tools and features are available, *but you cannot save any data*.

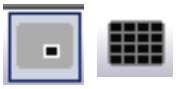
New Sub-grid Display Routine

The grid in CLOUD subdivides your project area into a user-defined set of cells so you can more quickly and easily manipulate a large data set.

Working on the grid, you can:

- **Quickly rotate or relocate subsets of the data i**n the window to optimize your viewing angle.

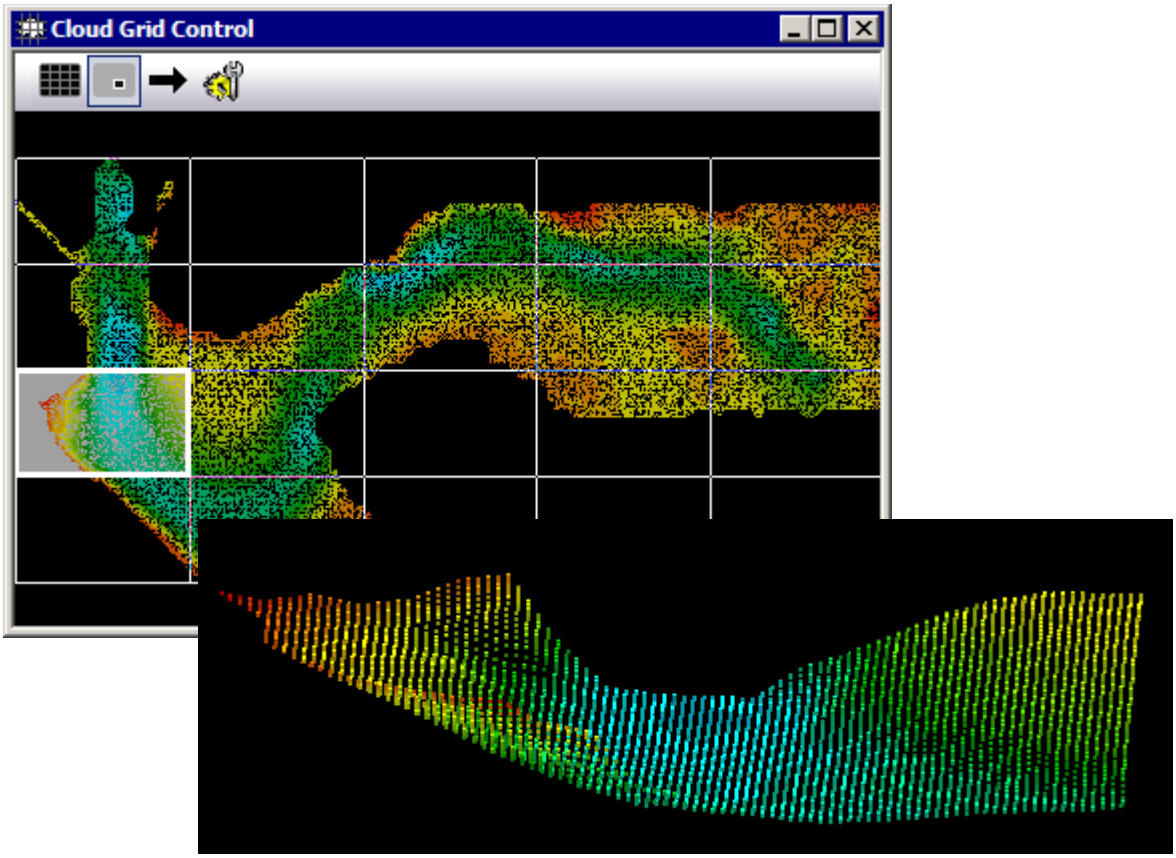
- **Perform any editing operation** available when viewing the full display.
- **Quickly switch between single cell and full grid viewing** with the multicell and single cell icons.



The Cloud Grid control tracks which cells you have viewed during the current CLOUD session by highlighting them with a semi-transparent, light gray.

The current cell drawn in the CLOUD window is outlined with a thicker grid line.

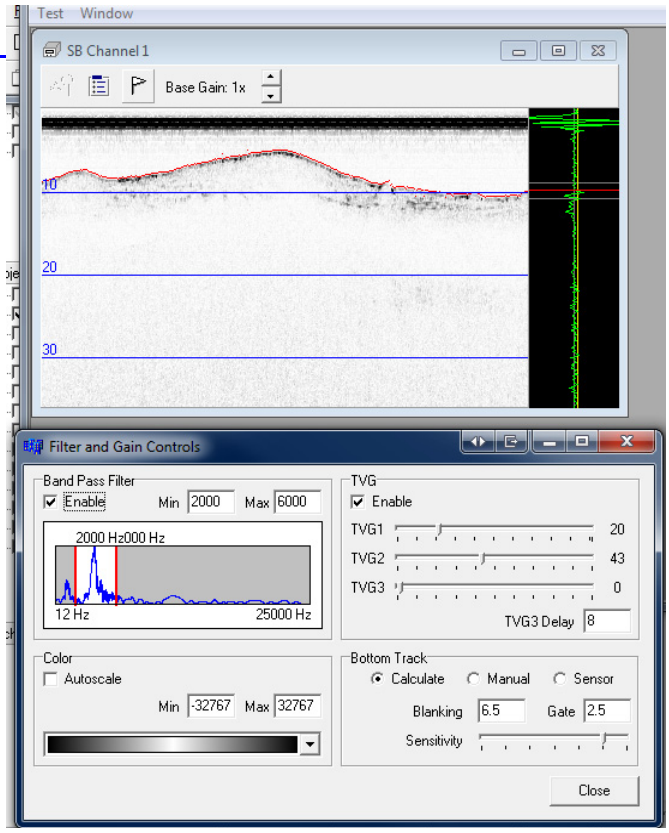
FIGURE 44. *CLOUD Grid Control and the Resulting Display in CLOUD*



SUB-BOTTOM PROCESSING

BOTTOM TRACKING

FIGURE 45. *Bottom Tracking in the Sub-bottom Profiler*



The new bottom tracking algorithm can be used for any profiler, analog or digital. By default, the driver will accept the depth as reported by the profiler (aka. 'Sensor' Mode). 'Manual', as expected, will set the depth to a level you specify. 'Calculate' will detect the bottom from the observed signal. You specify a blanking, gate, and sensitivity. Anything before the specified blanking time will be ignored and should be set to at least ignore the bang pulse. As data comes in, the gate follows along the detected depth and the algorithm looks within it for the observed signal to break the yellow threshold level.

On the voltage trace display, the sensitivity level is drawn as a yellow line, the gate high and low levels are gray, and the detected depth as red. At any point you can click on the voltage trace and the bottom track will jump to that point. This is helpful to 'seed' the algorithm when the driver first starts, or if it loses its lock on the bottom.

The bottom track depth is reported to HYPACK® SURVEY for display and logging and is also logged in the SEG/Y file.

BASE GAIN

In order to get the best imagery possible from analog profilers, it is imperative that the National Instruments A/D converter is configured with min/max voltage levels as close to the observed voltage peak from your profiler. Typically, this is either the peak of the bang pulse, the peak of the first bottom return, or somewhere in between. This optimal setting insures that you are getting the best resolution you can from the analog-to-digital conversion process.

In earlier versions, you were limited to digitizing +/-5V. A new 'Base Gain' setting allows you to dial in the voltage range from +/- 10 to +/- 0.25, which to the eye works as a base gain. Note that it is critical that the base gain is not set so high that it clips your data! (It's okay if you clip the bang pulse somewhat.)

TIME VARIED GAIN (TVG)

Three Time Varied Gain windows can be specified to improve the displayed imagery. In each, the amount of gain applied to the signal increases with time and is in dB units over 1 second. For example, in Figure 45, TVG1 is set to 20; this means that the TVG curve is configured so the sample 500 milliseconds down the signal trace will be amplified 10dBs, 1 second down by 20dBs, and so on.

TVG1 begins at the start of the signal. Don't overdo this one as it will amplify the bang pulse and water column noise in addition to everything else. Sliding TVG1 all the way to the left will set it to 'B' (for blanking). This mode will hide water column data on the display.

The **TVG2** window begins at the bottom detect. It is the most useful since you can increase the gain of the imagery of the sediments without affecting the water column noise. Of course, for TVG2 to work correctly it is important that the bottom tracking be accurate.

Finally, for deep surveys you can set a **third TVG** curve to begin at a specified time in milliseconds.

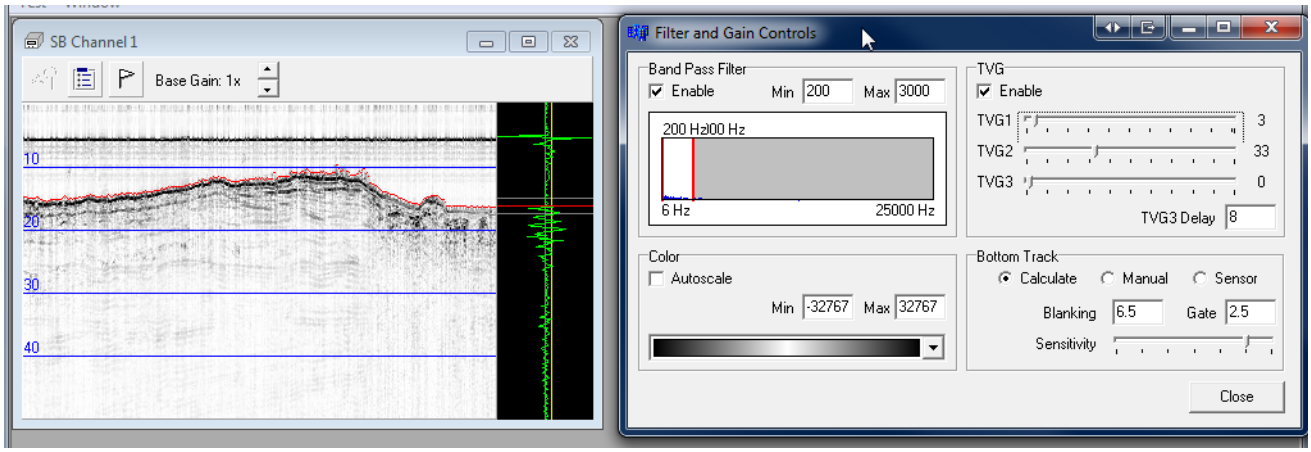
SUPPORT FOR TWO ANALOG PROFILERS

Lastly, the subbot.dll driver has been updated to allow 2 channels of sub-bottom data to be acquired simultaneously, such as a pinger and a boomer. Currently, this mode will only passively listen for two trigger signals, it will not create them. Each channel has an independent display and logs to independent SEGY files.

To enable the second analog channel, just add a second instance of subbot.dll to your HYPACK HARDWARE configuration and check the 'Channel 2' box on the setup form.

Figure 45 shows some pinger data. Here is a look at some boomer data logged with this 2-channel method:

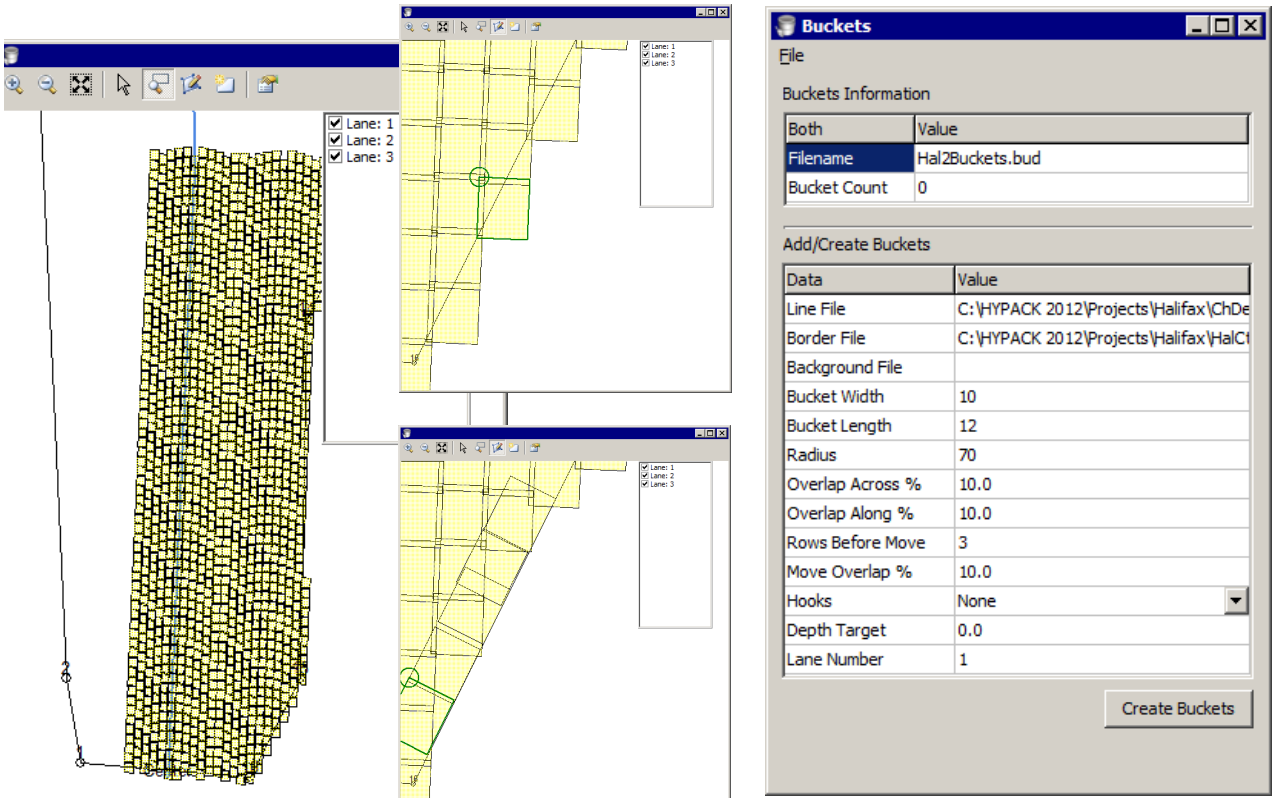
FIGURE 46. *2-Channel Data*



New Module! BUCKETS PROGRAM

The new BUCKETS dredging utility generates a DG2 chart showing a predefined pattern of bucket positions where the dredge operator will dig. From information about your project area and your digging specifications, the program generates a preliminary bucket pattern which you can then manually modify according to your needs and export to a DG2 chart. The DG2 chart, loaded in DREDGEPACK®, then serves as the dredge operator's digging guide.

FIGURE 47. *Generating a Bucket Pattern—Preliminary Buckets (left), Editing Buckets Before (top right) and After (bottom right)*



DRIVERS

COVERAGE.DLL

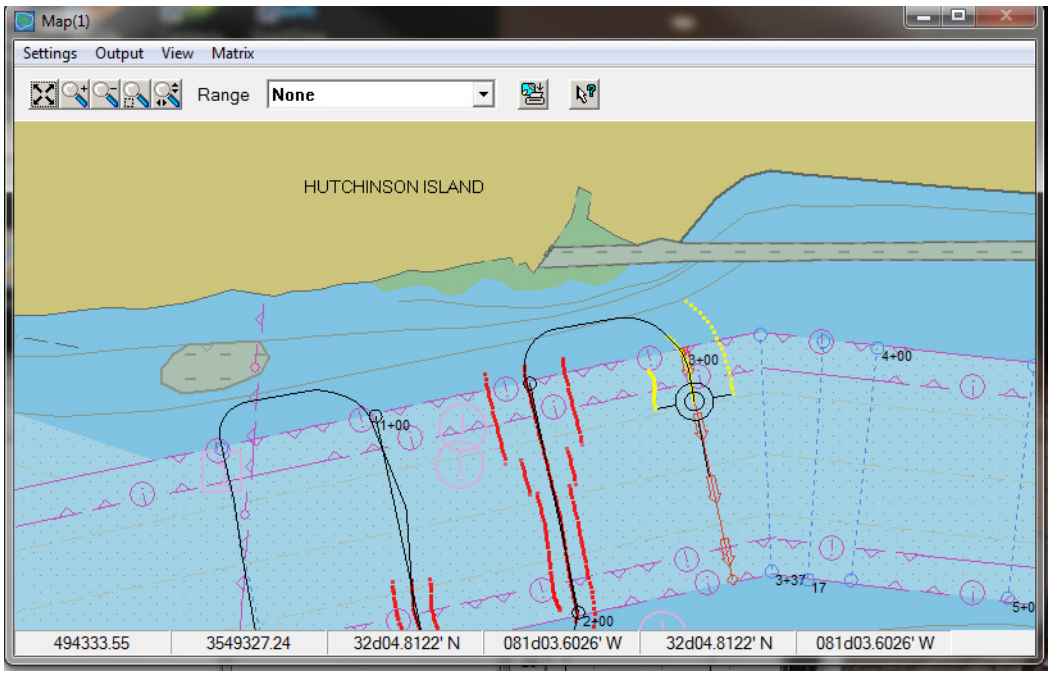
The Coverage driver displays a colored swath in the Map window of SURVEY to represent multibeam or side scan coverage. It is meant to provide real time verification of complete coverage. These swaths can also be converted to DIG chart files for further display and archival purposes.

New in HYPACK® 2012:

- **Additional option to determine the swath width.** The HYSWEEP/HYSCAN option to get the swath value generated by the multibeam system and stored in Shared Memory.

- **Display edges only** option in the driver's device window in SURVEY displays a row of dots at the outer limits of the swath determined by the limits set in HYSWEEP® SURVEY or SIDE SCAN SURVEY.

FIGURE 48. *Displaying Edges Only*



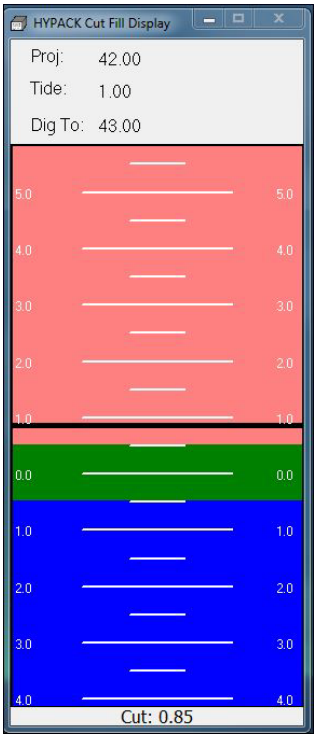
CUTFILL.DLL

The CUTFILL driver is assigned to the digging tool mobile (in this case the bucket mobile) to provide an instant display of how much more you need to dredge or cap.

New in HYPACK® 2012:

The driver was modified to display the current tide and a graphic to guide the digging and filling.

The exact amount of material that must either be cut or filled in to make this location match the grade is shown at the bottom of the display.



NTRIP.DLL

The NTRIP (Network Transport of RTCM via Internet Protocol) functionality, to receive differential or RTK corrections over a network connection and pass it to the GPS.

New in HYPACK® 2012:

- Previously available in the GPS driver, the **NTRIP function has been moved to its own driver** dedicated to that purpose. The NTRIP driver can pass such data to the GPS.dll, F180.dll or POSMV.dll.
- The **Advertise as NTRIP Ver. 2 Client** option inform the server that it is a version 2 compatible client and will accept replies according to this newer version of the NTRIP standard.
- The **Accept Improperly Formatted Replies** option helps handle servers that don't exactly follow the standard.

SISENDER.DLL

- Filters for Bad Data.
- Output to the DQM computer is now in XML format.