



HYPACK
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Sounding Better!

HYPACK® 2020 Q2 Updates

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PREPARATION

HYPACK® Shell: Grid settings have been moved from the Control Panel to the Widgets in each Map window.

GEODETIC PARAMETERS:

- Corrected RTK calculations using a geoid model with a KTD file. They were not applying KTD.
- Added Geoid Model for Poland.---Source of measurements on which it's based pending.

PLANNED LINE TEMPLATE VALIDATION FOR VOLUME CALCULATIONS

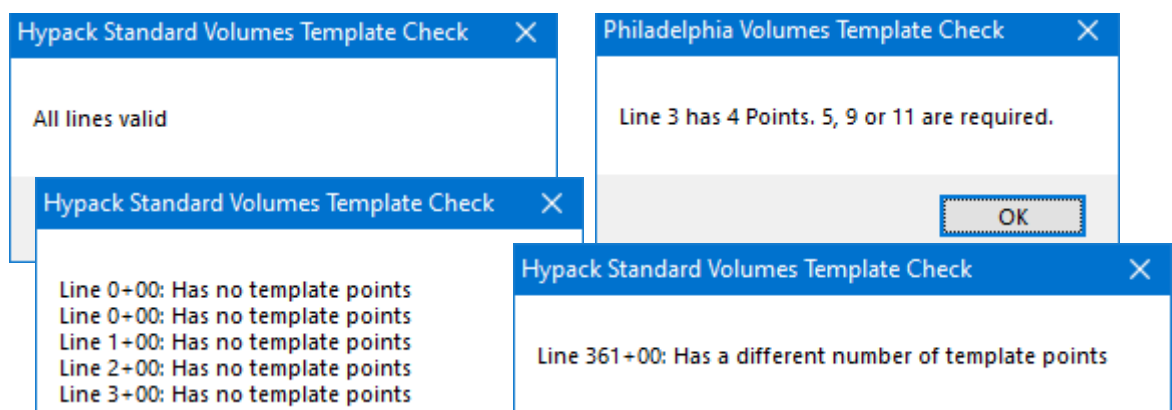
The LINE EDITOR can check the template information in a 3D planned line file to verify it is appropriate for Standard HYPACK® or Philadelphia volumes calculations in the CROSS SECTIONS AND VOLUMES and TIN MODEL programs.

It looks for the following characteristics:

- Each line has template information.
- A consistent number of points define the template in each line in the file.
- Philadelphia methods require 7, 9 or 11 template points.

Select TEMPLATES-VOLUME CHECKS and the volume calculation method. When the check is complete, a message appears with the results:

FIGURE 1. Messages for Checking the Planned Line Templates



PROJECT COLORS SIMPLIFIED

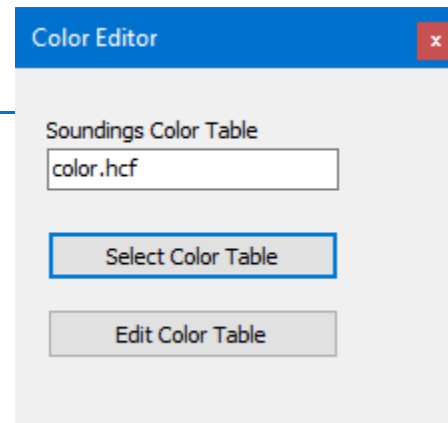
The *HYPACK Color Table* has not changed! It is the mechanism HYPACK® uses to assign a color to a value for display purposes. A value is typically regarded as a depth, but might also be a magnetometer reading or other sensor value. The table itself consists of a series of (value, color) entries, called bands, in ascending order from least to greatest value. A band represents a color transition point. All values greater than or equal to a band up to the next band will thus be assigned the same color. The first table entry provides a default color for all values less than the minimum defined band, while the last entry provides the color for all values greater than the highest defined band. In this way we ensure a color is output for any given input value. Each of these color table configurations is stored in its own HYPACK® Color Files (*.HCF).

What has changed?

- **The Color Editor Tab is more of a color file manager.** Here's what it does:

FIGURE 2. *Color Editor Tab*

- > **Displays the name of the current default color table** in the project.

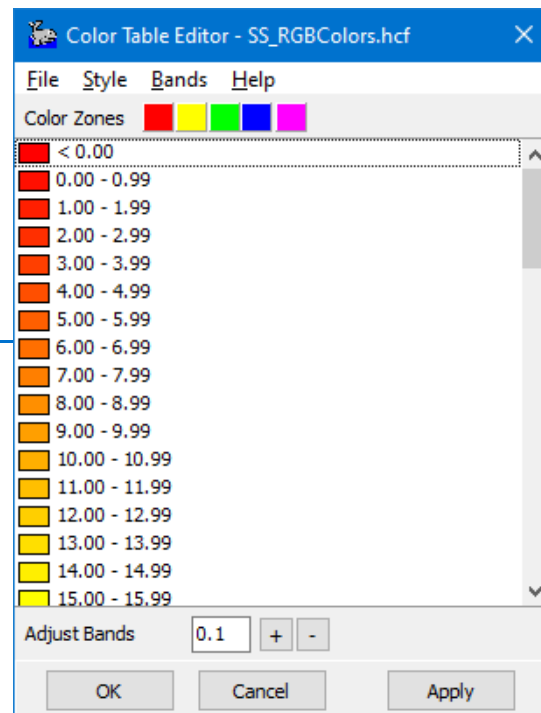


- > **Opens the familiar Color Table Editor** where you define or modify the ranges and colors in a HCF file.

Tip: *New in this release:* HYPACK® Color Files may be stored in the project folder or in C:\HYPACK Store. The HYPACK Store location enables you to share one or more color files *across all of your projects*.

FIGURE 3. *Color Table Editor*

Define as many color files as you want and name them whatever makes sense to you. (It is probably helpful to name them in a way that you know when to use it appropriately in your future work!)

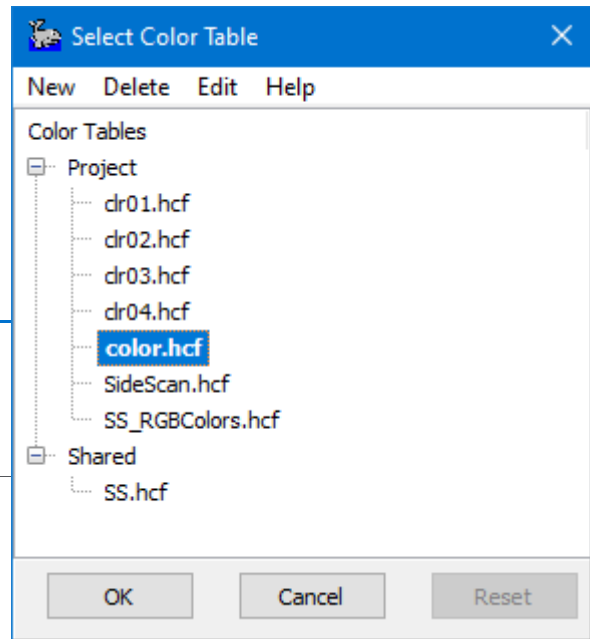


- > **Enables you choose a different HCF file to define the default project colors:** Click [Select Color Table] to open the Select Color Table dialog, which lists all of the HCF files in your project folder *and in C:\HYPACK Store*. Select your color file and click [OK].

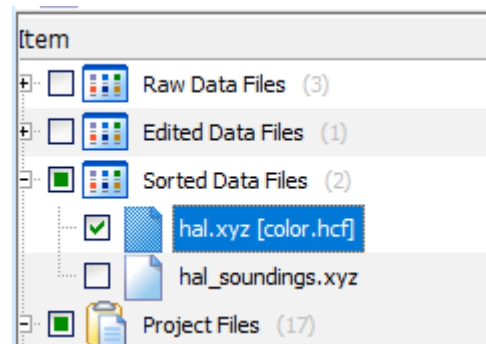
FIGURE 4. *Select Color Table Dialog*

Tip: When you select a color file, you can preview its effect in the Map display before you give it the [OK]!

NOTE: Select and Edit Color Table options are also available when you right-click the color bar.



- **Palettes have been eliminated** in favor of a selection of HYPACK® Color Files (*.HCF).
- **Assign HCF colors to one or more individual XYZ or Matrix files:** Select then right-click on the file or files in the Project Items list and select Set Color Table. Select your color file and click [OK]. The color file name appears next to each file using a color file other than the default.
To remove the individualized HCF assignment, return to the Set Color Table dialog and click [Reset].
- **Auto-Scale Colors to the range of a data file.** Right-click XYZ or MTX files and select Auto-scale Colors. The current number and colors of bands in your HCF are evenly distributed across the range of data in the selected file.



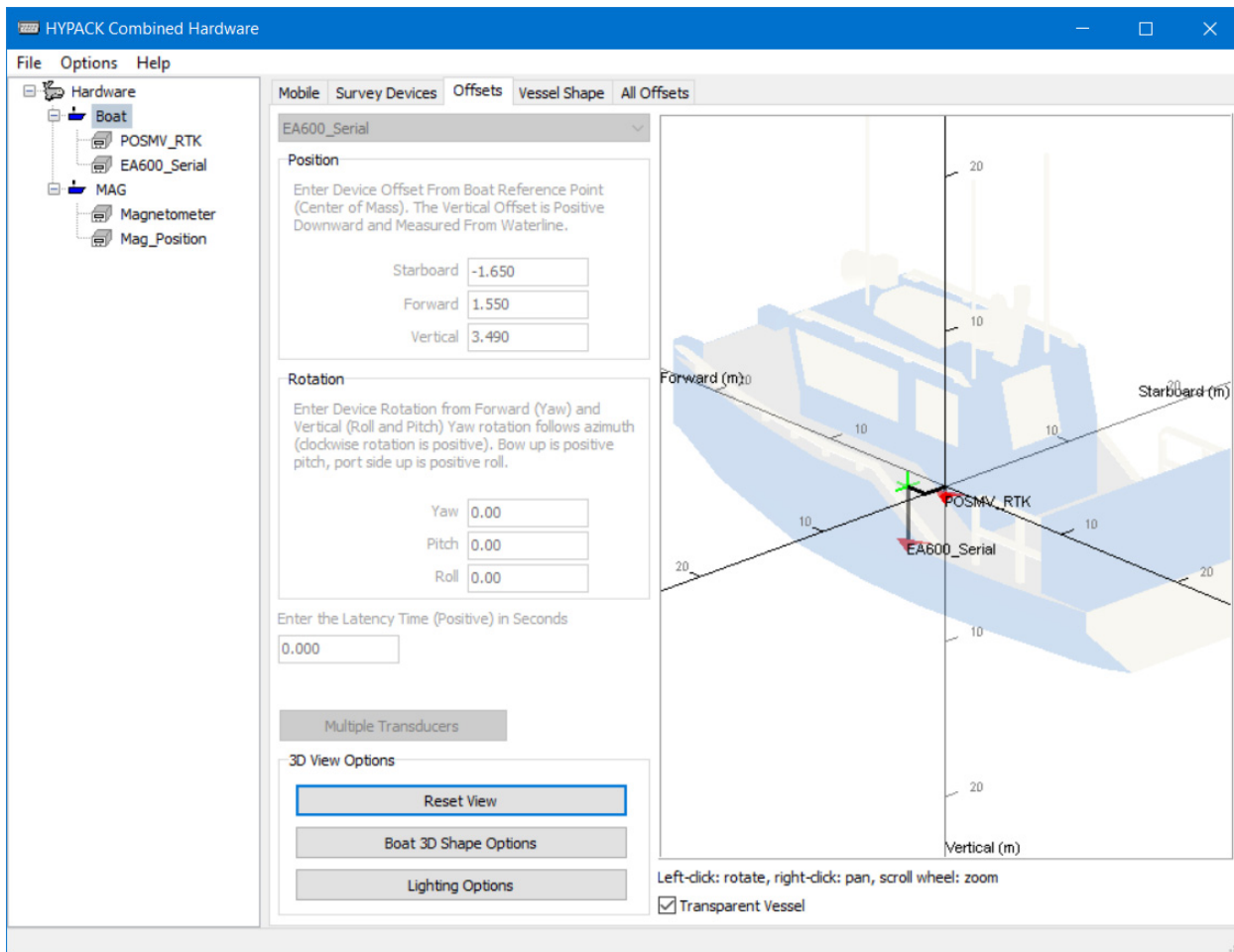
3D HARDWARE

3D VISUALIZATION AND AN ALL OFFSETS SPREADSHEET

3D visualization in the Offsets tab, and the spreadsheet in the new All Offsets tab, make it easier to see and configure the device positions relative to the vessel center and each other.

The Offsets tab shows one mobile at a time with all of its devices displayed according to their offset positions. A small green symbol indicates the defined tracking point. You can use your cursor to shift and rotate the display to view it from any angle. In the 3D Options dialog, you can configure a 3OD shape file of each mobile and device to represent your configuration as closely as possible.

FIGURE 5. 3D Visualization



ALL OFFSETS SPREADSHEET

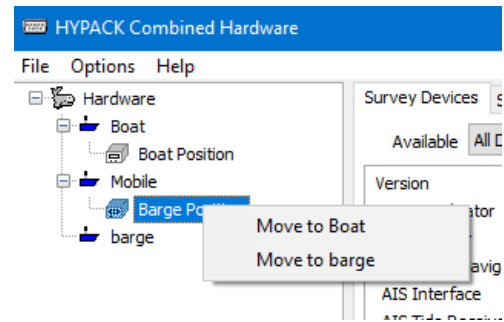
The All Offsets tab shows a spreadsheet of all devices in the configuration and their offsets. You can edit your offsets in either the Offsets or All Offsets tab, as necessary.

FIGURE 6. Sample All Offsets Spreadsheet

HYPACK Combined Hardware										
File Options Help										
Hardware Boat POSMV_RTK EA600_Serial MAG Magnetometer Mag_Position	Mobile	Survey Devices	Offsets	Vessel Shape	All Offsets					
	Device	Type	Starboard	Forward	Vertical	Yaw	Pitch	Roll	Latency	
	Survey Devices									
	POSMV_RTK		0.000	0.000	0.400	0.000	0.000	0.000	0.000	
	EA600_Serial		-1.650	1.550	3.490	0.000	0.000	0.000	0.000	
	Magnetometer		0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	Mag_Position		0.000	0.000	0.000	0.000	0.000	0.000	0.000	

REASSIGNING DEVICES TO ANOTHER MOBILE

Previously, if you wanted to assign a device to a different mobile, you had to remove it from the configuration then reinstall it on the correct mobile. Now, just right-click the device in the tree view and choose the appropriate option.



ACQUISITION

DRIVER UPDATES

- **GPS.dll:**
 - > Changed Driver Setup. The same options are available, but in a single panel dialog.

FIGURE 7. New GPS Driver Setup Dialog

A screenshot of the 'Setup' dialog box for the GPS driver. The dialog is organized into several sections:

- Synchronization:** Includes a checkbox for 'Use PPS box'.
- GPS Status Codes:** A table with columns for status codes and 'Show alarm' checkboxes.

Status	Code	Show alarm
Invalid	0	☐
Stand-Alone	1	☐
Differential	2	☐
Float RTK	5	☐
RTK	3	☐
Fixed RTK	4	☐
- User Modified NMEA Messages:** A dropdown menu currently set to 'None'.
- Advanced:** A button at the bottom left.
- Tide:** Includes a 'Minimum Status for RTK Tide' dropdown (set to 'Fixed RTK'), a 'Filter RTK tide' checkbox, and a 'Time constant' input field.
- Alarms:** A section with four rows of settings, each with a value input and a 'Show alarm' checkbox:

Setting	Value	Show alarm
Maximum HDOP value	0.0	☐
Min number of satellites	0	☐
Max synchronization error (ms)	500.0	☐
Max baseline error	0.0	☐
Max correction age interval (s)	0.0	☐
- Used sentences:** Three columns of checkboxes for different NMEA sentences:

Position	Heading	Misc
☒ GGA	☒ HDT	☒ GSA
☐ GLL	☒ VTG	☒ GST
☐ GNS		☒ GSV
☐ PTNL, GGK		☒ PTNL, QA

- > Changed Device Window. The display groups related items. Using the arrow buttons on the headings, expand and hide groups, to show only the information you need.

FIGURE 8. Sample GPS Device Window

- > RTK in the device window and Data Display corrected. Values had been labeled in reverse.
- > Depth shows as N/A when the Depth function is unselected.
- > Code updated.
- **POS MV:**
 - > Updated to support new correction services from FUGRO. (Codes 17-19 in Group 3)
 - > Updated Survey window
 - > Corrected misplaced RTK (N and K) labels.
- **SBG.dll:** Device window displays 'd' for degrees.
- **Subbot.dll:** Falmouth device depths logged to SEG Y.
- **Towfish.dll:** Displays Cyrillic fonts correctly.
- **Tritech.dll:**
 - > Updated to match manufacturer specifications and ping rate is displayed in the Device window.
 - > Added ping rate status bar.

SUPPORT FOR MULTIBEAM DEVICES WITH PAN/TILT

HYSWEEP® SURVEY processes the pan and tilt data in real time for Cloud and matrix displays.

- Generic Attitude driver supports pan/tilt devices.
- NORBIT and Reson drivers now support 'pass through' pan/tilt data (datagram 1017) to HYSWEEP® SURVEY.

It also logs the angles to the raw HSX files for post-processing in the 64-bit HYSWEEP® EDITOR where all the data (including pan and tilt) is merged, processed and exported to final XYZ data.

GPS NMEA-0183	
General	
Mode	Differential
Lat	41°29.6511 N
Lon	072°41.3001 W
Easting	-309151.23
Northing	4639175.92
Tide Corr	-0.00 m
Speed	N/A
Depth	62.15 m
Heading	0.0°
Time source	computer
Sync Error	N/A
RTK	
Ell Height	62.15 m
Elevation	0.00 m
A= WGS84 height	62.15 m
H= Z offset	0.00 m
D= Draft	0.00 m
N= Geoid Ht above CD	N/A
K= Undulation	N/A
K-N= Ellipsoid Ht above CD	N/A
WGS84	
WGS84 Latitude	41°29.6511 N
WGS84 Longitude	072°41.3001 W
WGS84 Height	62.15 m
Uncertainty	
Sigma N	0.00
Sigma E	0.00
Sigma Z	0.00
Number of Satellites	9
HDOP	1.3
Corr age	4
Misc	
Baseline	N/A
Baseline err	N/A

NOTE: This feature is ready for field testing.

PROCESSING

64-BIT SINGLE BEAM EDITOR (SBMAX64)

- Read Parameters accommodates 2 devices with the same name. (the 32-bit SINGLE BEAM EDITOR is updated in the same manner.)
- Echogram corrections:
 - > Zoom extents zooms to template extents.
 - > Correct Tide corrections.
- For dual beam datasets, SBMAX correctly calculates and displays both spike filters when applied to both beams.

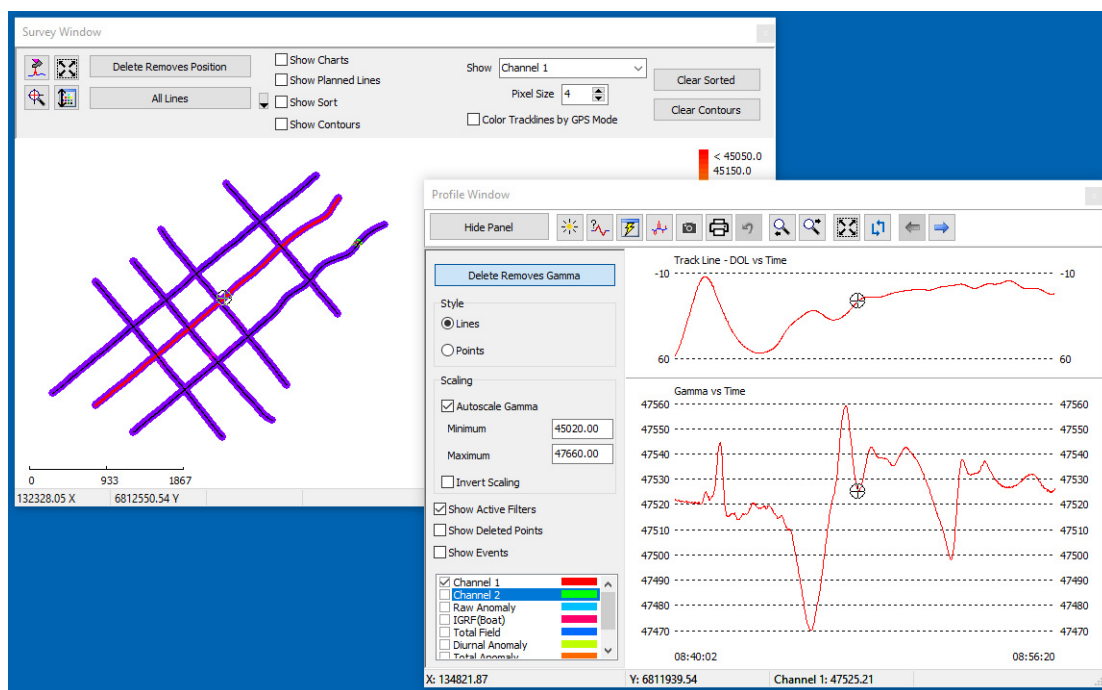
MAGNETOMETER EDITOR

BASIC VS ADVANCED DISPLAY MODES

The program offers two window display modes that you select through the VIEW-WINDOW MODES menu item.

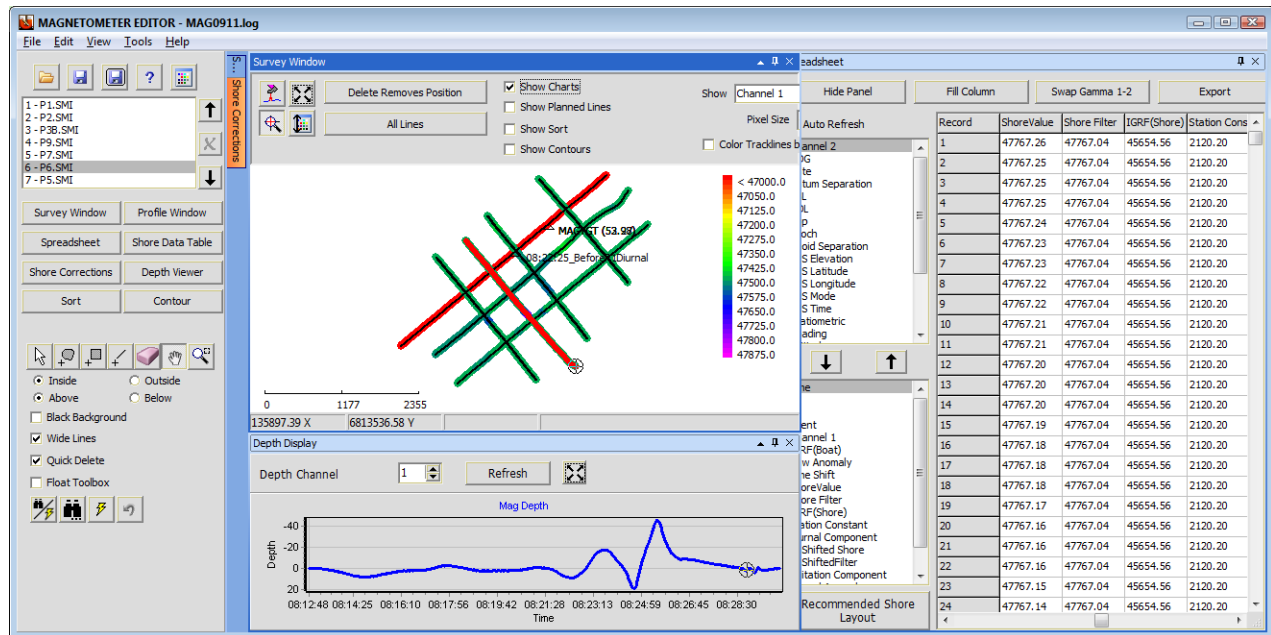
- In **Basic Mode**, the Survey window is built into the shell. All other displays are free floating and you can resize and position them individually.

FIGURE 9. Basic Mode



- In **Advanced Mode**, you can, not only adjust the widths of the windows, but you can resize and reposition them into any layout you want or, in one easy click, pin them to the side of the shell window. When you drag the toolbar of any window to reposition the window, the interface displays "landing pads" where you can dock your window.

FIGURE 10. Advanced Mode



The MAGNETOMETER EDITOR interface includes all of the options to configure your displays. The panel in the program shell provides settings that are not specific to any one window. Each window also includes a panel with the options pertinent only to its display.

Tip: When you have configured the Profile and Spreadsheet displays, click [Hide Panel] to increase screen space for your data displays.

PROCESSING ENVIRONMENTAL DATA

The tools in the MAGNETOMETER EDITOR can be used to process environmental data recorded to the raw data in SMI (Special Marine Instrument) records.

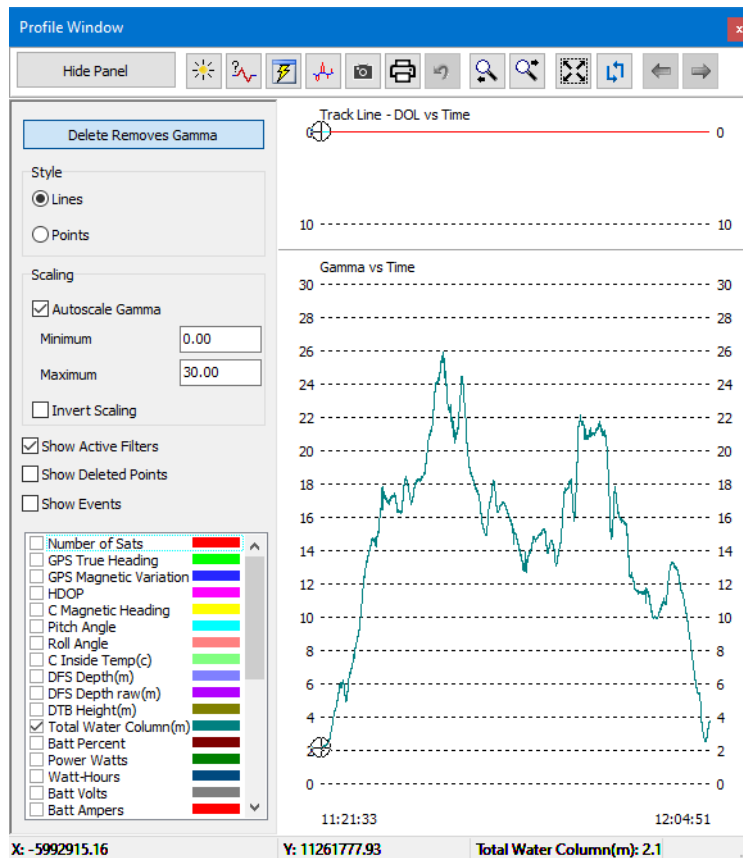
When the MAGNETOMETER EDITOR recognizes SMI records, it makes them available for viewing and manual editing in the Profile and Spreadsheet windows. You can configure each window to display up to 32 such values in a single editing session. The Profile window graphs each value using a different color.

At any time you can save your work:

- **Save your editing session:** Select FILE-SAVE SESSION. MAGNETOMETER EDITOR saves each line to a binary file with an SMI extension. This format retains all data and can be reloaded for further editing.

Tip: It is best practice to *always save your session*. You can then reload the session files to restore your data in its current state without re-editing.

- **Save a user-defined set of values** to the HYPACK® All or XYZ format.



Spreadsheet

Hide Panel Fill Column Swap Gamma 1-2 Export Shore Value Highlights

☒ Auto Refresh

Agitation Component

Batt Amper

Batt Percent

Batt State

Batt Volts

COG

Current Step

Date

Datum Separation

DBL

Depth Goal(m)

Dist to next (m)

Distance to Track(m)

Diurnal Anomaly

Time

Number of Sats

GPS True Heading

GPS Magnetic Variation

HDOP

C Magnetic Heading

Pitch Angle

Roll Angle

C Inside Temp(c)

DFS Depth(m)

DFS Depth raw(m)

DTB Height(m)

Total Water Column(m)

Recommended Shore Layout

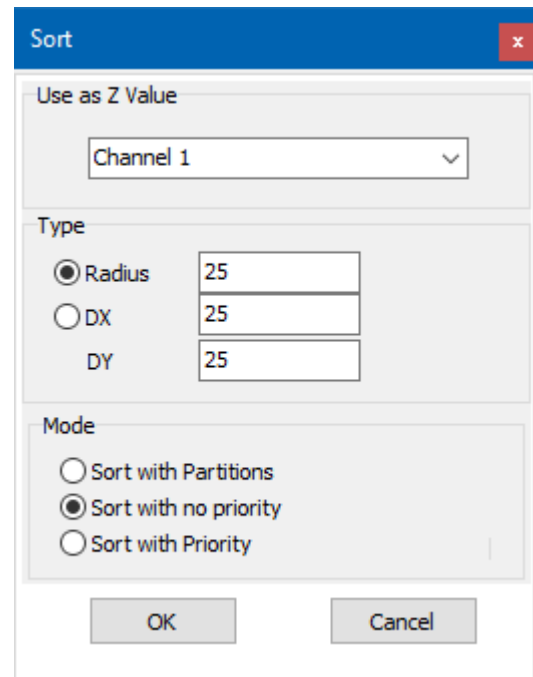
Record	Time	Number of Sat	GPS True Heading	GPS Magnetic	HDOP	C Magnetic	Pitch Angle	Roll Angle
1	11:21:33.63	10.00	325.50	7.98	0.95	299.90	2.30	-6.0
2	11:21:34.15	10.00	325.50	7.98	0.95	298.90	2.50	-5.0
3	11:21:34.68	10.00	325.50	7.98	0.95	298.30	2.50	-5.0
4	11:21:35.19	10.00	325.50	7.98	0.95	298.40	2.50	-6.0
5	11:21:35.71	10.00	325.50	7.98	0.95	298.70	2.50	-6.0
6	11:21:36.24	10.00	325.50	7.98	0.95	297.80	3.30	-4.0
7	11:21:36.79	10.00	325.50	7.98	0.95	294.40	3.50	1.0
8	11:21:37.30	10.00	325.50	7.98	0.95	293.70	2.90	3.0
9	11:21:37.82	10.00	310.60	7.98	0.95	296.20	2.00	1.0
10	11:21:38.33	10.00	310.60	7.98	0.95	297.50	1.40	-0.0
11	11:21:38.86	10.00	305.20	7.98	0.95	298.00	1.10	-0.0
12	11:21:39.38	10.00	305.20	7.98	0.95	299.30	1.70	0.0
13	11:21:39.91	10.00	304.90	7.98	0.95	300.10	2.10	-0.0
14	11:21:40.42	10.00	304.90	7.98	0.95	300.10	2.60	-0.0
15	11:21:40.94	10.00	305.60	7.98	0.95	300.80	2.90	0.0
16	11:21:41.45	10.00	307.10	7.98	0.95	303.20	3.50	-1.0
17	11:21:41.98	10.00	307.10	7.98	0.95	306.40	4.50	-3.0
18	11:21:42.50	10.00	310.60	7.98	0.95	307.10	5.10	-1.0
19	11:21:43.01	10.00	310.60	7.98	0.95	305.20	5.60	2.0
20	11:21:43.54	10.00	314.80	7.98	0.95	305.90	5.50	4.0
21	11:21:44.07	10.00	314.80	7.98	0.95	310.70	5.70	2.0

SORT

The MAGNETOMETER EDITOR you can sort your data based on a user-defined value in a routine that mirrors the SORT program for single beam data:

The Sort routine thins data while it guarantees the minimum data value at their proper locations. It looks for the minimum data value, saves it and eliminates any data point that is within the user-specified distance. It then repeats the process until all points in the file have been saved or eliminated.

Your sort results are automatically saved to an XYZ format file in the project Sort folder. The file is automatically named `MagEdit_Z-Value_hhmmss.XYZ`.



CONTOURS

The contouring routine generates DXF charts of magnetometer targets or data from environmental studies. The output files can be used as a HYPACK® chart or exported to third-party CAD programs. All DXF output information is written in real world coordinates.

Normalized magnetometer data can be effectively displayed as 2-dimensional contours. Contoured raw anomaly data clearly shows your monopolar and dipolar target areas.

The MAGNETOMETER EDITOR can also process environmental data from devices that measure and record any number of different values.

FIGURE 11. MAGNETOMETER EDITOR Contour Parameters—Magnetometer Raw Anomaly (left), Total Water Column Environmental Data (right)

The figure displays two side-by-side screenshots of the 'MAGNETOMETER EDITOR Contour Parameters' dialog box. Both windows have a blue title bar with the text 'Send To' and a red close button. The left window is titled 'Magnetometer Raw Anomaly' and the right window is titled 'Total Water Column Environmental Data'.

Left Window (Magnetometer Raw Anomaly):

- Export:** 2D Contour (dropdown)
- Contour parameters:**
 - Filtering:**
 - Minimum Leg: 25 (text input)
 - Minimum Area: 0 (text input)
 - Enable Smoothing: ☒
 - Export:**
 - ☒ Contours
 - ☐ Solid Area
- Step:** Color Scheme (dropdown)
- Contour Attributes:** (button)
- Use as Z Value:** Raw Anomaly(CH1-IGRF) (dropdown)
- Grid Spacing:** 20m (slider)
- Buttons:** Autoscale Colors, Edit Colors, Test, Save, Save as, Clear, Cancel

Right Window (Total Water Column Environmental Data):

- Export:** 2D Contour (dropdown)
- Contour parameters:**
 - Filtering:**
 - Minimum Leg: 5 (text input)
 - Minimum Area: 0 (text input)
 - Enable Smoothing: ☒
 - Export:**
 - ☒ Contours
 - ☒ Solid Area
- Step:** 1.0 (text input)
- Contour Attributes:** (button)
- Use as Z Value:** Total Water Column(m) (dropdown)
- Grid Spacing:** 20m (slider)
- Buttons:** Autoscale Colors, Edit Colors, Test, Save, Save as, Clear, Cancel

FIGURE 12. 2-dimensional Contours of your Magnetometer Raw Anomaly in HYPACK®

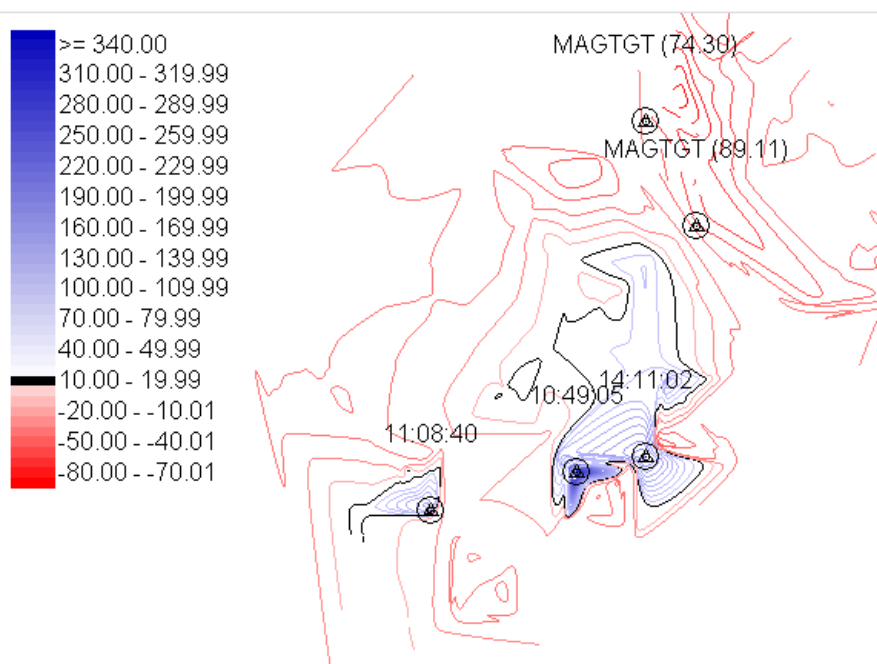
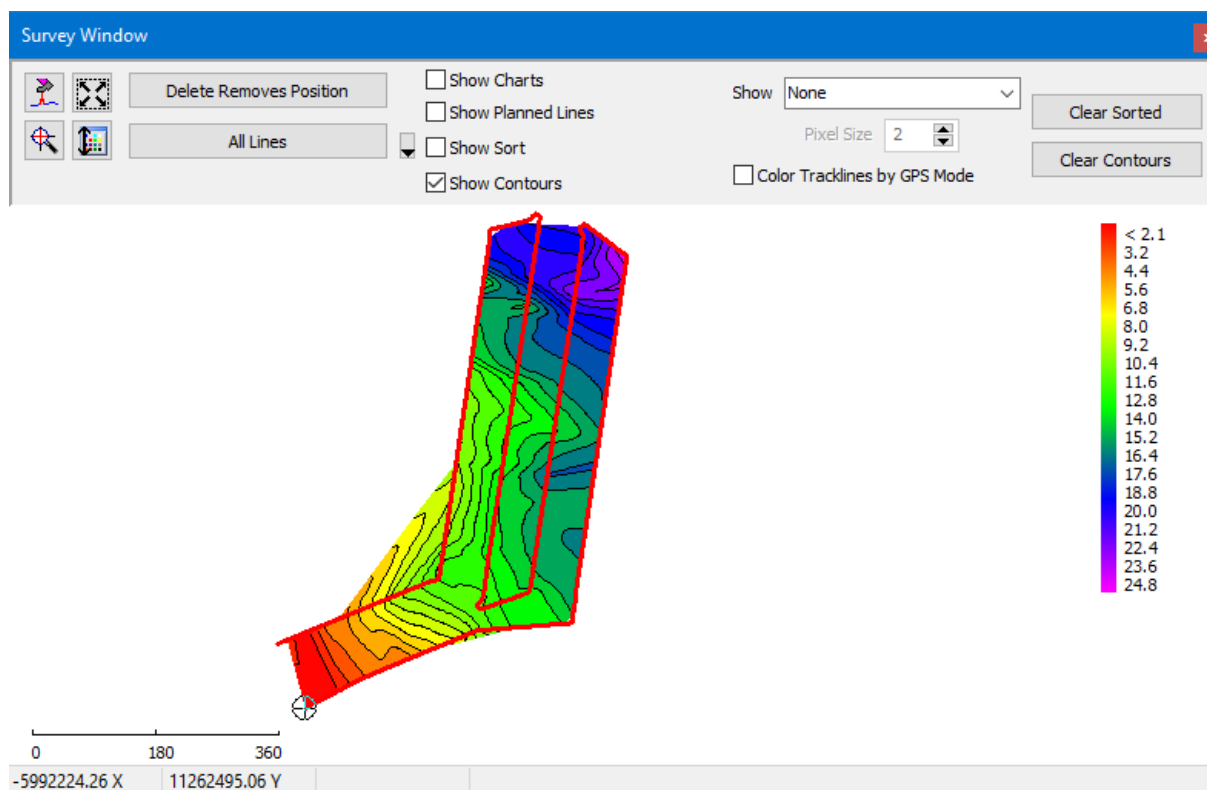


FIGURE 13. Water Column Data from I3XO Environmental Data in the MAGNETOMETER EDITOR



MBMAX64 (64-BIT HYSWEEP® EDITOR)

- **Reads Reson S7K files directly.** This provides better elevation data without using the DATA CONVERTER.
- **The Reson 7042 accounts for no data due to blanking** using a sample delay.
- **SHOM QC report:** The SHOM QC report is a custom-formatted text file reporting beam angle, count, mean and standard deviation where the mean value is the average difference between the reference and check line of all soundings within the 1 degree angle bins.

FIGURE 14. Sample Segment of the SHOM Report

	A	B	C	D	E	F	G
1	Beam Angle	Count			Mean	Std Dev	
80	15 - 16	122			0.043	0.132	
81	16 - 17	135			0.036	0.126	
82	17 - 18	118			0.018	0.11	
83	18 - 19	121			0.014	0.145	
84	19 - 20	134			0.006	0.116	
85	20 - 21	124			0.012	0.132	
86	21 - 22	127			0.021	0.139	
87	22 - 23	128			0.023	0.146	

- **Upgraded to process the Pan/Tilt angles** now logged in the raw HSX files. (See [Support for Multibeam Devices with Pan/Tilt](#).)
- **Feature Detection (Beta):** Making the assumption that cell maximum is the bottom point, the routine compares cell vertical range to your Height Above Bottom. If the range is greater, we consider a potential feature. You can examine each feature, mark those you deem worthy, and export their positions in a spreadsheet report that satisfies the current USACE/NOAA requirements. (See [MBMAX64: Feature Detection](#).)

CURSOR DIFFERENTIATION

- The cursor of the Line Select tool includes an A or B label to remind you that you are deleting points above (A) or below (B) the line you draw.
- The Manual Patch Test cursor includes a wrench with an AB label



INTERMITTENT SAVE REMINDERS

When you are editing over an extended time, it is wise to save your work intermittently to preserve your work in the case of system failure; however, it is easy to lose track of time and forget to do so. You may set regular reminders to appear in the 64-bit HYSWEEP® EDITOR to save your work during Stage 2 editing.

Beginning with your first edit, when the user-defined time interval has elapsed after the first edit the background of the data displays turn yellow with a large “Save Reminder” message. The displays return to normal after you save your work.

To configure the reminder, click [Save Reminder] in the Save Options dialog:

- **To enable the reminder**, select the Enable option and enter a time interval. Optionally, add the Beep option to provide an audio alarm each minute after the initial reminder until you save the data.
- **To disable the reminder**, deselect the Enable option.

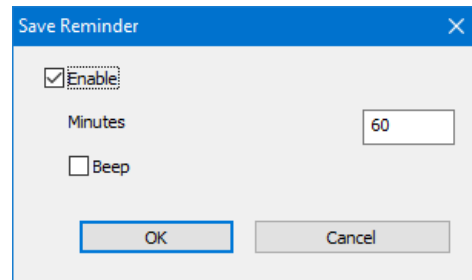
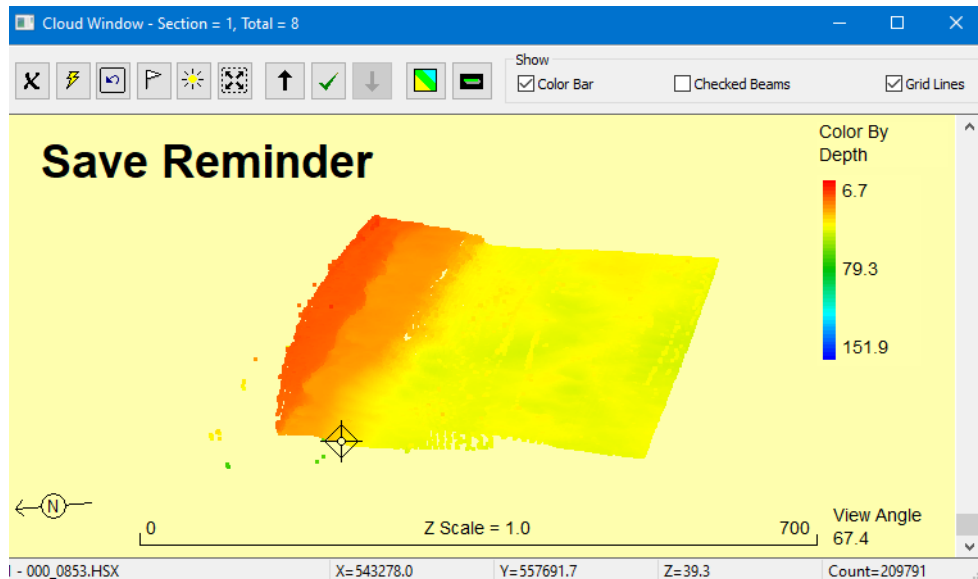


FIGURE 15. Sample Save Reminder



BORDER FILTER

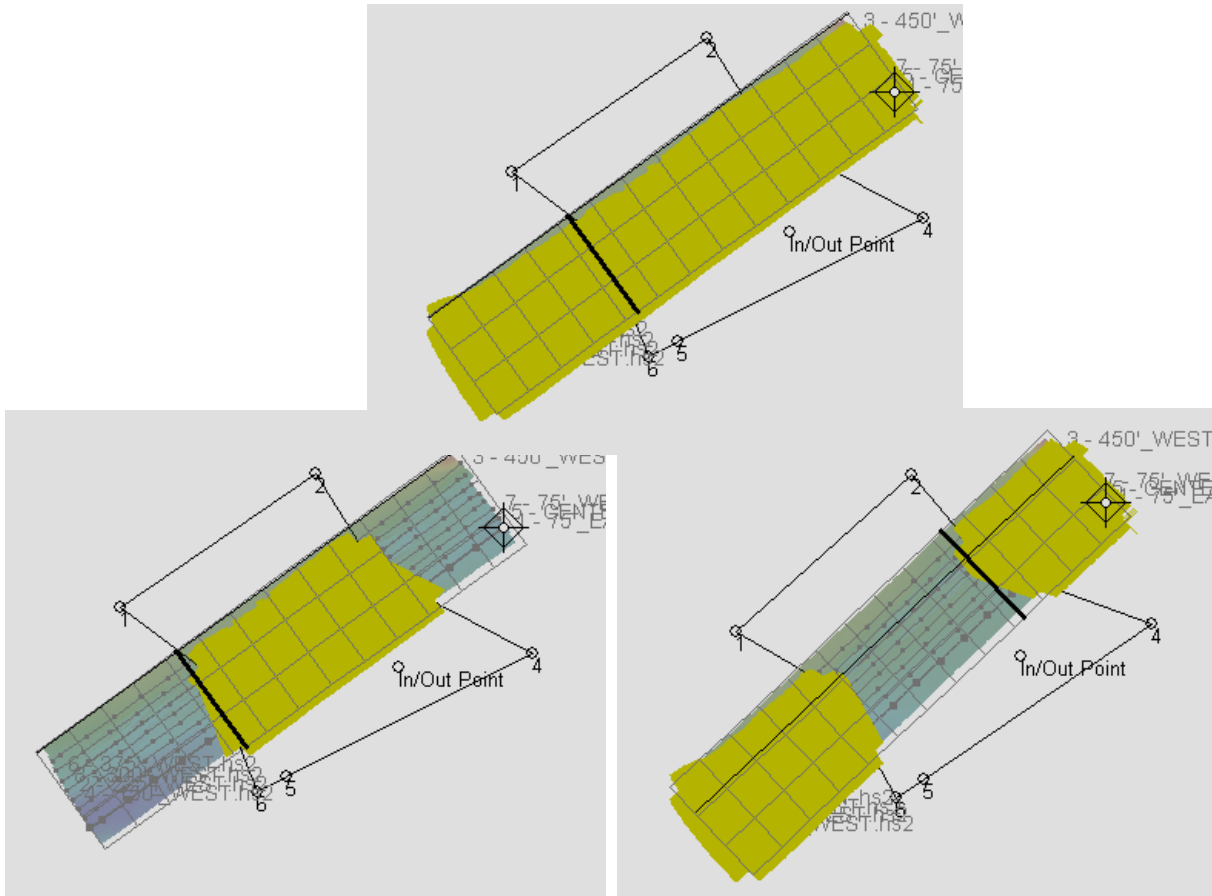
A Border File can limit the area where search and filter operations occur.

1. In the **BORDER EDITOR**, make a border file that defines the area where you want to work.
Tip: To view the border file in the Survey window, enable the border in the HYPACK® Map window, then open the 64-bit HYSWEEP® EDITOR and select the **Charts** option in the toolbar.
2. In the **64-bit HYSWEEP® EDITOR**, set the **Border filter parameters** in the Search and Filters dialog. Load the border file that defines the area where you want to work and select the Search/Filter option to determine whether the editor will work on data inside or outside of the border.

NOTE: The 64-bit HYSWEEP® EDITOR ignores the In/Out point of the border file.

3. **Enable or disable your border filters** using the Border checkbox.
4. **Apply any changes to your Border filtering options.** Click [Update Filter Preview].

FIGURE 16. Border Filtering Previews—No Border Filter (top), Search/Filter Inside Only (bottom left), Search/Filter Outside Only (bottom right)



MANAGING FILTER OPTION SETS

When you open the 64-bit HYSWEEP® EDITOR, it loads the most recent set of filter options used by the editor, *not necessarily in the current project*.

Reusing the same filter set is useful if your projects use the same sensors in similar survey areas and with similar survey specifications; however, that is not always the case and your filter settings vary between projects or even datasets within the same project.

In the Action tab of the Search and Filter dialog, you can save and quickly restore complete sets of filter options according to your needs instead of manually choosing each option for each editing session.

Tip: You can save any number of filter option sets to your project, and just load the one appropriate to the current editing session each time.

FIGURE 17. Search and Filter Dialog—Actions Tab

To save your filter options, click [Save Filters], name your filter set and click [Save]. All of the current Search and Filter options, as well as the Vegetation Filters, are stored to that file with an MBFILTERS extension in your project folder.

Tip: Use a name that is meaningful so you know which set to load in future sessions.

To load a filter option set, click [Load Filters], select the appropriate MBFILTERS file and click [Open].

XYZ MANAGER

Corrected logic error in the border clipping for export of final soundings.

The screenshot shows the 'Search and Filter Options' dialog box with the 'Actions' tab selected. The 'Filter' section has buttons for 'All Files' and 'Selected Files', a 'Reset All' button, and a 'Count' input field. The 'Search' section has buttons for 'All Files', 'Selected Files', 'Next', and 'Back', and a 'Found' input field. Below these are 'Load Filters...' and 'Save Filters...' buttons. A text field shows the path 'E:\000 Test Projects\1mb\Sample_Performance_Test\CenterBorder.mbfilters'. There is a checked checkbox for 'Exclude Checked Beams from Filter and Search'. The 'Border' section has a checked checkbox, a text field with the path 'E:\000 Test Projects\1mb\Sam...\RefCenter.brd', and radio buttons for 'Search / Filter Inside Only' (selected) and 'Search / Filter Outside Only'. An 'Update Filter Preview' button is at the bottom.

FINAL PRODUCTS

- **HYPLOT:** Bug fix for drawing targets correctly.
- **TIN MODEL:** TIN-to-Channel volumes reported to 2 decimal accuracy.
- **ENC EDITOR:** Corrected zoom extents of the selected background chart.

CROSS SECTIONS AND VOLUMES: VARIABLE TEMPLATES FOR BEACH VOLUMES

Minimum Design Template and **Maximum Design Template** are templates that are offset vertically above and below the Design Template, respectively, by user-specified distances. You can elect to calculate volume quantities for each template level. Past releases provided only fixed Minimum and Maximum template options.

Using Variable Design Templates you can set minimum and maximum template values individually for each template segment on each line.

NOTE: The fixed design templates can be used in conjunction with the variable templates, but there can be only one maximum and minimum design template for each segment; you must choose *either* the Maximum Design Template or Variable Maximum Design

Template option, not both. You *can*, however, choose a Maximum Design Template with a Variable *Minimum* Design Template, or a Minimum Design Template with a Variable *Maximum* Design Template.

The **Maximum and Minimum tabs** separately show the maximum and minimum template values for each segment of each line in the current session.

The **Per Line tab** shows the maximum and minimum values for the currently selected line and you can use the arrow buttons to scroll through the lines.

FIGURE 18. Minimum and Maximum Tabs (left), Per Line (right)

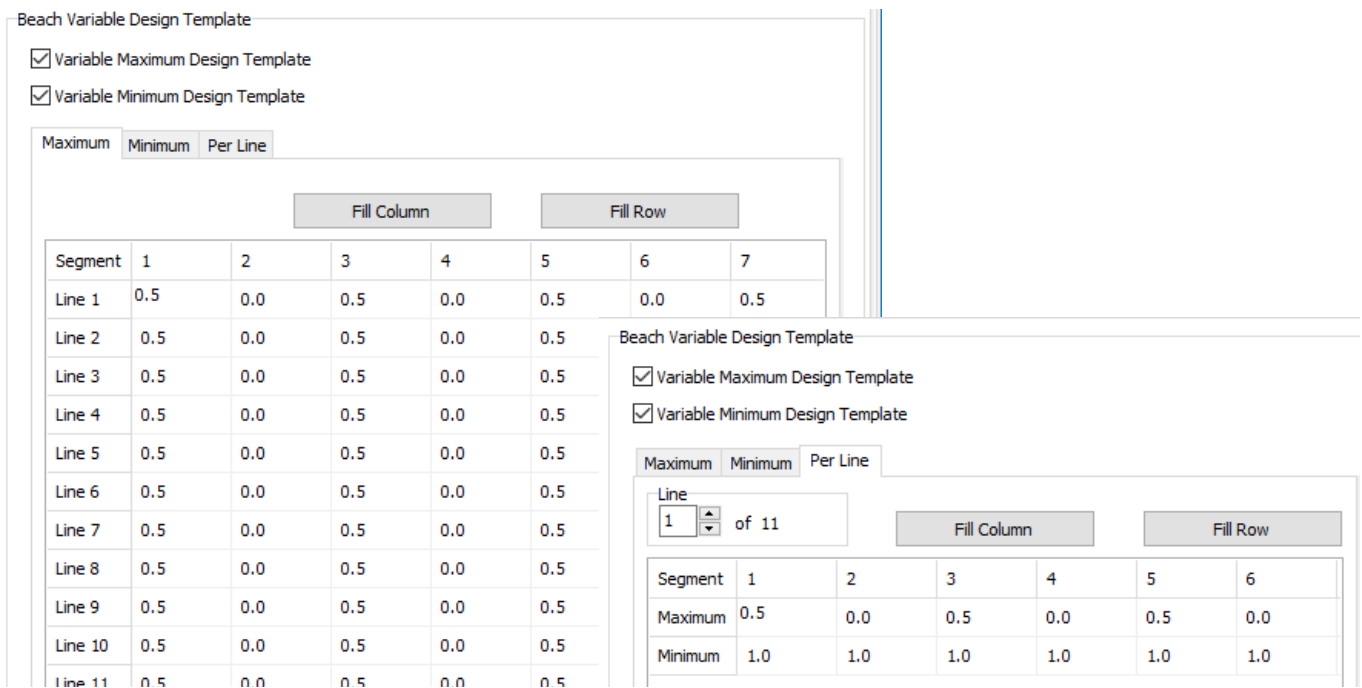
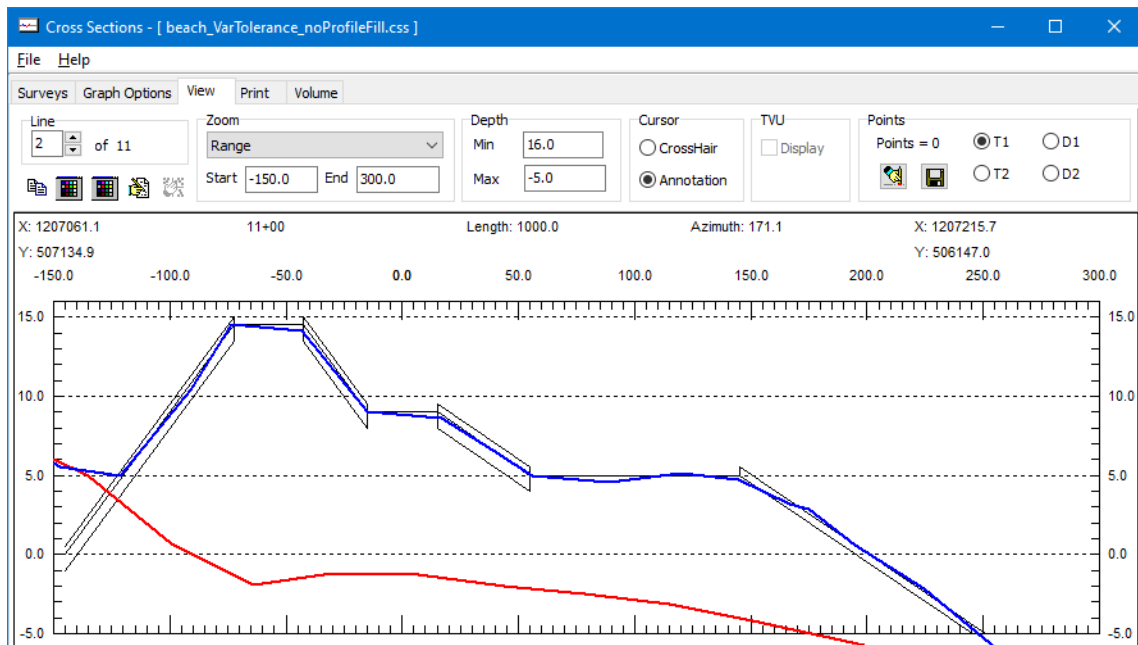


FIGURE 19. View Tab with Variable Templates



SYSTEM

- **Corrected Unicode problem** associated with using passwords.
- **Localization:**
 - > User Interface: Updated files to provide more fully translated User Interface.
 - > Documentation: Russian and Spanish Manuals, Spanish Language Help file.

FIGURE 20. *Translated Documentation*

