



HYPACK
a xylem brand

Sounding Better!

2018 Release Notes

By Judy Bragg

The following highlights the major changes that have been implemented in HYPACK® 2018 since the HYPACK® 2017 release:

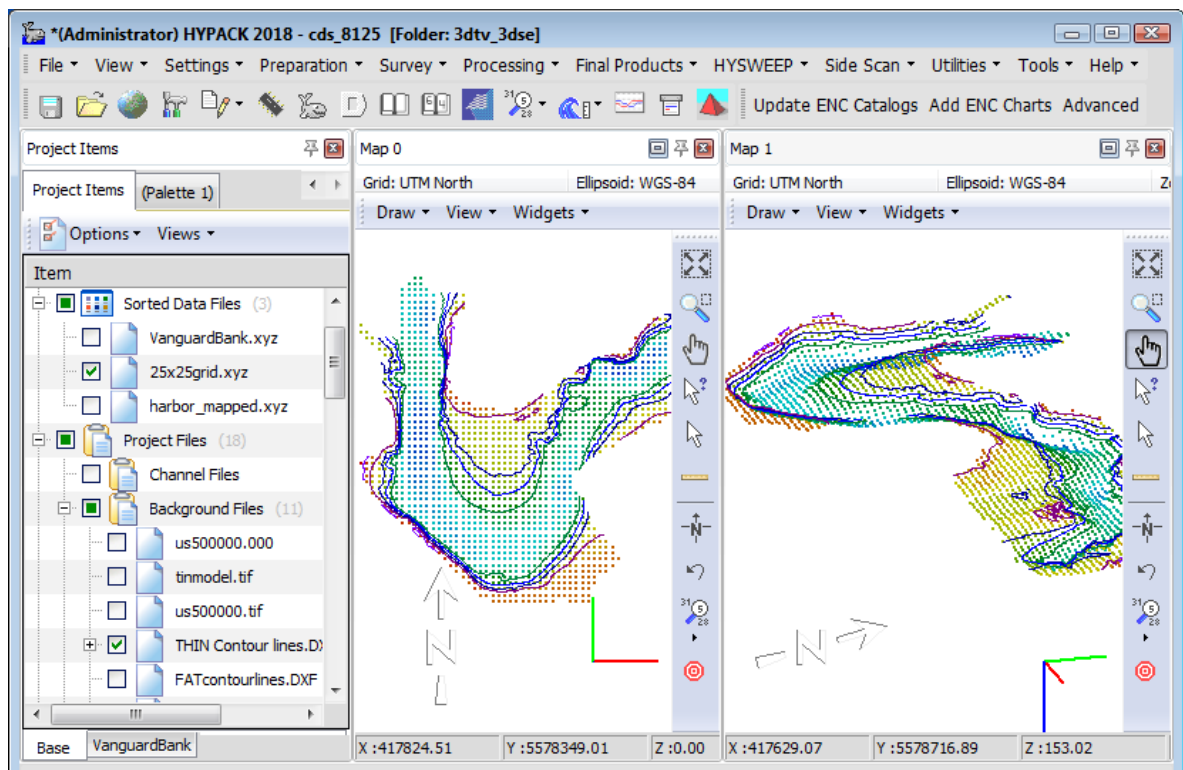
HYPACK® SHELL

3D DRAWING IN THE HYPACK® MAP

You can now tilt and rotate the display in the HYPACK® Map windows to view your data from any angle.

NOTE: Raster charts can only display in 2 dimensions.

FIGURE 1. Tiled Map Windows—2D (left) and 3D (right)



- **Hand icon replaces the pan tool**, to tilt and rotate the 3D display. Alternatively, you can use keyboard controls:
 - **To tilt**, Ctrl + mouse wheel.
 - **To rotate**, Shift + mouse wheel
- The **angle of Rotation and Tilt** appear in the Map status bar
- **To adjust the scale of the Z axis**, Shift + Page Up and Down

REMOTE TECHNICAL SUPPORT THROUGH BOMGAR

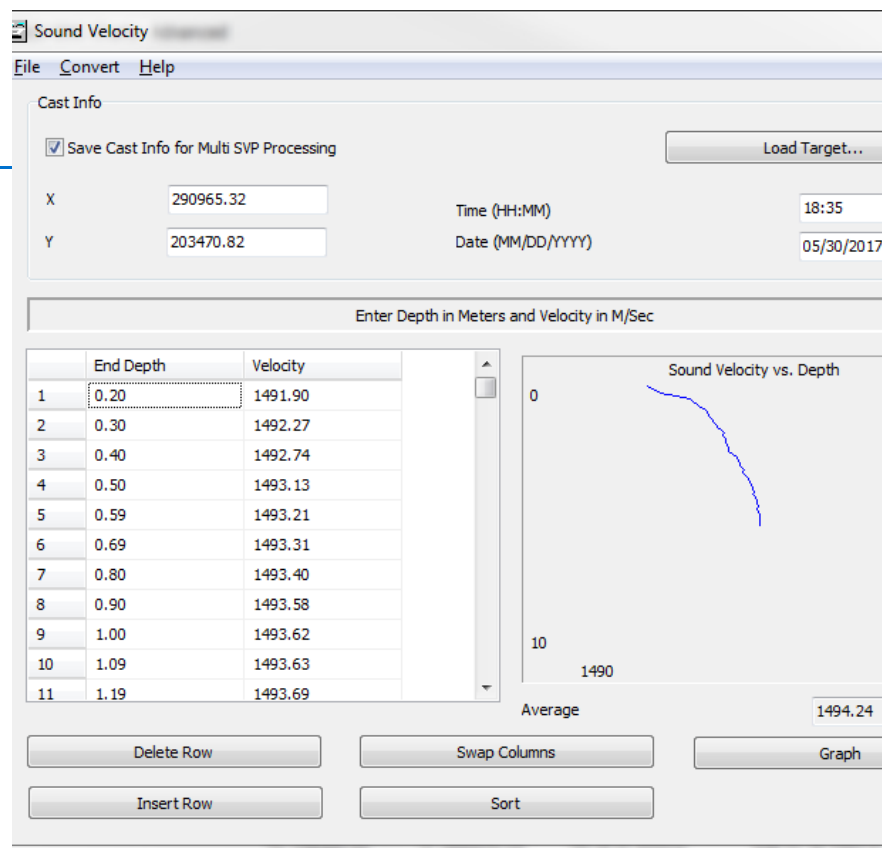
Bomgar replaces TeamViewer to provide HYPACK Staff with remote access to your computer for the purposes of technical support. The site is automatically launched from the Remote Assistance option in the Help menu. Contact HYPACK Support for a session key. The session key is a single, timed login for running remote support.

PREPARATION

SOUND VELOCITY

FIGURE 2. Downloaded SV Data Populates the SOUND VELOCITY Program

- **Valeport SWiFT SVP download interfaces directly via Bluetooth connections:**
 - **SOUND VELOCITY program:** While the SWiFT can export a HYPACK® *.VEL file from the Valeport DataLog software, this interface makes it much easier for you to download the



SWiFT SVP sound velocity data directly into HYSWEEP® SURVEY and the HYPACK® SOUND VELOCITY program.

Since the SWiFT SVP has a built in GPS, the SOUND VELOCITY program also downloads the time and position of the current cast. The position is displayed, in local coordinates, based on the geodetic parameters in the current project.

- **In HYSWEEP® SURVEY**, you must add the Valeport SWiFT SVP as a device in the HARDWARE program. You can then download the latest cast from the HYSWEEP® SURVEY menu (TOOLS-VALEPORT SWiFT SVP CONTROL).
- **Sound velocity is expressed in sounding units** rather than *always* m/sec.

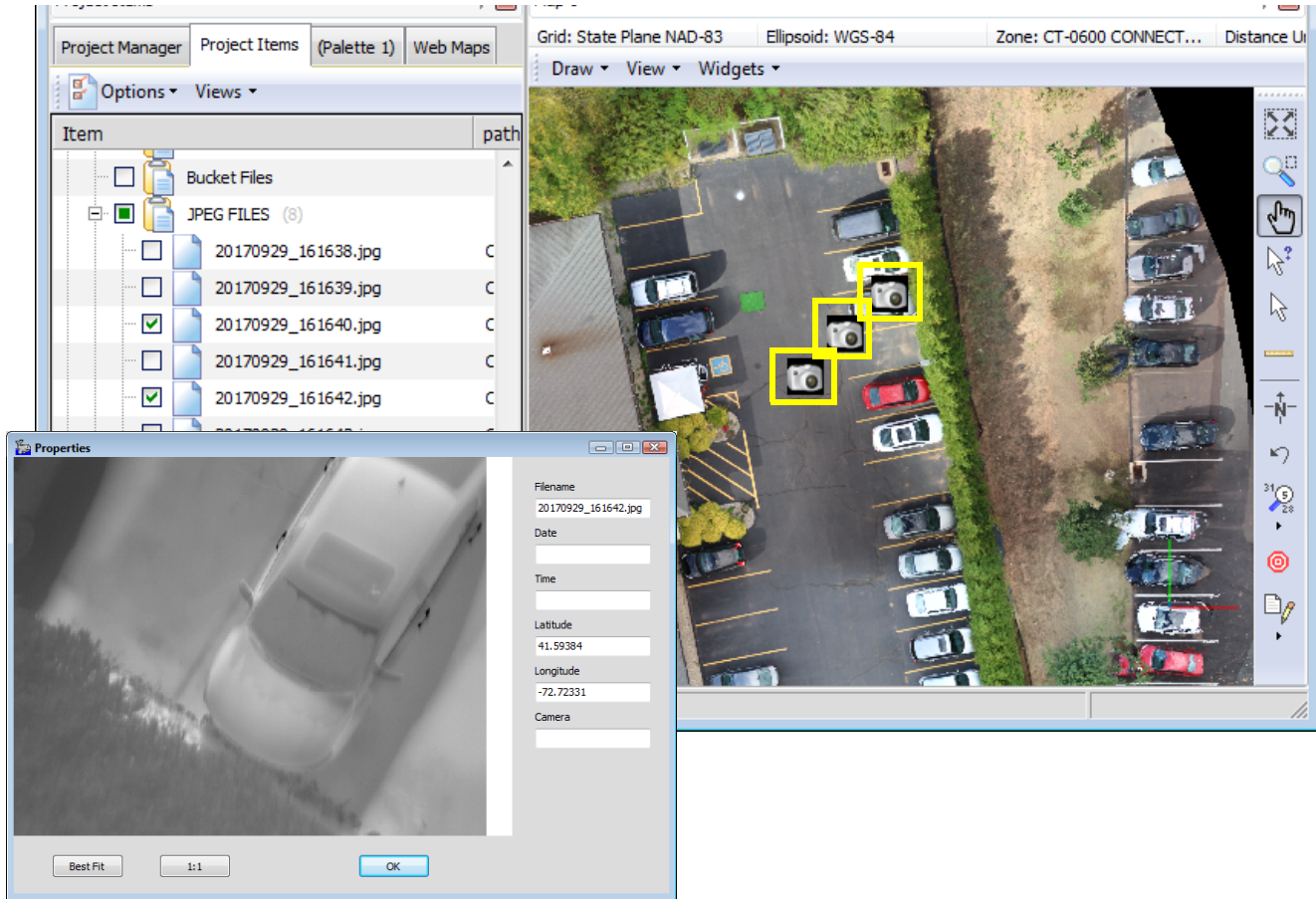
HYPACK® DRIVERS

- **ADCP.dll:**
 - Support for DVL.
 - Supports Rowe and Nortek devices
- **NEW! Autopilot.dll:**
 - Adds Quality Control messages from an Autonomous Vehicle.
 - Includes a selection of alarms to alert you to possible data acquisition problems, and when the vehicle strays outside a user-defined area.
- **Autolines.dll:** Generates planned lines based on multibeam coverage.
- **DVL.dll:** Supports DVL without the ADCP driver. Uses Kalman to give better position than the ADCP driver.
- **CMAX driver:** Added pass through for magnetometer data.
- **NEW! FLIRThermal.dll** (FLIR) and **Ladybugintf.dll** (Ladybug 360) camera support to provide photographic records of the survey site at user-defined intervals. Developed to compare photos with topographic LiDAR data, MBMAX64 (64-bit HYSWEEP® EDITOR) synchronizes the image display with the cursor position in based on the timestamp.

You may also load Photos to the Project Items list to display a camera icon at each image location in the Map window, then query the image to view the photo and its metadata.



FIGURE 3. Images Captured using NEXUS Powered by HYPACK®—JPG Properties Dialog (bottom left), Camera Icons in HYPACK® Map (top right),)



- **Echologger.dll:** Echogram support for EU D24 and EU400.
- **LineOffset.dll:** When you end line, the driver automatically creates next survey line at a user-defined distance along the normal of the previous survey line.
- **Mavlink.dll:** Controls unmanned vessels that follow the MavLink protocol.
- **Navisound210.dll:** Supports second transducer. Requires offsets for the second head and writes ECM records.
- **Phins.dll:** Separate records for heave, pitch and roll.
- **Sontek_M9_HS.dll:** Set Lat/Long position in base station
- **NEW! SBG.dll:** Support for PPS message to SBG inertial system.
- **Subbot.dll:**
 - Ping Rate displays all changes in the rate. Synchronized with Discover.
 - Resamples the long Ping Rate data to comply with SEG-Y specifications. Resampling is maximum-based.
 - Controls embedded in the main window.
 - Supports multiple instances of subbot.dll in your HARDWARE configuration.
- **TideDR** shows both predicted and real-time tide in the graph.
- **NEW! YSI_Turbidity.dll:** Checks turbidity levels every 2 minutes, displaying them on a graph, and can set an alarm if the level is above a threshold value.

HYSWEEP® DRIVERS

Bathy

- **NEW!** Picotech sonar
- **NEW!** Norbit sonar
- R2Sonic added UHD mode
- Reson Integrated dual head mode

Ancillary Devices

- **NEW!** [Valeport SVP](#) (via bluetooth)
- **SBG**: Added delayed heave support
- **Generic Attitude**: Added UDP option (added to serial)
- **Additional devices pass GPS information through to HYPACK® SURVEY.** (This provides single-cable operation as data is internally sent to SURVEY.
 - RTA (Odom)
 - POS (CeeScope)
 - RRIO (Reson)
 - CV3 (Odom)
 - PingDSP
 - Edgetech (6205)
 - Edgetech –NMEA
 - Kongberg
 - WASSP
 - Klein HydroChart

Water Column Support

- Reson compressed water column (7042)
- Teledyne MB2 water column

LiDAR

- **NEW!** Reigl VUX laser driver
- Velodyne driver added angle of beam (to beam number)
- Carlson Merlin name change from Renishaw

ACQUISITION

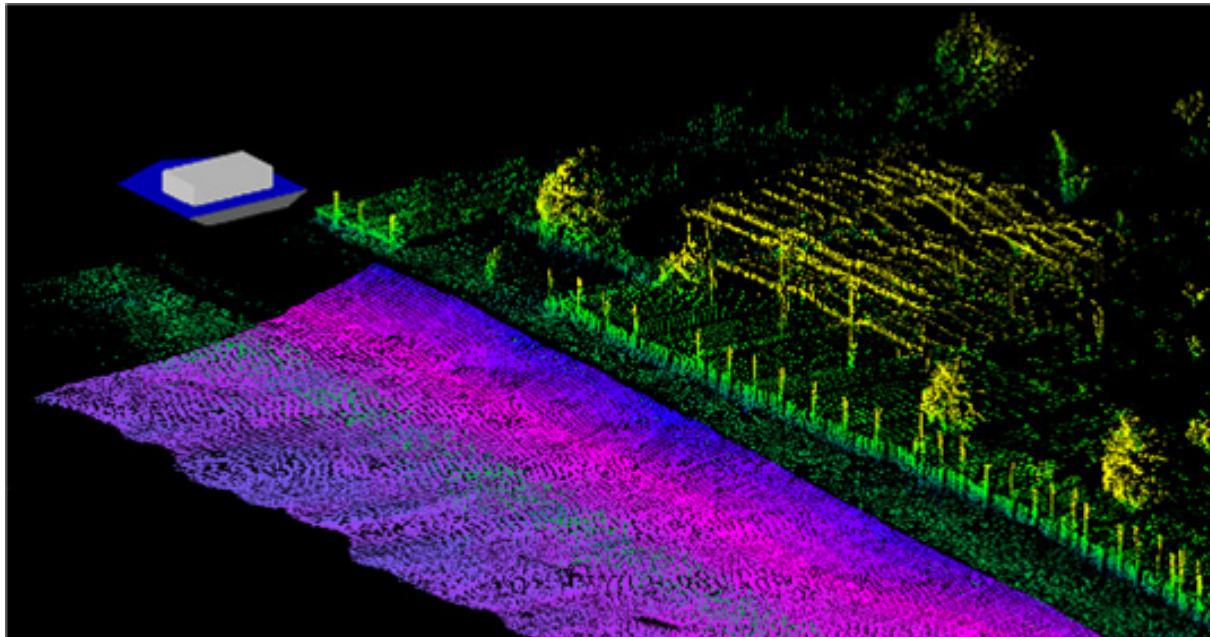
RTCLOUD

The Real Time Cloud window provides a 3-dimensional display of your survey area. Originally developed for HYSWEEP® SURVEY to merge hydrographic and topographic soundings into one display, it is now also accessible from OPTIONS-SHARED MEMORY in HYPACK® SURVEY and DREDGEPAK®.

Regardless of the project type, you may also provide further context to the point cloud display with the projection grid, charts and other project files (planned lines, plotting sheets, matrix files, etc.) displayed as charts.

In **HYSWEEP® surveys**, you may draw both hydrographic and topographic points in one display. Alternatively, you could choose to draw your hydrographic data as a matrix, and display only the topographic data in your point cloud.

FIGURE 4. *Real Time Cloud in a HYSWEEP® SURVEY*



In **HYPACK® SURVEY** or **DREDGEPAK®**, you can paint your matrix in the context of your other project files in a 3-dimensional display.

FIGURE 5. *Real Time Cloud in DREDGEPAK® (bottom)*

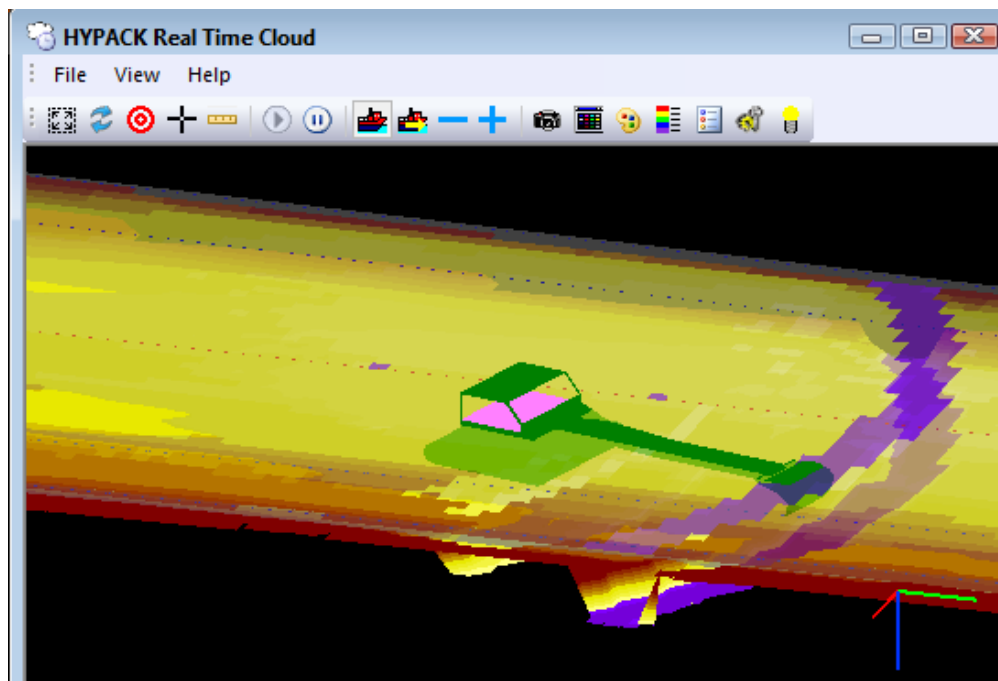
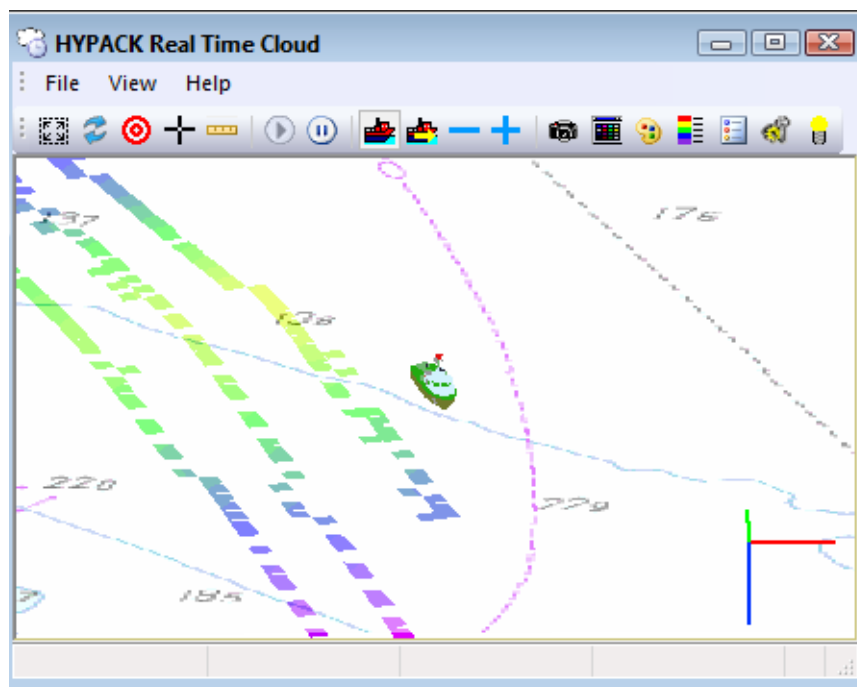


FIGURE 6. Real Time Cloud in HYPACK® SURVEY (top) and DREDGEPACK® (bottom)



HYSWEEP®

- **Valeport SWiFT Support:** Include the Valeport SWiFT SVP device in your HARDWARE configuration then download the most recent sound velocity profile, via Bluetooth connection, directly to HYSWEEP® SURVEY (TOOLS-VALEPORT SWiFT SVP CONTROL).
- **RT Dual Head snippet display** (dual head patch test). Choose which head paints the matrix in Survey when you are logging your patch test lines to assure coverage.
- **The 64-bit HYSWEEP® EDITOR synchronizes images with your survey data.** A camera icon appears in the Map window at each image position. Click an icon to see the corresponding image displayed in a pop-up window.

PROCESSING

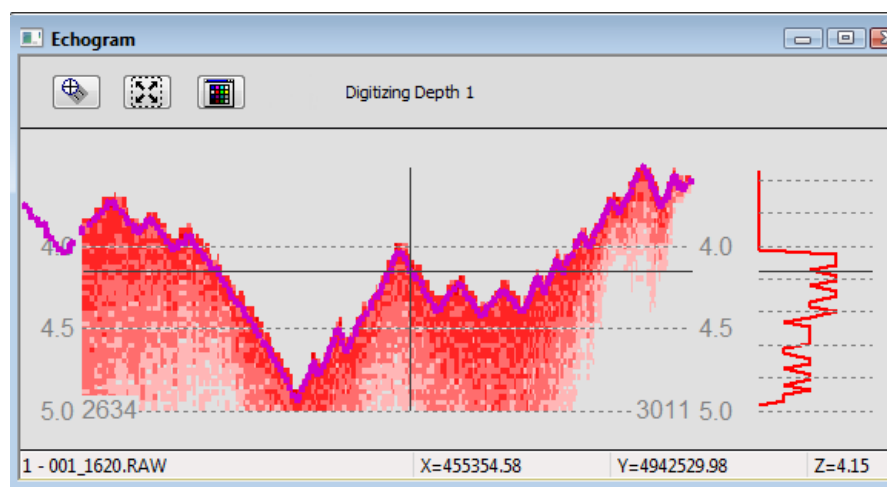
64-BIT SINGLE BEAM EDITOR

Developments in the SBMAX64 have continues as we strive to integrate all features that were available in the 32-bit version.

ECHOGRAM

The Echogram Window provides an editable graphical display of analog data. It displays high frequency (red) and low frequency (blue) depth data in a time vs distance graph (left) and the return strength information corresponding to the current cursor position (right). The window synchronizes with the other window displays, providing you with additional information and tools with which you may edit your data.

FIGURE 7. *Sample Echogram Window*

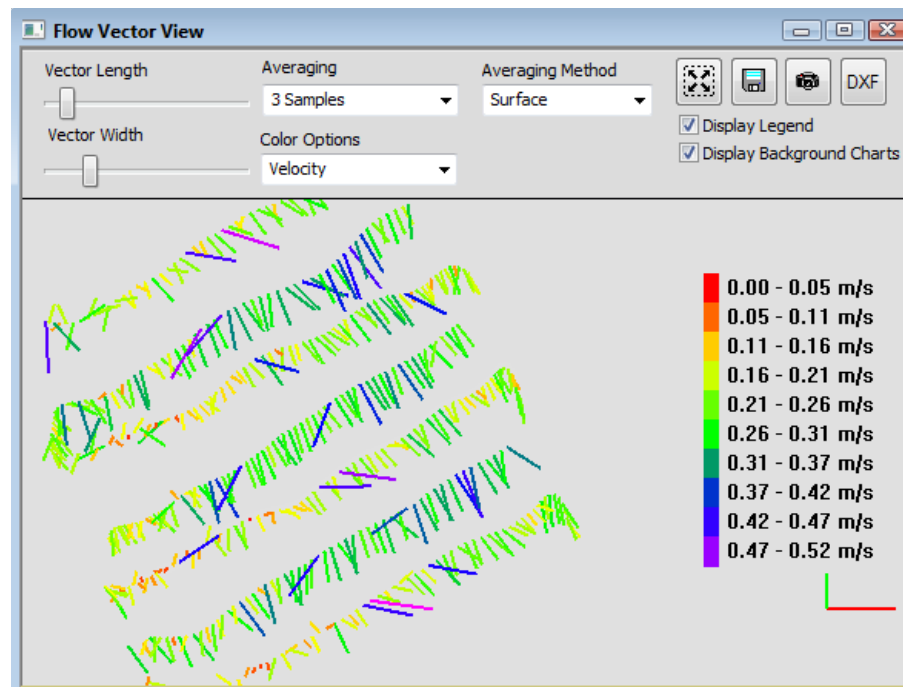


FLOW VECTOR VIEW

When you load raw SonTek M9 HydroSurveyor data, the 64-bit SINGLE BEAM EDITOR automatically loads the corresponding YDFF files and draws them in the Flow Vector window. The toolbar provides display and output options.

- **Averaging samples:** Average up to 100 samples to thin the data in the display.
- **Vertical Range:** Method options enable you to choose the vertical range included in the vector calculations.
- **Display options** include vector length and width, and the basis for coloring the vectors (direction, line, magnetic error or velocity). You may additionally include background charts for context and a legend to interpret the current colors.

FIGURE 8. Sample Flow Vector Window



- **Output options:** You can output flow vector data in any of the following formats:
 - **X, Y, Velocity text files:** The data is saved with an XYZ extension, but the third value in each record represents the velocity for the selected range.

FIGURE 9. Spreadsheet Export Records

```

13:04:49.383 *****
13:04:51.402 ***** -0.19 -0.01 0.01 -0.05 -0.02
13:04:53.383 ***** -0.11 -0.03 0.07 -0.07 0.03
13:04:54.381 ***** -0.08 0.00 0.06 -0.09 0.03
13:04:56.362 ***** -0.04 0.03 0.04 0.03 0.06
13:04:58.366 ***** 0.09 0.16 0.04 0.16 0.13
13:04:59.417 ***** 0.13 0.23 0.25 0.12 0.26
13:05:01.366 ***** 0.09 0.26 0.26 0.04 0.22

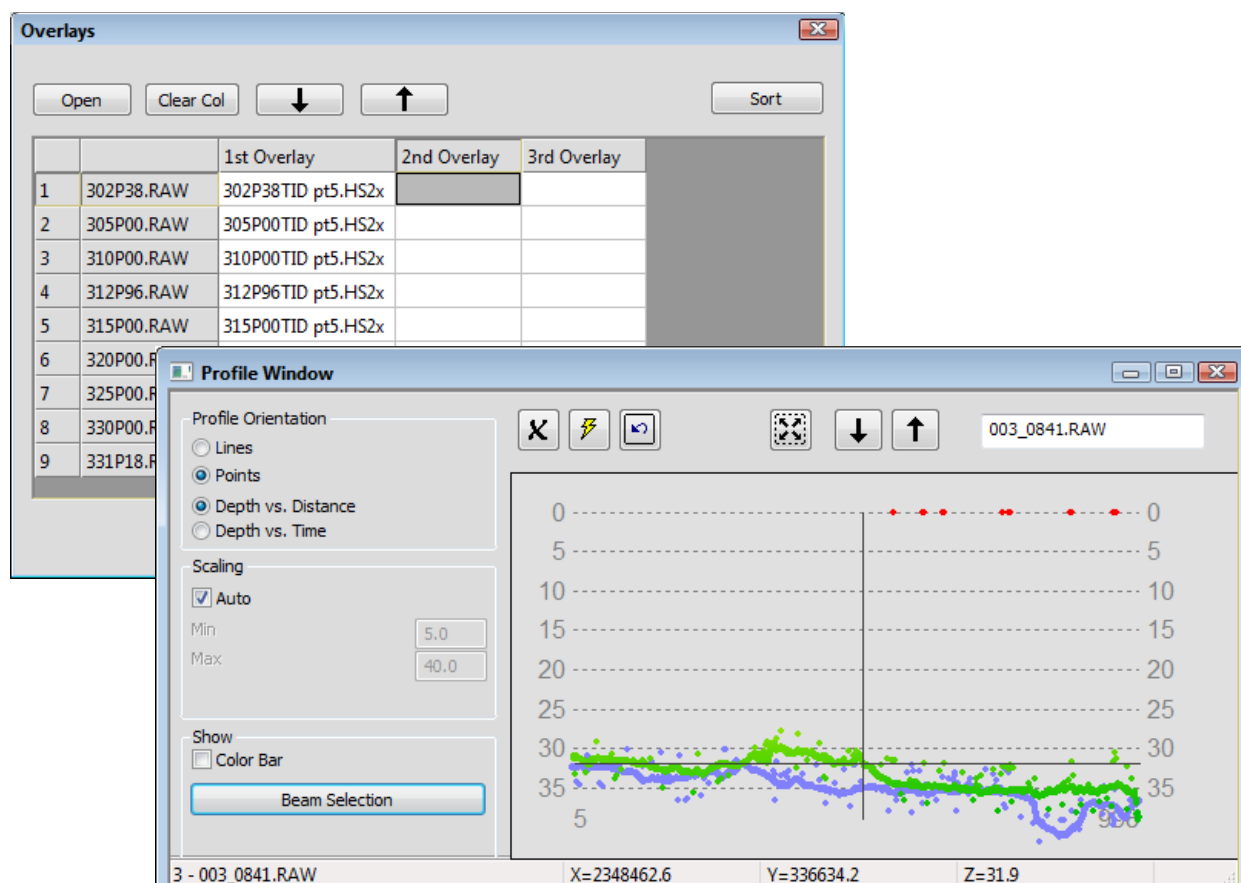
```

- **Screen captures:** Stored in BMP, TIF or PNG image format. These images are not geo-referenced.
- **Georeferenced CAD DXF files.** Load them to HYPACK® as a chart file or into a CAD program.

OVERLAYS

You can display up to three additional sounding files from the same survey line. The depths are displayed according to the options set in the View Options and Color Settings dialogs. The overlaid data cannot be edited. *It is only used as a reference*, should you want to compare the current data file to a previous survey of the same line.

FIGURE 10. Overlays Dialog



You can also display up to four channel templates in the profile window. These are based on the templates of the primary files.

DEPTH INTERPOLATION

If you remove sounding data, the data will be interpolated or removed according to the status of the selection in the Settings dialog (EDIT-SETTINGS) which toggles between the two choices.

If you have elected to interpolate, soundings will only be deleted if you remove data at either end of the survey line, rendering interpolation impossible.

SMOOTHING

If you have been surveying in rough waters and do not use a heave sensor, your data can be very jagged. In cases such as these, you can smooth the position and depth of the corrected soundings.

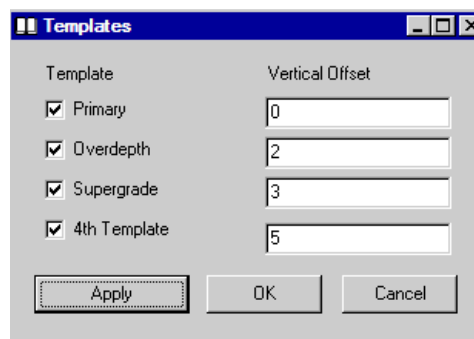
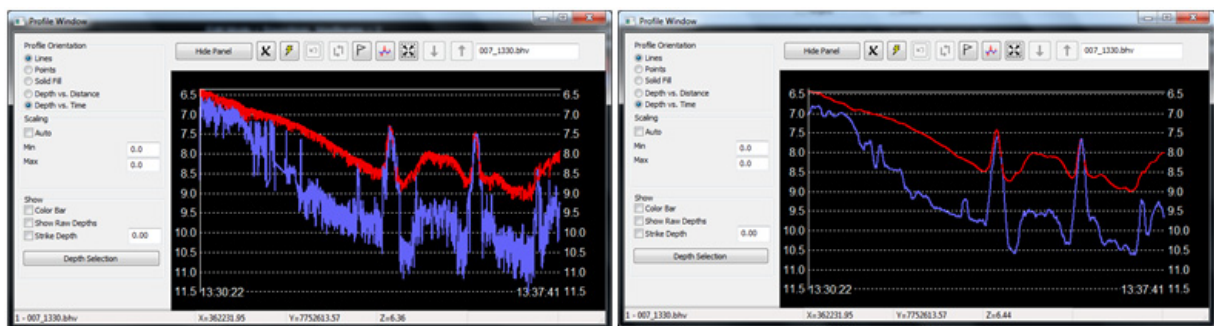


FIGURE 11. Smoothing Soundings—Before (left) and After (right)



NOTE: *This is not highly accurate. We recommend properly measuring heave, pitch and roll with an MRU. This smoothing is only a close approximation.*

FILE INFORMATION

The File Information report provides statistical data about the currently loaded data set.

FIGURE 12. Sample File Information Report

File Information		
Rec Count: 6235		
Depth	Minimum: -1.994550	Maximum: 54.058667
DOL	Minimum: -35.130744	Maximum: 17.055726
Tide Corr	Minimum: -1.574800	Maximum: 0.229658
# Sats	Minimum: 0	Maximum: 10
HDOP	Minimum: 0.600000	Maximum: 1.900000

IMPROVED SPREADSHEET CONFIGURATION

- Double-click the Display Option items to add/remove them from the spreadsheet. It's quicker and easier than the arrow buttons!
- The current sounding is highlighted in yellow.

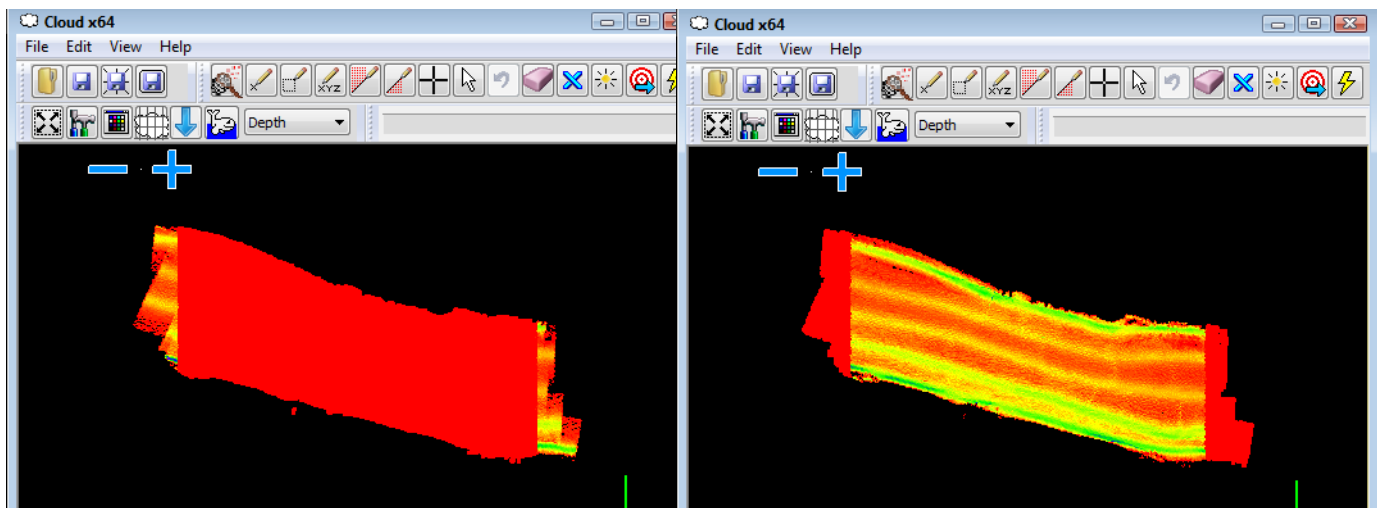
FIGURE 13. Spreadsheet

	Time	X	Y	Corr. Depth 5	Raw Depth 1	Corr. Depth 1	DOL	Heave Corr
496	08:25:06.270	1084299.16	255705.13	48.29	48.50	48.24	-7	0.33
497	08:25:06.334	1084298.44	255705.72	48.23	48.50	48.31	-7	0.36
498	08:25:06.400	1084297.71	255706.31	48.15	48.40	48.29	-7	0.41
499	08:25:06.467	1084296.97	255706.91	48.07	48.30	48.23	-7	0.43
500	08:25:06.530	1084296.26	255707.48	47.95	48.20	48.15	-7	0.43
501	08:25:06.595	1084295.55	255708.05	48.13	48.10	48.07	-7	0.44
502	08:25:06.661	1084294.83	255708.63	48.09	48.00	47.95	-7	0.43
503	08:25:06.725	1084294.12	255709.20	48.13	48.20	48.13	-7	0.41
504	08:25:06.791	1084293.42	255709.77	48.17	48.20	48.09	-7	0.39
505	08:25:06.855	1084292.72	255710.33	48.01	48.30	48.13	-7	0.36
506	08:25:06.920	1084292.03	255710.90	48.07	48.40	48.17	-7	0.33
507	08:25:06.986	1084291.33	255711.46	48.02	48.30	48.01	-7	0.30
508	08:25:07.049	1084290.66	255712.01	47.95	48.40	48.07	-7	0.28
509	08:25:07.115	1084289.97	255712.57	47.84	48.40	48.02	-7	0.25
510	08:25:07.181	1084289.28	255713.14	47.84	48.40	47.95	-7	0.20

CLOUD

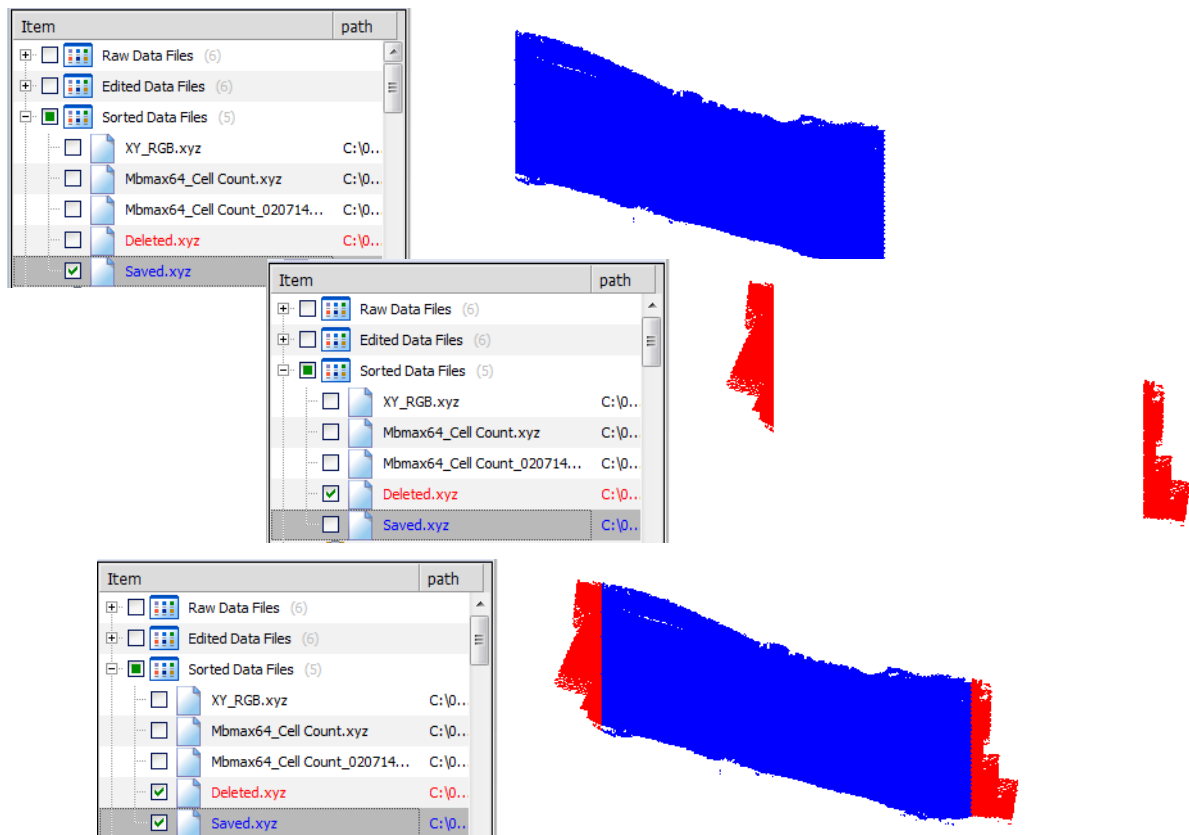
- Option to invert selection (EDIT-INVERT SELECTION).

FIGURE 14. Inverting Selected Points (solid red)—Before (left) and After(right)



- Option to save deleted points to a separate XYZ file (FILE-SAVE DELETED TO XYZ). In Figure 14, we deleted the points on the end of each line (as in the “After” image) then saved the results to Saved.xyz and the deleted points to Deleted.xyz. In Figure 15 we see (top to bottom) saved, deleted and both files displayed together.

FIGURE 15. Saved (top) , Deleted (center) and Both files (bottom) together show the two data sets fit exactly together to form the size and shape of the original data set in Figure 14



- **IMPORT-GEOTIFF** menu item now also supports georeferenced PNG (Like those from web maps) to color SOUNDINGS.
- **Support for added third-party point cloud formats:**
 - Input: E57, LAS, LAZ, PTS, ASC
 - Output: LAS, LAZ, PTS

DATA CONVERTER (FORMERLY HSX CONVERTER)

- **Same program, new name:** The HSX CONVERTER title has been a misnomer for some time. The program that began as the tool to convert third-party side scan formats to the HYPACK® HSX format, has developed over time to support several other conversions and file types. In 2018, the program, renamed DATA CONVERTER, still appears in the Side Scan menu, but also under UTILITES-FILE WORK.
- **Supports Sonardyne *.SWF8 to HSX** conversion
- **SonTek YDFF to RAW** file now includes GPS quality (QUA records) for RTK.
- **Supports dual head Reson *.S7K**
- **HSX split by frequency.** The program reads the information from the message in the header and divides the data according to frequency. The output files append the frequency to the rootname of the original file.

SIDE SCAN TARGETING AND MOSAICKING

- **New Angle Varied Gain** option (Side Scan Ctrl's, gain tab).
- **The scale bar now includes the current cursor position** in red at the bottom of the Scan View display.

24-BIT COLOR TABLE

HYPACK® 2018 offers two modes: 8-bit and 24-bit color depths.

- **8-bit mode** is similar to the HYPACK® 2017 mosaicking mode. This has, however, been improved to more fully utilize the 255 colors of the 8-bit color depth. You will notice more detail in your mosaics, as well as a wider variety in colors.
- **24-bit mode** is completely new to TARGETING AND MOSAICKING for 2018. Using this mode makes over 16 million colors available for the mosaic, which provides increased clarity, especially in areas with a similar signal return. The new mode generally takes 1.5-2 times longer to make a mosaic.

CUSTOM COLOR PALETTES

You can neither modify the colors, nor the color distribution in the default color palettes that come in the HYPACK® install; however, you can create or modify custom palettes for your mosaic displays and output files in the Color Palette Editor. Custom palettes are saved separately from your project, so you can use them across all of your side scan projects.

In the Colors tab of the Side Scan Controls, click [Edit Custom Palettes] to open the Color Palette Editor where you can load any existing palette and modify it by doing any of the following:

- Adding or deleting colors (sliders)
- Choosing new colors
- Shifting color distribution

To save your palette, enter a name at the bottom right and click [Save Palette].

- **If you have modified a default palette**, you must save your modifications to a new palette. The editor suggests the name by appending (1) to the default palette name, but you may change it. Your new palette appears in the Custom Palettes list.
- **If you have modified a custom palette**, you can overwrite the existing palette, or save it to a new palette with a different name.

FIGURE 16. Color Palette Editor—Default Gold (top), Custom Palette (bottom)

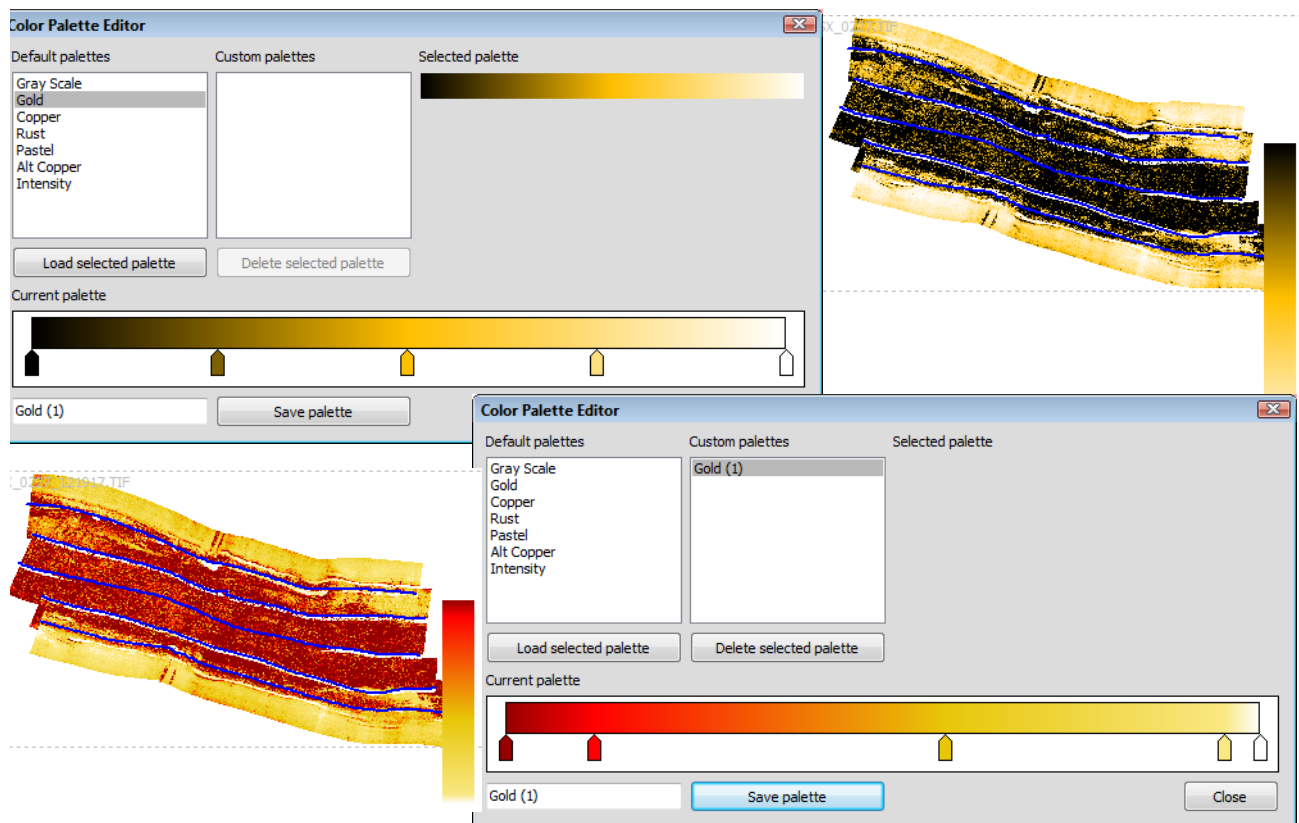
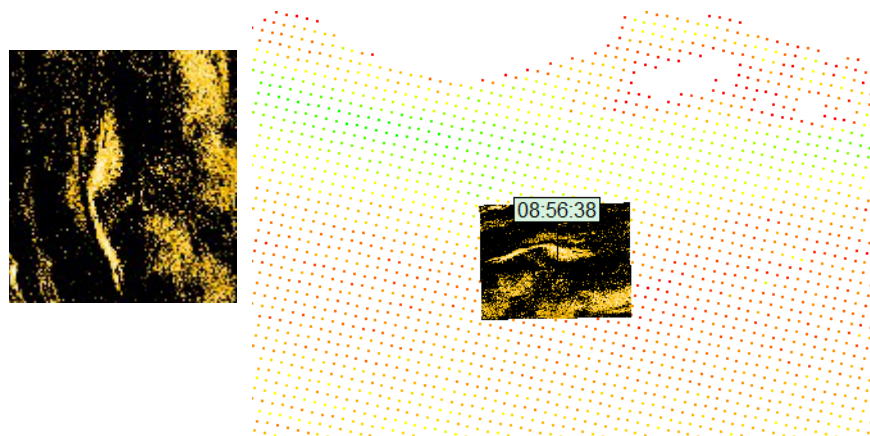


IMAGE CAPTURE TARGET QUICK MARK

The Quick Mark method enables you to mark multiple target locations in quick succession, but there are no additional records about the target location. The program generates the target at the center of each user-defined area and stores JPG and Geo-TIF images of the area, named with the timestamp of the targeted location, to the project \Side Scan Images folder.

FIGURE 17. Captured Images—JPG (left) , TIF on XYZ Soundings (right)



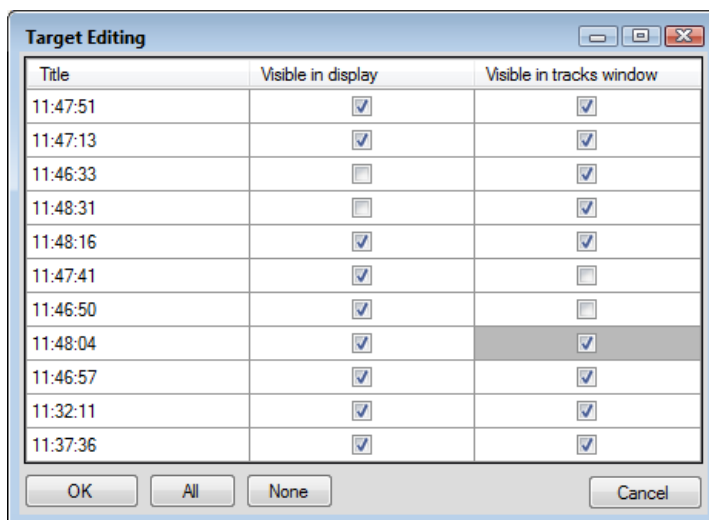
SUB-BOTTOM PROCESSING

- Reads SEG, SEGY, SGY *and* Edgetech JSf. You can multiselect individual files or make and load a catalog (*.LOG).
- Restores user-defined TVG

IMPROVED SUPPORT FOR TARGETS

- **Target Visibility Dialog:** The Target Visibility dialog (REFLECTORS AND TARGETS-TARGET VISIBILITY) controls which targets from the SBP target group appear in the sub-bottom profile display and, configured separately, in the View Tracks window.

FIGURE 18. Target Visibility Dialog



In addition, the **Show Targets** option in View Tracks tab of the Settings dialog toggles the display of all targets in the group on and off. When you use this option, the column for the tracks window updates accordingly.

These settings do *not* affect the targets displayed in the HYPACK® area map.

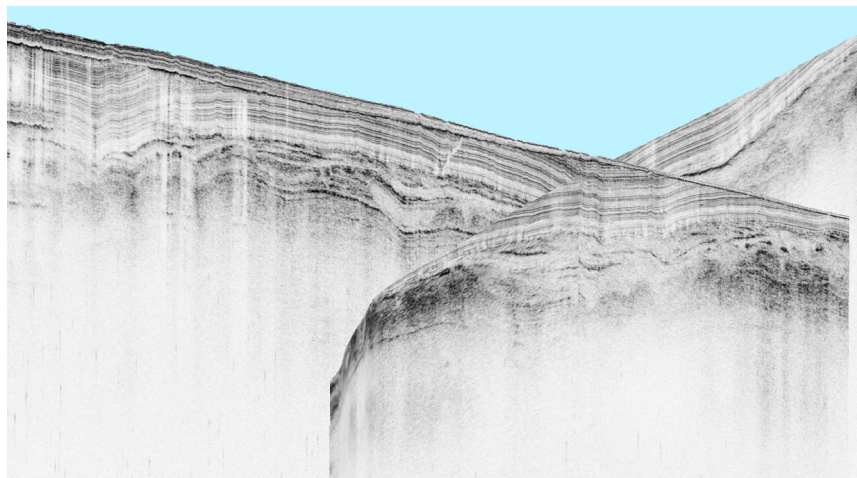
- **Target Properties:** Source and Line Name properties are now captured with the Depth of Burial attribute and stored with the target.

FENCES

The sub-bottom fence diagram shows one or more profiles together in a 3-dimensional, interactive display. The options in the Settings dialog enable you to customize your display.

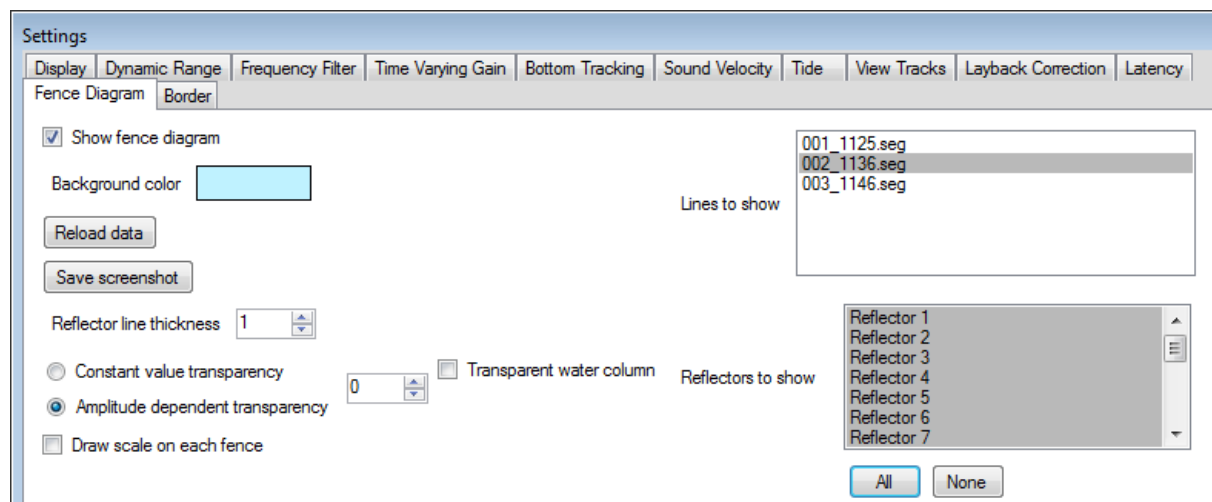
Many of the SUB-BOTTOM PROCESSOR options are common to both the sub-bottom profile and the fence diagram.

FIGURE 19. Sample Fence Display—Layers Match on Intersecting Lines



The options in the Fences Diagram tab of the Settings affect only the Fence Diagram:

FIGURE 20. Settings Dialog—Fences Diagram Tab



EXPORTING CORRECTED SOUNDINGS

While you may record corrections to the RAW data file during acquisition, this data is not recorded or applied to the SEG-Y files. In HYPACK®, you must apply corrections to sub-bottom data in post-processing. (In addition, you can correct any layback and latency errors.) You can then export corrected All format (*.EDT) and XYZ data from the SUB-BOTTOM PROCESSOR.

Past versions of the SUB-BOTTOM PROCESSOR included only sound velocity corrections. This year we've added tide corrections as well.

- **EXPORT EDT** options convert your digitized layers to All format files, one for each layer, and stores them in the project Edit folder. Additionally, it generates catalog files for each exported layer.

Tip: For further analysis, you can load the All format files to the HYPACK® CROSS SECTIONS AND VOLUMES program.

- **EXPORT XYZ** options stores the digitized points to XYZ format files, one for each layer, in the project Sort folder. You can choose to export depth, isopach or both as the Z-value. Each file is named with the format.

DATA SPLITTER-JOINER

The DATA SPLITTER-JOINER is designed for you to define the segments of your RAW or HSX data that are useful for your survey and generate a new line set from the chosen segments. The program was initially designed convert long serpentine lines of unmanned vessel missions into a more conventional line file set removing the data on sharp turns and .

- **Shows background files and other project files** when you load your data. The program automatically displays charts, matrix files, and border files that were enabled in the Shell when you opened the DATA SPLITTER-JOINER.
- **Clip the original data tracks to a border file** as an alternative to manually defining the lines with your cursor.
- **Eliminates redundant data** from any overlaps in the original data set.
- **Show Sidescan Swath** toggles a diagram of the data coverage in the Display window.

FIGURE 21. DATA SPLITTER-JOINER—Main Window (left), Display Window (right), Output Results (bottom)

