



Multibeam Improvements for the HYPACK® 2009 Service Pack

By Mike Kalmbach

We are preparing a service pack for HYPACK® 2009, which will contain a number of HYSWEEP® improvements and yes, a couple of bug fixes.

Here's a list, with details to follow.

New Drivers:

- EdgeTech 4600 multibeam,
- IXSEA Octans driver with a network interface,
- Reson Seabat 7150 multibeam.

Driver Updates:

- POS/MV network input,
- REIGL laser,
- Reson 7101, 7125 multibeam,
- Reson 81xx network multibeam,
- Benthos C3D multibeam,

General

- Smart down sampling of sound velocity profiles.
- Separate antenna offsets for (1) Position GPS and (2) RTK tide GPS.

HYSWEEP® SURVEY

- Improved real-time depth calculations,
- Moving Velocity Profiler (MVP) interface,
- Improved matrix update.

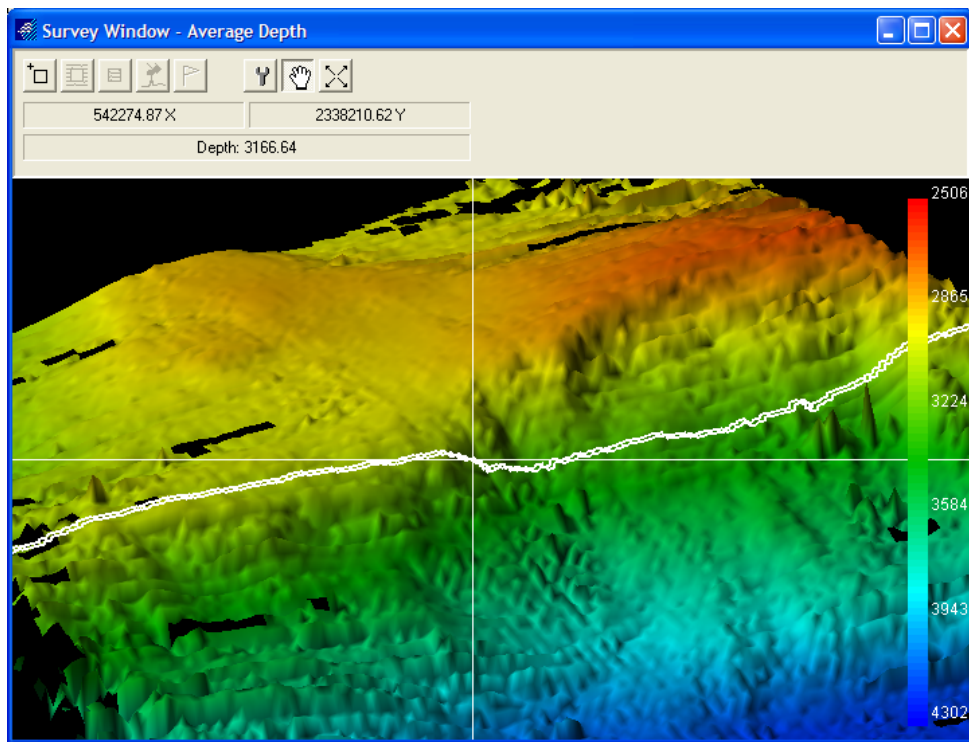
MBMax (HYSWEEP® EDITOR)

- HYPACK® RAW file adjustments,
- Sound Speed Adjustments,
- GSF export,
- Maximum intensity filter.
- Border editor,

NEW DRIVERS

- **EdgeTech 4600 multibeam:** This is a new interferometric system and the driver is still under development. Not ready yet. Also included is a real-time display of the interferometry points.
- **IXSEA Octans driver with a network interface:** Free up a COM port while still reading Octans heave, pitch, roll and heading.
- **Reson Seabat 7150 multibeam:** Deep water system with pitch and roll stabilization. Successful sea acceptance test and survey.

FIGURE 1. Seabat 7150 data in 2,500 to 4,500 meter depths. Data courtesy of Tetra Tech.



Note, I have done a lot over the past couple of years to improve and verify HYSWEEP® operation in deep water. For example:

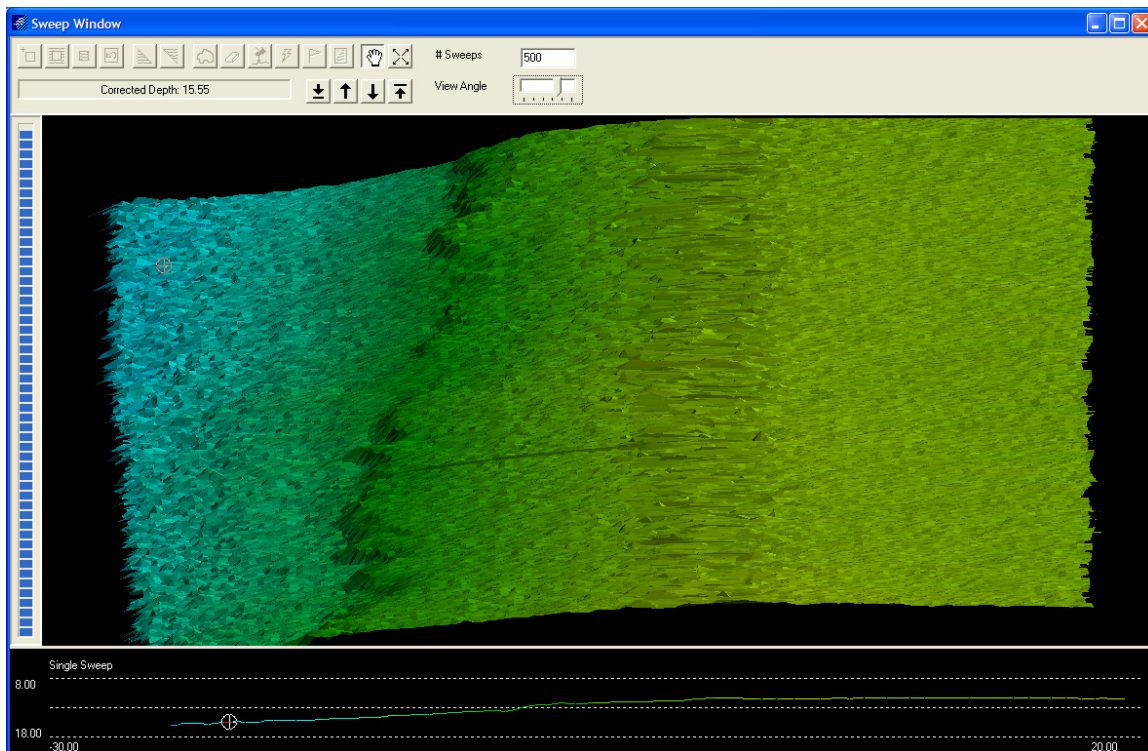
- Adjusted timeouts to accommodate very long ping delays due to beam travel time and sonar buffering.
- Increased support sensor history to over two minutes for accurate real-time depth calculation and display.
- Validated complicated depth calculations for pitch and roll stabilized Seabat systems.
- Added arc ray tracing method.
- General sound speed modeling and extrapolation to full ocean depth.
- Sea trials and testing, testing, testing...

HYSWEEP® SURVEY 2009 works very well with deep water systems.

DRIVER UPDATES

- **POS/MV network input:** Bug fix – our driver was missing datagrams when any POS/MV data groups other than 3, 7, 20 and 102 were selected.
 - **REIGL laser:** Timing fix, leading to better pitch and roll compensation.
 - **Reson 7101, 7125 multibeam:** Support for roll stabilized systems.
 - **Reson 81xx multibeam:** Two changes; (1) add sonar controls to Hysweep survey and (2) support for pitch and roll stabilization in Seabat 8150 and 8160.
 - **Benthos C3D multibeam:** Numerous changes. A Benthos software update is required for good data collection.
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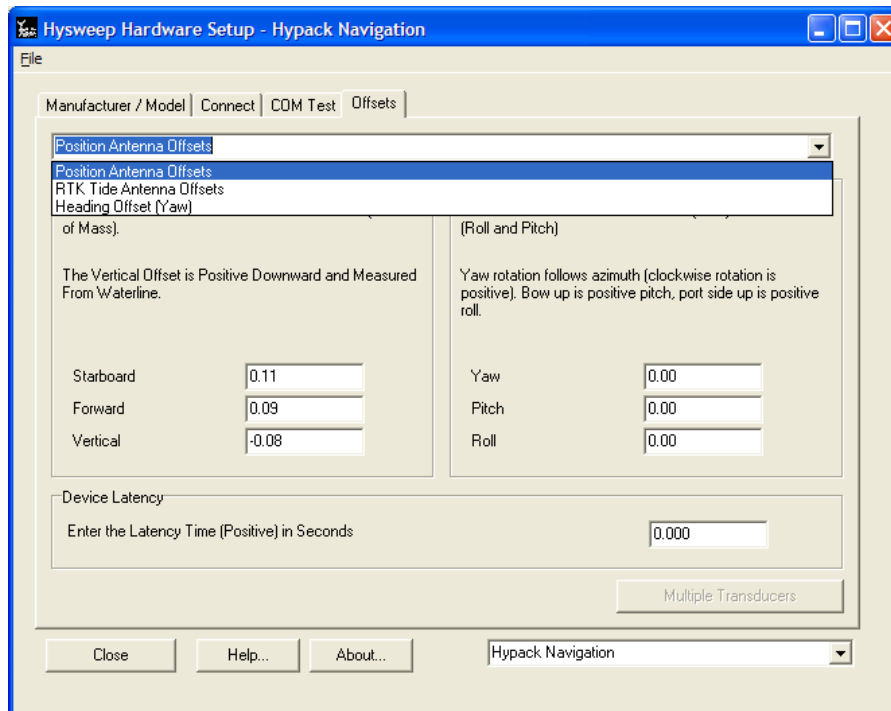
FIGURE 2. Figure 2: Benthos C3D shallow survey. Data courtesy of NOAA.



GENERAL HYSWEEP® CHANGES

- **Real-time depth calculations:** HYSWEEP® SURVEY now calculates multibeam depths *exactly* as done in MBMax post-processing. In the past, the survey calculations were close but not identical. So now there is a better WYSIWYG (What You See Is What You Get!) QC thing going on.
- **Smart down-sampling of sound velocity profiles:** There has always been a limit of 512 sound velocity profile points. In the past, when the limit was exceeded, the points at the end were removed. Now, the profile is intelligently down-sampled such that points are removed where the sound velocity gradient change is the smallest. Much better!
- **Separate antenna offset for (1) Position GPS and (2) RTK tide GPS:** This change involves the HYPACK® Navigation device in the HYSWEEP® HARDWARE setup. In the past, there was a single set of offsets (starboard, forward, vertical) for GPS. This worked fine if a single GPS system was used for survey; not so good if one system was used for positioning and a different system was used for RTK tides.

FIGURE 3. Figure 3: Separate Position and RTK Tide Offsets in HYSWEEP® HARDWARE.



HYSWEEP® SURVEY

- **Moving Velocity Profiler (MVP) interface:** Automatically updates HYSWEEP® SURVEY with MVP casts. The interface to the MVP itself is a HYPACK® driver – MVP.DLL, also included in the service pack.
- **Improved matrix update:** No longer leaves gaps in the HYPACK® SURVEY matrix. No longer causes gaps in logged data.

MBMAX EDITOR (HYSWEEP® EDITOR)

- **HYPACK® RAW File Adjustments:** This rather nice change allows substitution of positions and RTK tides in HYSWEEP® raw data (.HSX files) with that available in HYPACK® raw data (.RAW files).
- **Sound Speed Adjustments:** Tool to remove sounding artifacts resulting from incorrect profiles. See May, 2009 Sounding Better for the details.
- **GSF export:** Saves data used by HYPACK® GEOCODER™ to process Seabat 7K snippets. Previously only supported Seabat 81xx snippets.
- **Max Intensity Filter:** Filters soundings based in a high-intensity limit. The low-intensity limit has been available all along.
- **Border Editor:** The border editing tool has been restored to MBMax edit phase 2.

FIGURE 4. Figure 4: The beloved Border Tool is back! Return engagement courtesy of Woody.

