



HYSWEEP Editor – 64 Bit Development

By Mike Kalmbach

INTRODUCTION

Although 64-bit Windows has been available for years, many programs still do not take advantage. The reason is that, for most programs, there is no advantage. The 32-bit versions run just as fast and there's no need for the increased memory addressing of 64-bit.

Following that, the programs that do benefit from 64-bit are those that use vast amounts of memory. A perfect example is the HYSWEEP® EDITOR (MBMAX). It often requires all the memory available on the host computer. And sometimes more!

Since February, I've worked almost exclusively on a 64-bit version of the HYSWEEP® EDITOR. It will be the 4th generation editor. In addition to 64-bit capabilities, it will offer many improvements based on feedback from multibeam surveyors and processing technicians.

HYSWEEP® EDITOR - GENERATIONS 1 THROUGH 3

1. **MS-DOS Version (16-bit):** While offering decent graphical editing, the MS-DOS version suffered severely from memory limitations. It was the very first multibeam editor for MS-DOS.
2. **Windows 3.1 Version (16-bit):** Great improvements in graphical editing but still constrained by memory access. It was the very first multibeam editor for Windows®.
3. **Windows 32-bit version (MBMAX):** With 32-bit memory addressing, MBMAX was the first generation that simultaneously loaded all survey lines. This was a big step forward, allowing editing to be based on overlapping survey data. MBMAX has been refined over the years to the good program it is today. It's showing its age, however, and it's time to move on. Hence, the 64-bit generation 4 editor.

PLANS FOR THE 64-BIT VERSION

Before any software work, I put together a list of suggestions for improvements in HYSWEEP® editing. It became a Very Big List.

Here are some highlights of the development plan. The big stuff. It is nowhere near a complete list.

- **Increase the number of beams per ping from 1,440 to 5,000:** This applies to interferometry systems and topographic laser scanners, not true multibeam systems. But why stop at 5,000? The 64-bit editor will handle an unlimited number of beams/shots/interferometry points per ping. That should do it.
- **Load Larger Surveys:** The latest MBMAX (with improved memory management) loads ridiculous amount of data. But people want more and the 64-bit version will provide it. Up to the amount of memory you are willing to buy for your computer. You can go 16 gigabytes now, perhaps next week 32 or 64!

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- **Edit Multiple Surveys Simultaneously:** In MBMAX, if you want to edit a multibeam and laser survey together, you were limited to using XYZ files. Kind of clunky. The 64-bit version will overcome that limitation.
 - **Faster Loading of Edited Files:** MBMAX is very slow to reload edited files. That's due to the choice of small files over fast reload. The 64-bit version will reload very quickly at the expense of larger edited files.
 - **Save ALL data in Edited Files:** An example problem with MBMAX; editing is done using a *.TID file to replace RTK tides, so RTK tides are not saved to the edited files. Also due to limiting file size. The 64-bit version will save every bit of raw data to the edited files.
 - **MBMAX Edit Phases:** OK, this one can be annoying. Edit phases 1, 2 and 3 in MBMAX are quite rigid. After transition from phase 1 (raw data review) to phase 2 (line by line depth data), phase 1 editing becomes closed. Ditto phase 2 to phase 3 (area editing). GRRRR, right? The 64-bit version will remove these restrictions.
 - **Point Cloud Editing:** In HYPACK, the Cloud program is the only place for point cloud editing. Nothing in MBMAX. The 64-bit version will provide point cloud editing, bringing us in line with other MB processing systems.
 - **Faster Drawing:** Drawing needs to be optimized for large, larger and largest data sets.
 - **CUBE:** Integrate CUBE algorithms into the HYSWEEP Editor. Currently, CUBE resides in a separate program.
 - **Parallel Processing:** (Just put this in to emphasize that we already do this! I don't know that anyone else does.)

PROGRESS

Although progress has been slow initially, it should pick up soon. Here are some highlights.

SURVEY OPTIONS SHEET:

Problem: When loading files in MBMAX, important settings are hidden behind tab sheets and drop down lists.

FIGURE 1. HYPACK® SURVEY Options Sheet

The 'Survey Options Sheet' dialog box is organized into several sections:

- *Survey Info:** Includes a 'Details...' button and a date field set to '12:07:05 06/18/2008'.
- *Corrections:** Contains fields for '*TID File...' (set to '*Previous=DummyTide.tid') and '*VEL File...' (set to '*Previous=DummySVP.vel'), each with an 'X' button.
- *Device Settings:**
 - *Navigation: 'Hypack; X=0.00; Y=0.00; Z=-8.00'
 - *MRU: 'Odom; X=0.00; Y=0.00; Z=0.00'
 - *Heading: 'Odom; *Yaw=0.00'
 - *RTK Tide: '*Not Using RTK Tides'
 - *Sonar Head 1: 'Odom; X=0.00; Y=0.00; Z=2.60'
 - *Sonar Head 2: (empty)
- *Patch Test: '*Yaw=7.00; *Pitch=-2.50; *Roll=0.40' with an 'Edit...' button and a '*Load From Boat Config File...' button.
- *Processing:**
 - *Depth Mode: (radio button)
 - *Elevation Mode: (radio button, selected)
 - Heave...: '*Use MRU Heave; *Correct for Induced Heave'
 - *Sonar...: '*Ray Tracing=*Auto Select; *Presort=*Off'
- *Files:** A list of files (000_1207.HSX, 000_1216.HSX, 000_1221.HSX, 000_1224.HSX, 000_1226.HSX) with buttons for '*Apply These Settings to All Files' and '*Apply These Settings to Selected Files'. A checkbox for '*Take All Settings From the Edited Files' is unchecked.

Buttons for 'OK' and 'Cancel' are at the bottom right.

FIGURE 2. Patch Test Offsets Dialog

The 'Patch Test Offsets' dialog box contains the following settings:

- *Sonar Head 1:**
 - *Yaw: 1.20
 - *Pitch: -2.50
 - *Roll: 0.40
- *Sonar Head 2:**
 - *Yaw: (empty)
 - *Pitch: (empty)
 - *Roll: (empty)
- *GPS:**
 - *Latency: 0.000

Buttons for '*Patch Test History...', 'OK', and 'Cancel' are at the bottom.

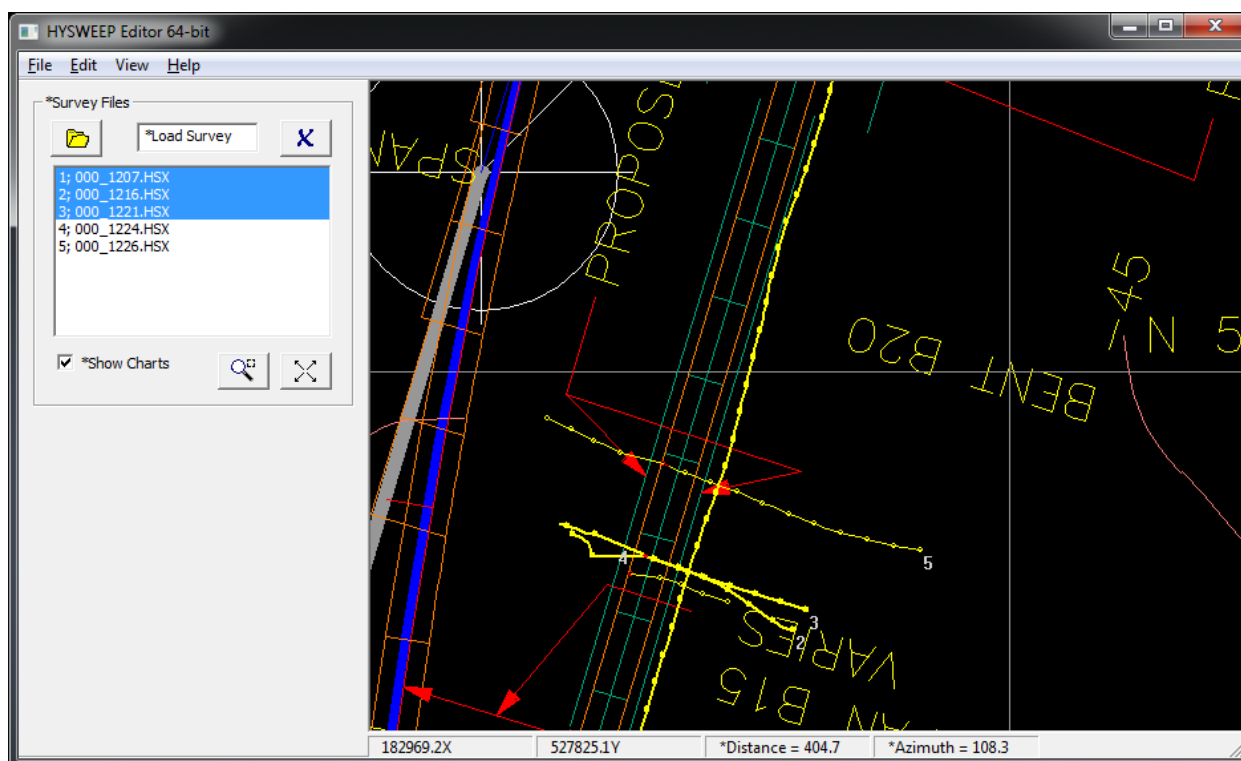
Solution: The 64-bit version uses a 'Survey Options Sheet' instead of tabs and drop downs. The options sheet gives a summary on a single page. The detailed information (patch test for example) is available using the edit buttons.

SURVEY (MAP) WINDOW

The 64-bit editor integrates file selection with a view of the survey and selected charts / drawings. This may not seem like much, but it allows some things we couldn't do in MBMAX.

The list of survey files is prominent and the editor will take good advantage of the ability to select multiple files. For example, offsets for some (but not all) files can be adjusted by selection. Time series graphs can be 'stacked' using multiple selections. And so on. The end result will be faster and more flexible editing.

FIGURE 3. MBMAX 2012 Survey Window



WHAT'S WITH ALL THE *'S IN THE SCREEN SHOTS?

Place holders for words and phrases that need translation.

SUMMARY

HYSWEEP® has always been multibeam software for anyone with programs that can be learned and used easily. That's still the goal for the HYSWEEP® 64-bit Editor. We're just ramping up the sophistication a notch or two.