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MBES – Data Collection

HYPACK 2022 – Training Event

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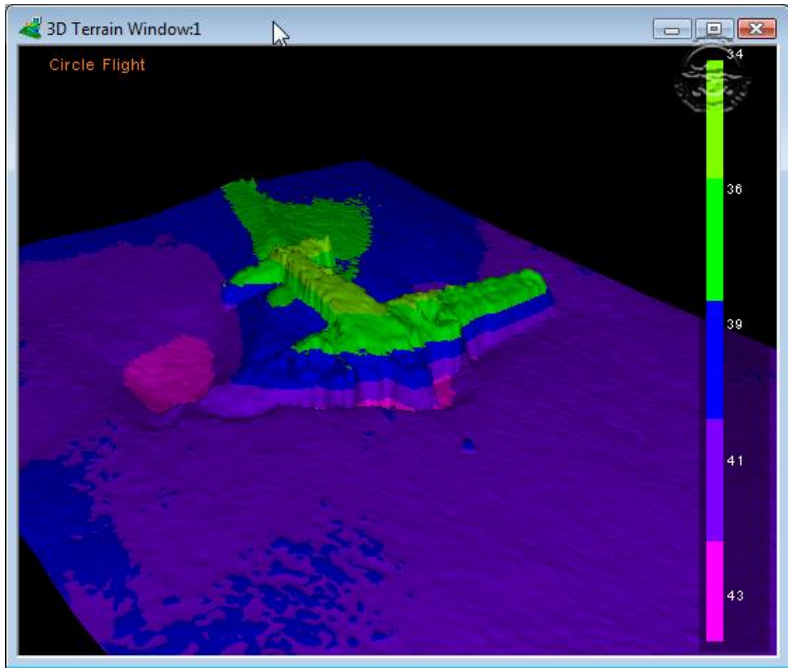
HYSWEEP® Overview

HYPACK 2022 – Training Event

HYSWEEP® Overview

S/V Bufe - USACE Sault Ste. Marie Area Office

Full Coverage Survey of a DC3.



Multibeam vs. Single Beam

The Good:

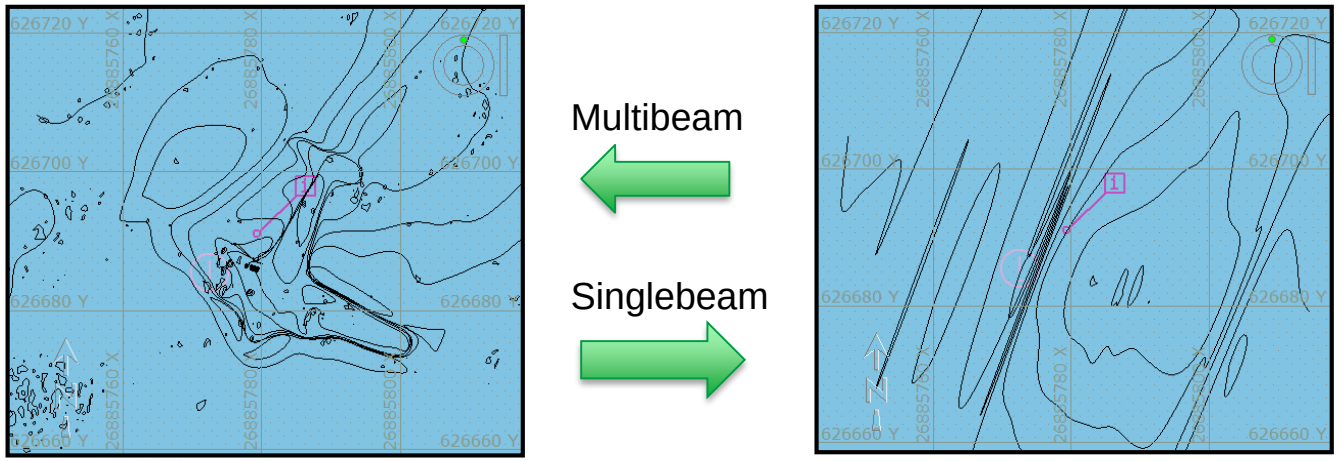
Saves time: Multibeam provides high resolution and full coverage of the seafloor. The data is more accurate for volume computations.

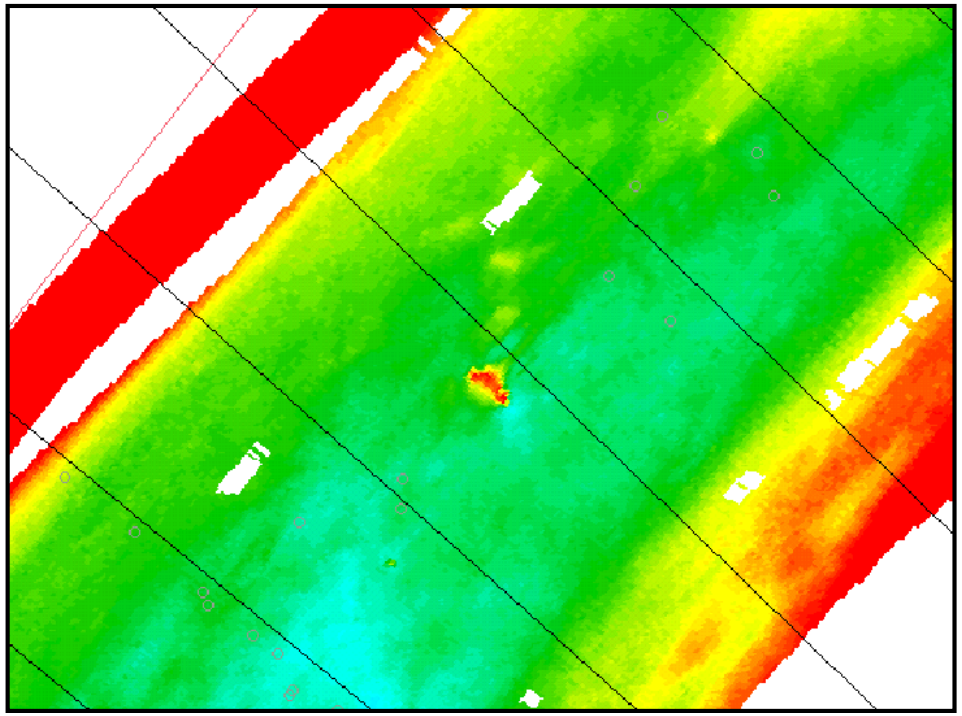
The Bad:

More data to work with but takes more time to process. With additional sensors needed, there are more error sources.

The Ugly:

Plane is lost entirely in singlebeam contours.





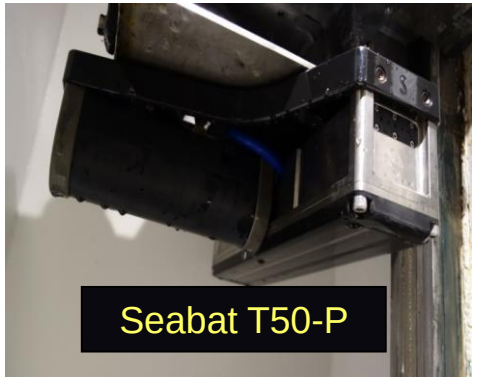
Example of using a Multibeam where previous work was with single beam sonar. An Obstruction was easily missed

Multibeam Sonar Types

Beamforming Systems:

Forms beams using an array of transducer elements.

Each beam has a Maximum Response Angle, giving the direction of the beam.


Seabat T50-P

Interferometric Systems:

AKA ‘bathymetric sidescan’.

Forms beams from phase angle of backscatter.

Edgetech 6205

Multiple Transducer Systems:

Widely spaced Singlebeam transducers pointing down.


Ross Sweep System

ADCP Systems:

Angular-set transducers

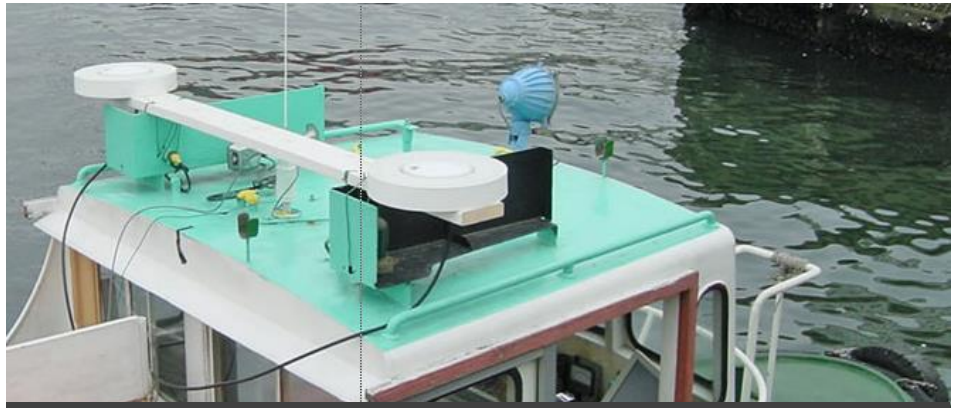

SonTek M9

CAATI Systems:

Computed Angle-of-Arrival Transient Imaging.


PING 3DSS-iDX-450

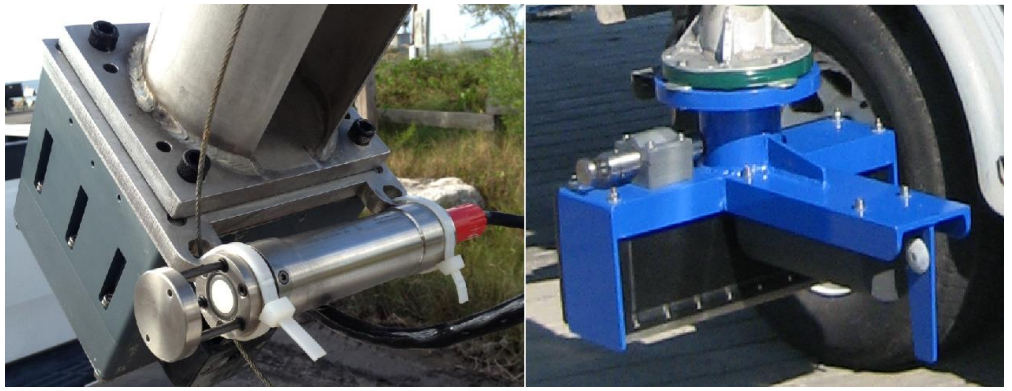
Support Sensors



Heading: Using a gyro or dual GPS antenna array.

Motion reference (MRU / IMU):

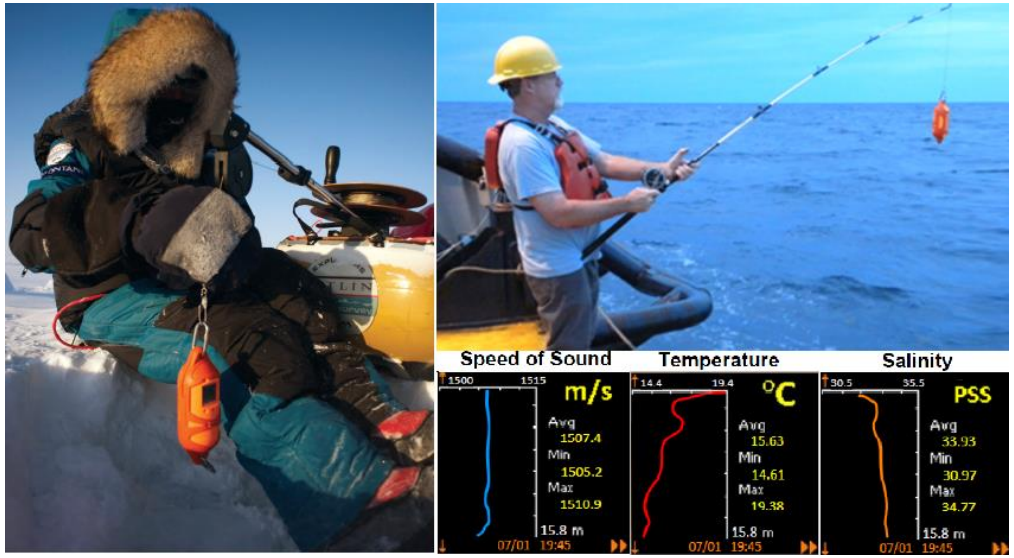
Measures boat heave, pitch and roll.



Sound Speed Sensor & Profiler:

Sensor: Sound speed at sonar head.

Profiler: Sound speed through water column.



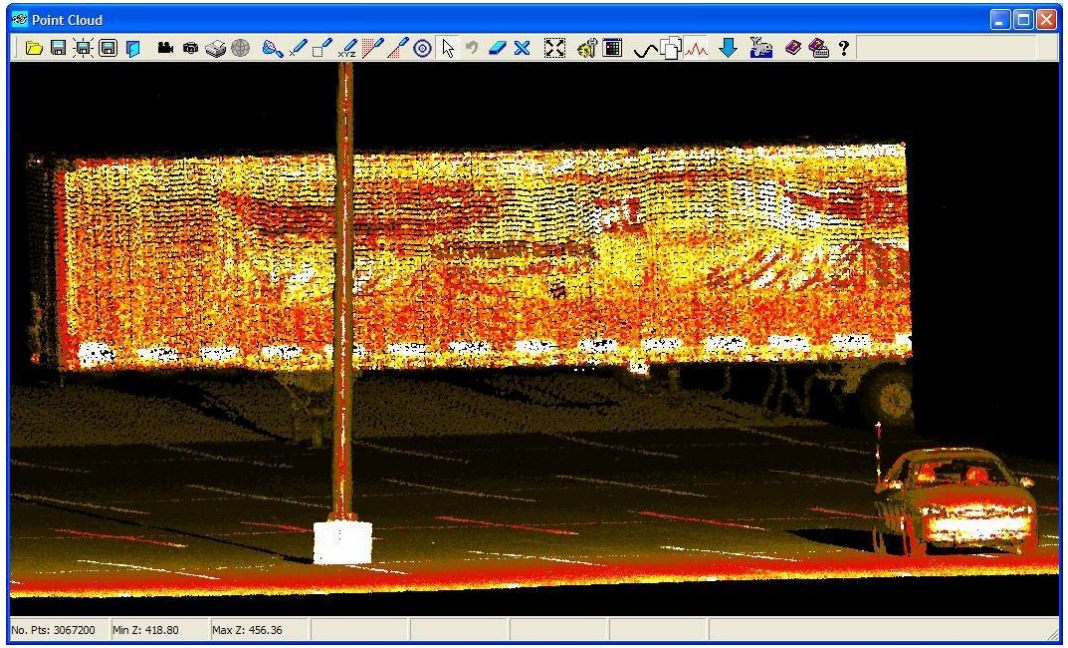
HYSWEEP® MB Interfaces

Multibeam Sonars Available in HYSWEEP®:

- **Atlas**: Bomasweep, Fansweep, Hydrosweep MD2, MD/30, MD/50, DS.
- **Benthos**: C3D.
- **BlueView**: MB2250/1350, BV5000.
- **EdgeTech**: 2205, 4600/6205.
- **Furuno**: HS Series.
- **GeoAcoustics**: GeoSwath.
- **Ibeam** Multibeam
- **Imagenex**: Delta T, DT100/101 SIR, Dual Delta T
- **IS Tech** Multibeam
- **Kongsberg**: MS1000, M3
- **Klein**: 5000, Hydrochart 3500
- **Norbit**: WBMS single and dual head, WINGHEAD
- **Odom**: ES3, Dual ES3, Echoscan II, Miniscan, MB1 (dual), MB2 (Dual)
- **Picotech**: PicoMBES
- **Ping DSP:** 3DSS-DX, 3DSS-iDX
- **R2Sonic**: SONIC 2020, 2022, 2024, 2026 (Dual – All).
- **Reson**: Seabat 71xx, 81xx, 900x, T20P, T50P/R (Dual – All)
- **Ross**: Smart Sweep.
- **SEA**: Bathyswath, SWATHplus.
- **Seabeam**: 2100, SB1000 Series, 3000 Series.
- **Simrad (Kongsberg)**: EM 302, 710, 1002, 2000, 2040(c), 2040 Dual Head, 3000, 3002, 3002 Dual Head, SM2000, ME70 (ALL & KMALL formats)
- **SonTek**: M9 HydroSurveyor
- **Tritech**: SeaKing.
- **WASSP**: Multibeam, DRX

At last count, 50 different multibeam and multiple transducer systems are supported.

HYSWEEP® Topographic Lasers



Renishaw Merlin

REIGL V-Series

- **2G Robotics** ULS-500
- **Leica:** P20/P15/P30/P16, P40, P50
- **Newton** Laser (Beta)
- **Optech:** ILRIS, Polaris
- **Ouster** OS-1
- **Quanergy** M8 Beta (Horizontal & Vertical)
- **Renishaw/Carlson:** Dynascan & Merlin
- **RIEGL:** LMS and V Series, miniVUX
- **Trimble:** MX2
- **Velodyne:** VLP-16 (Hi Res)/32, HDL-32E

Velodyne VLP-16

HYSWEEP® Driver Reference

Motion / Heading / Other Sensors:

- **Advanced Navigation**: Spatial, Spatial Dual, Spatial FOG Dual, etc.
- **AML:** AML-3, AML-6
- **Applanix**: POS/MV, (Ocean, Wave, and Surf Master Models).
- **Coda Octopus:** F180.
- **IXSEA**: OCTANS, PHINS, Hydrins.
- **JAE:** JM7531.
- **KVH**: Gyrotrac.
- **Novatel**: SPAN
- **Odim**: MVP (Moving Velocity Profiler - HYPACK Survey driver).
- **SBG**: Ellipse, Ekinox and Apogee Models
- **Seatex**: MRUx.
- **SG Brown**: 1000S.
- **Sontek** YSI Castaway
- **TSS**: 335B, DMS.
- **Valeport**: Swift CTD.
- *** - Other sensors available via the generic and NMEA drivers.

Sontek Castaway CTD/SV Probe

AML AML-3 CTD/SV Probe

Valeport Swift CTD/SV Probe

Installation

Hull Mount

Pole Mount: Over the Side

Pole Mount: Bow

Moon Pool

Sonar mounting (in order of preference *for data quality*):

- Hull mount at boat CG
- Moon pool at boat CG
- Pole mount; bow or over the side

Motion Sensor: Mount at boat CG. Alternate location: As close as possible to boat CG.

Integrated MRU at the Sonar is becoming commonplace.

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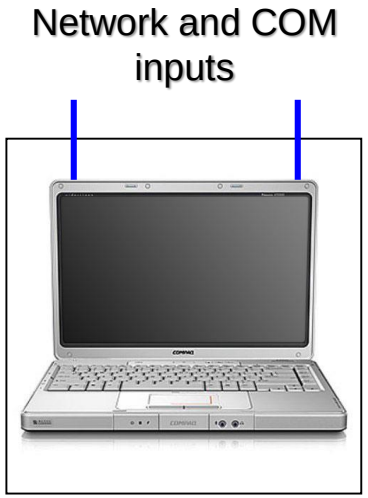
HYSWEEP® HARDWARE

HYPACK 2022 – Training Event

Sensor Interfacing

Bringing in the data

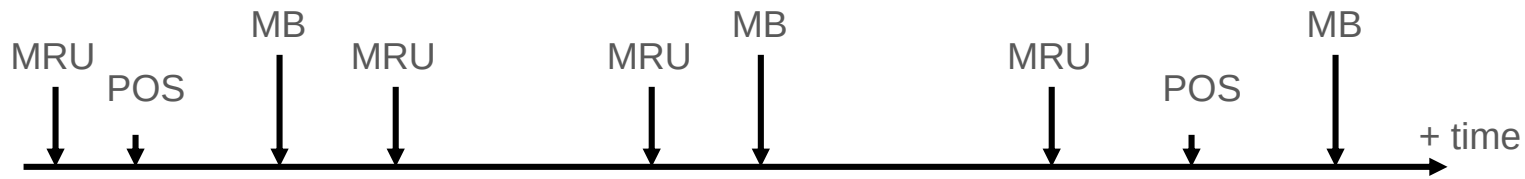
- **Network**: For high volume data like multibeam. Data is received with UTC time tag.
- **Serial RS-232**: For lower data volume like GPS.



Time Tagging

- ***Very Important*** - Device data are correlated by time tags.
- All devices **must** use the same time base – UTC time or PC time.

  Without it, data will not be good
- Typically, Motion and Heading messages do not contain time tags. Data gets timed at arrival to COM port.
- Exception is GPS ($GPGGA has a UTC time tag) and Inertial Systems (embedded time tag in data packet).



Asynchronous data are correlated with time tags.

Do I Need to Synch My Clock to UTC?

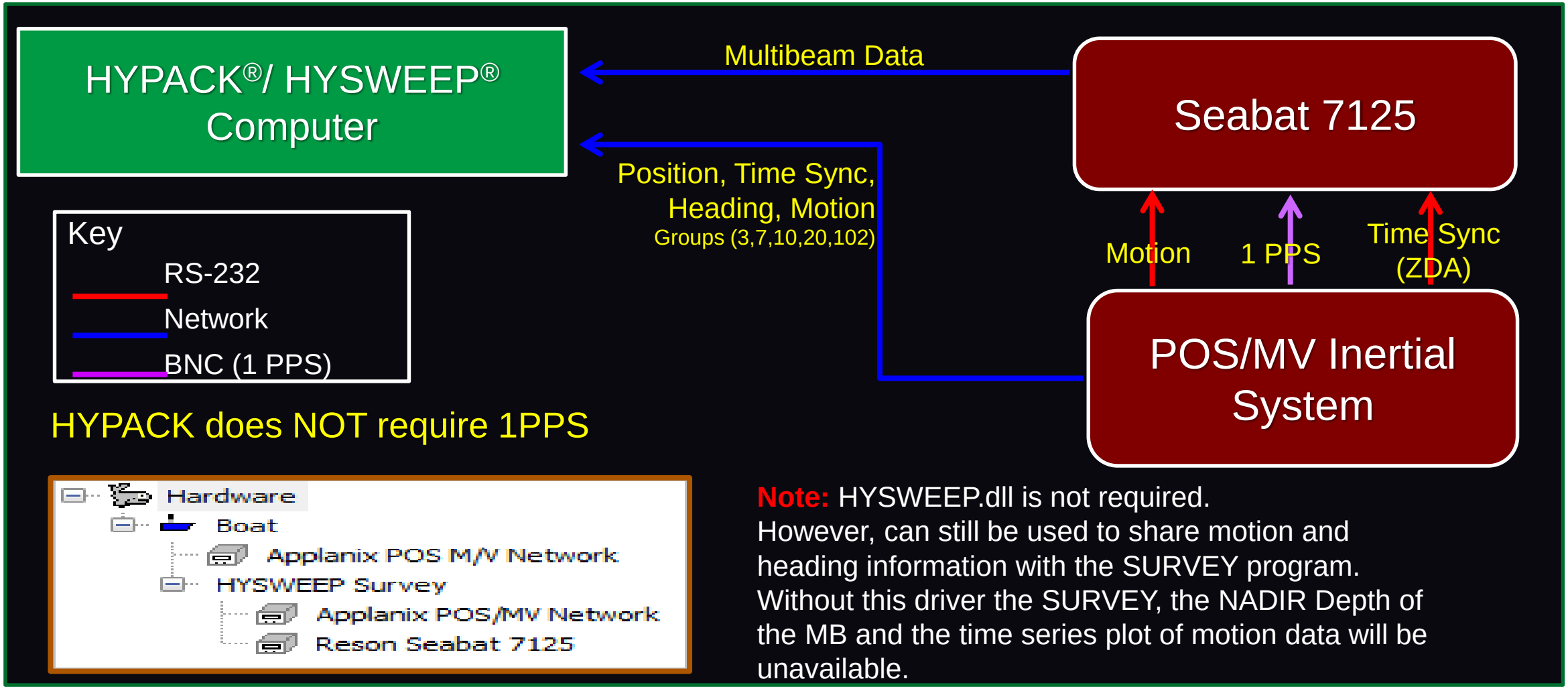
If you have a Positioning device that sends datagrams with UTC time stamps, AND devices that do NOT have embedded UTC time stamps, then the answer is:

Yes

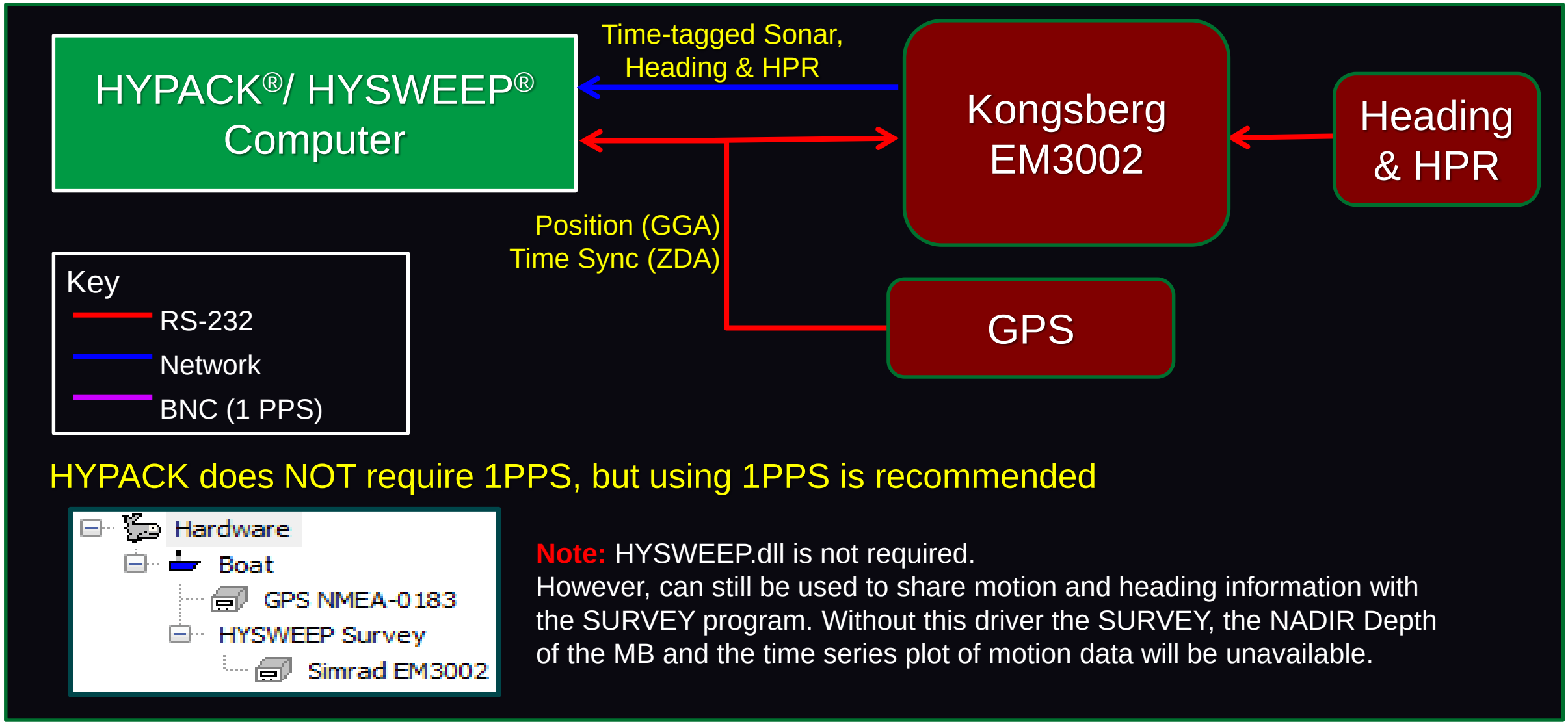
Examples of when time synch to UTC is required:

- GPS (UTC), Seabat (UTC), TSS DMS/05 (No time sent), Gyro (No time sent).
- POS/MV (UTC), Seabat (UTC), Single beam on a COM port (No time sent).
- Time Synchronization by GPS ZDA ONLY = +/- 10 – 30 mSec in Latency, however, it can be improved to +/- 1 – 5 mSec in Latency by using a HYPACK 1PPS Box.

Reson Seabat 7125



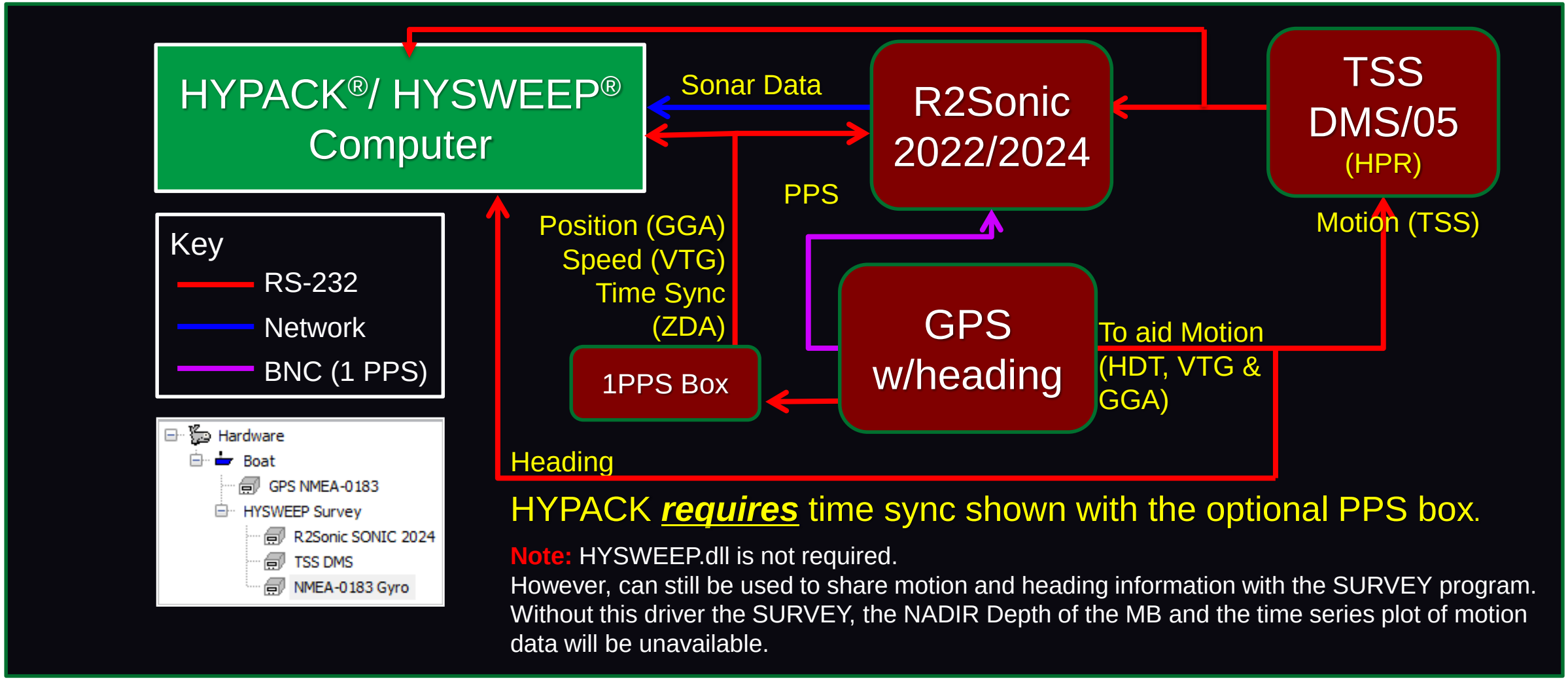
Kongsberg EM3002



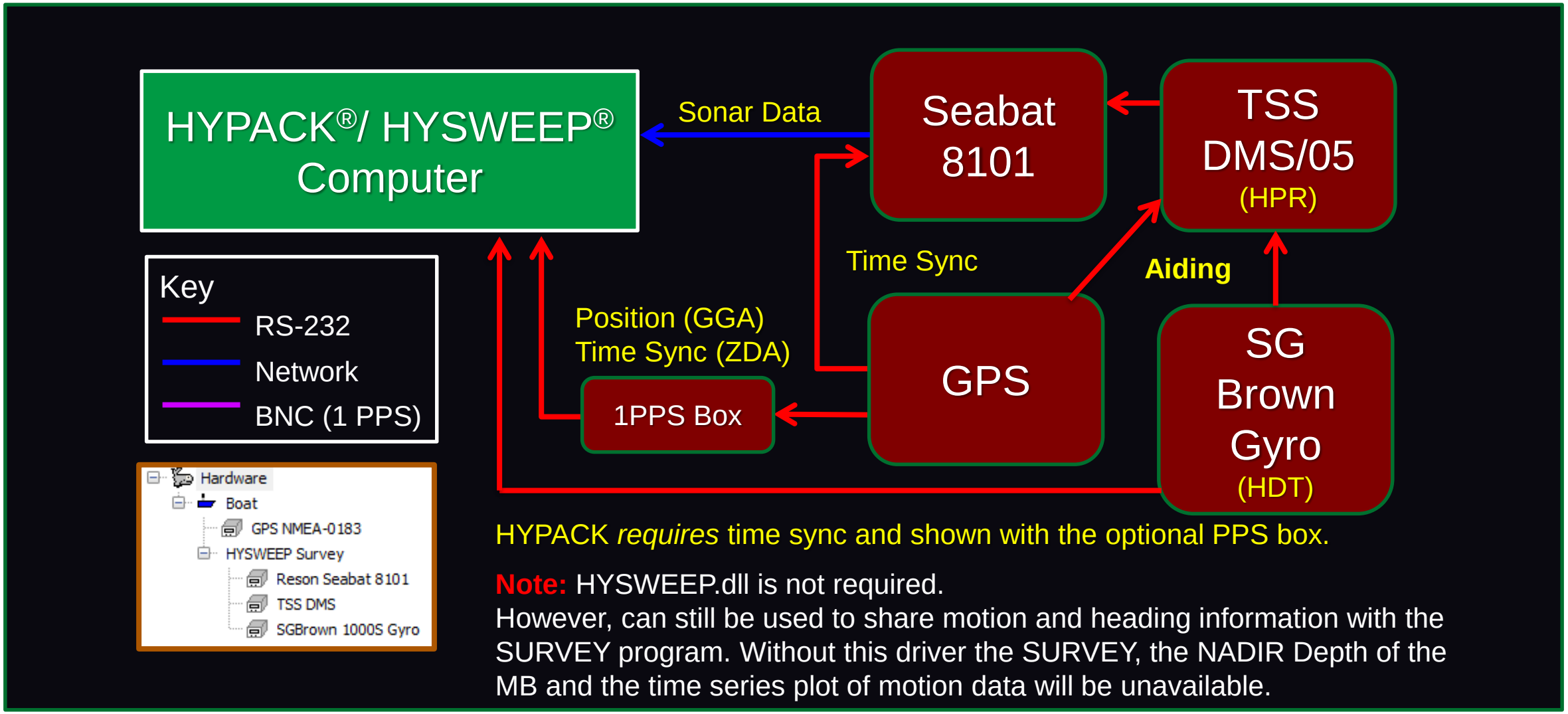
HYPACK does NOT require 1PPS, but using 1PPS is recommended

Note: HYSWEEP.dll is not required.
However, can still be used to share motion and heading information with the SURVEY program. Without this driver the SURVEY, the NADIR Depth of the MB and the time series plot of motion data will be unavailable.

R2Sonic with 1PPS Box (example)



Reson 8101 with 1PPS Box:



HYPACK *requires* time sync and shown with the optional PPS box.

Note: HYSWEEP.dll is not required.
However, can still be used to share motion and heading information with the SURVEY program. Without this driver the SURVEY, the NADIR Depth of the MB and the time series plot of motion data will be unavailable.

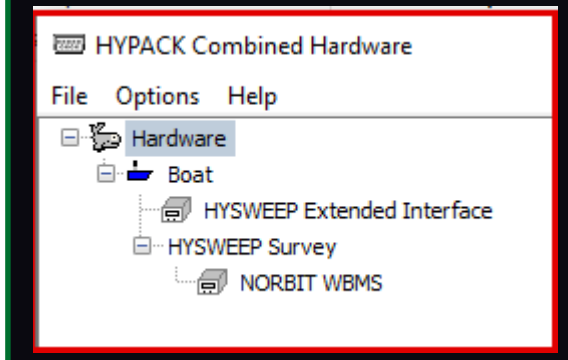
NORBIT iWBMS

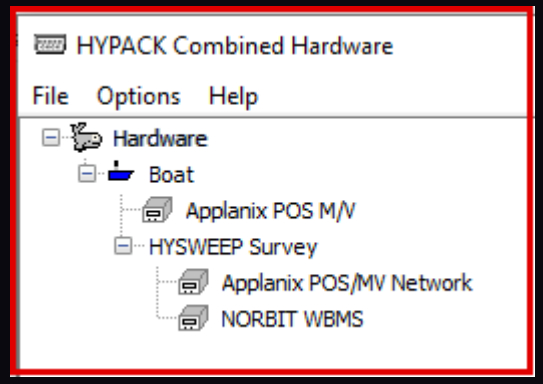
HYPACK®/ HYSWEEP® Computer

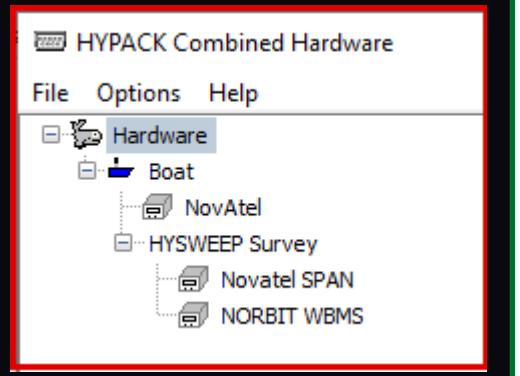
Multibeam Data
Position, Time Sync,
Heading, Motion, Tide

NORBIT iWBMS (w/ integrated IMU)

HYPACK does NOT require 1PPS







Note: HYSWEEP_Extended.dll can also be used to 'share' Position, Tide, Motion, Heading and Nadir Depth information with the SURVEY program. Primarily for Dredge Monitoring. Not recommended for detailed surveying or precise timing.

Offsets

Adjustment for:

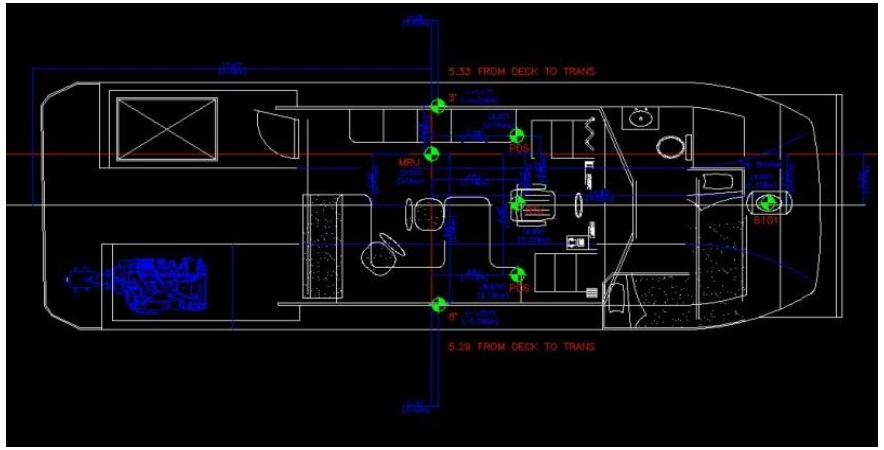
Boat Origin (AKA Reference Point): Vessel Center of Gravity XY. Static waterline Z.

Device Location: Offsets in X (Starboard), Y (Forward) and Z (Vertical), as measured from boat origin.

(Be aware that X and Y are reversed in most Inertial systems)

Device Rotation: Pitch, Roll and Yaw orientation of directional devices such as multibeam sonar.

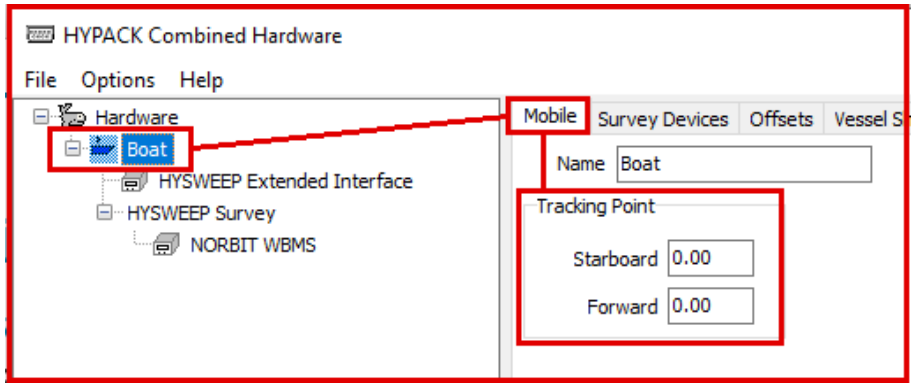
Device Latency: Time delay = data arrival time – data valid time.



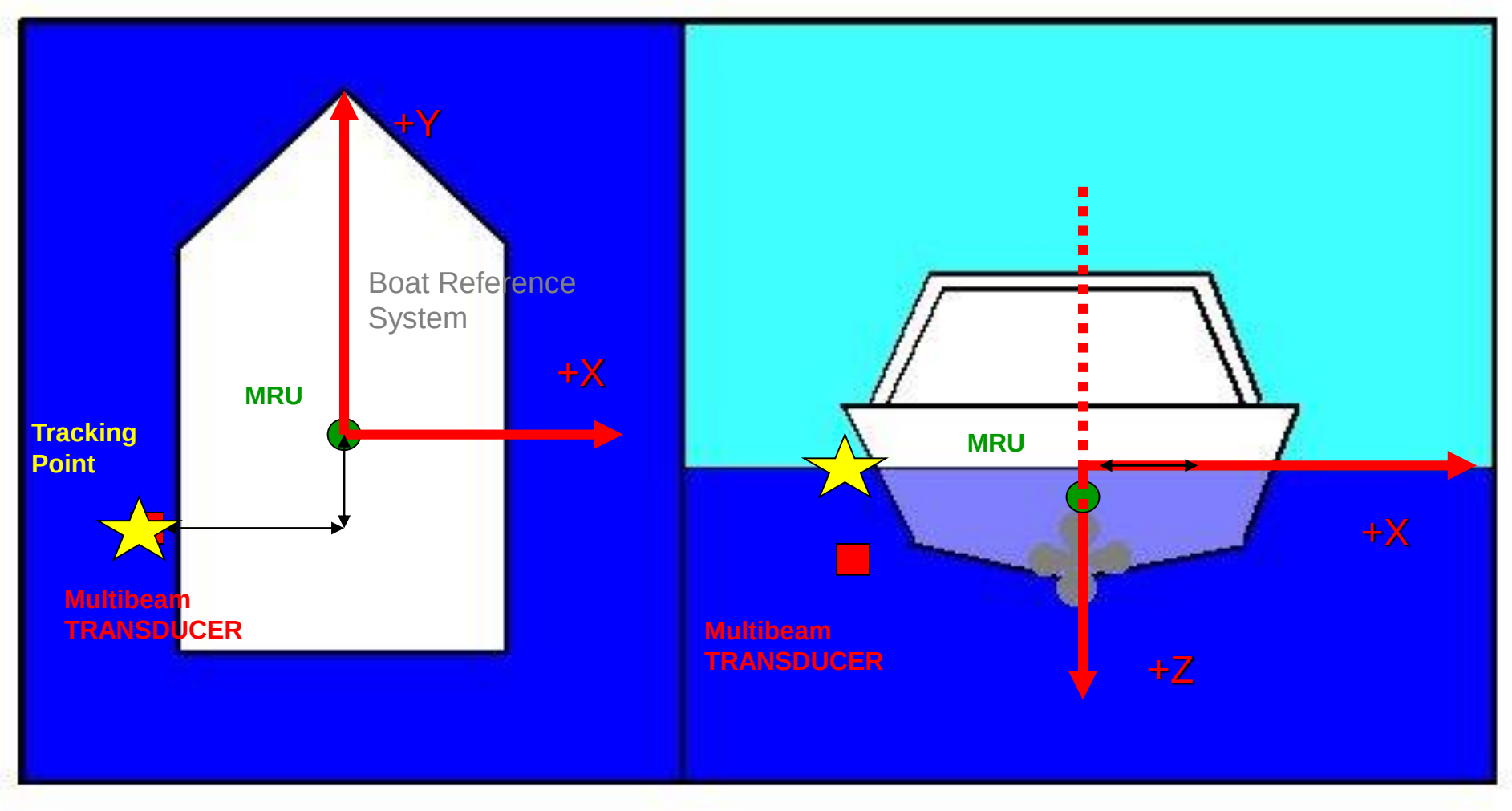
"Red Rogers" and drawing (device locations).

Tracking Point: XY location of the sonar head. Used to adjust the Left/Right indicator.

HYPACK HARDWARE – Boat - Mobile



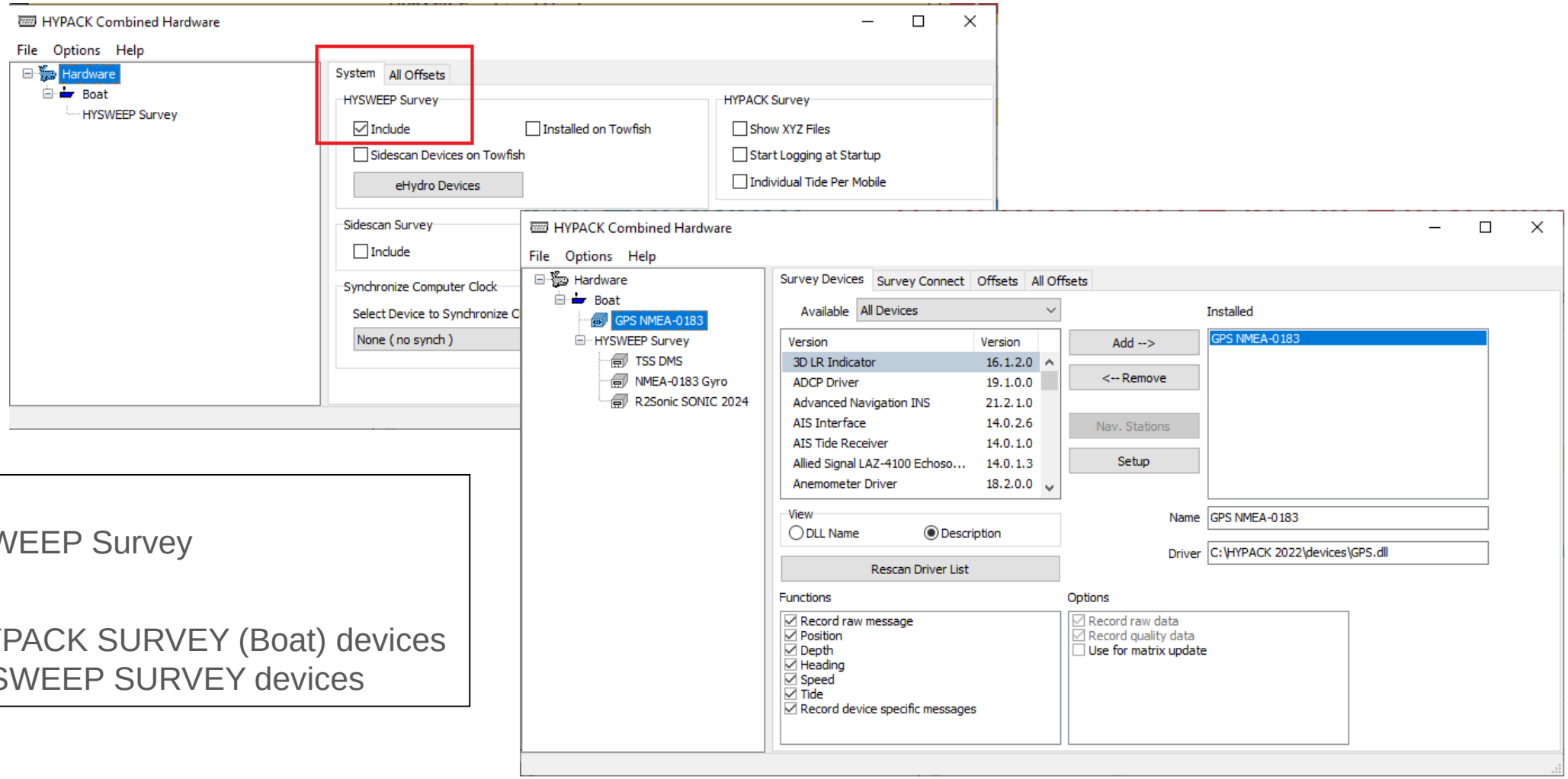
Boat Origin & Tracking Point



In this example, the MRU is at boat origin, tracking point is over the transducer.

HYPACK® Hardware

Combined Hardware program will set the hardware for both HYPACK® and HYSWEEP®.



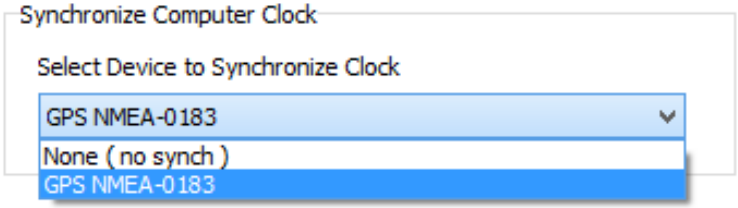
- System Tab:
  - Include HYSWEEP Survey
- Main page:
  - Configure HYPACK SURVEY (Boat) devices and then HYSWEEP SURVEY devices

HARDWARE (HYPACK® SURVEY)

Positioning Devices (Heading and RTK Tide, as needed):

GPS.DLL (just about any make and model)	COM Port or Network
ADVANCEDNAVIGATION.DLL (ANSS INS Systems)	Network
POSMV.DLL (Applanix INS Systems)	Network
F180.DLL (CODA F-series INS Systems)	Network
HYSWEEP_EXTENDED.DLL (NORBIT INTEGRATED INS Systems)	Network
IXSEA.DLL, PHINS.DLL, OCTANS.DLL (iXBlue/iXSEA INS Systems)	Network
SEAPATH.DLL (Kongsberg INS Systems)	Network
NOVATEL.DLL (Novatel INS Systems)	Network
SBG.DLL (SBG INS Systems)	COM Port or Network
SONARDYNE.DLL (Sonardyne INS Systems)	Network
VECTORNAV.DLL (VectorNav INS Systems)	Network

• Select 'Time Synch' option on the HYPACK configuration page (as needed).



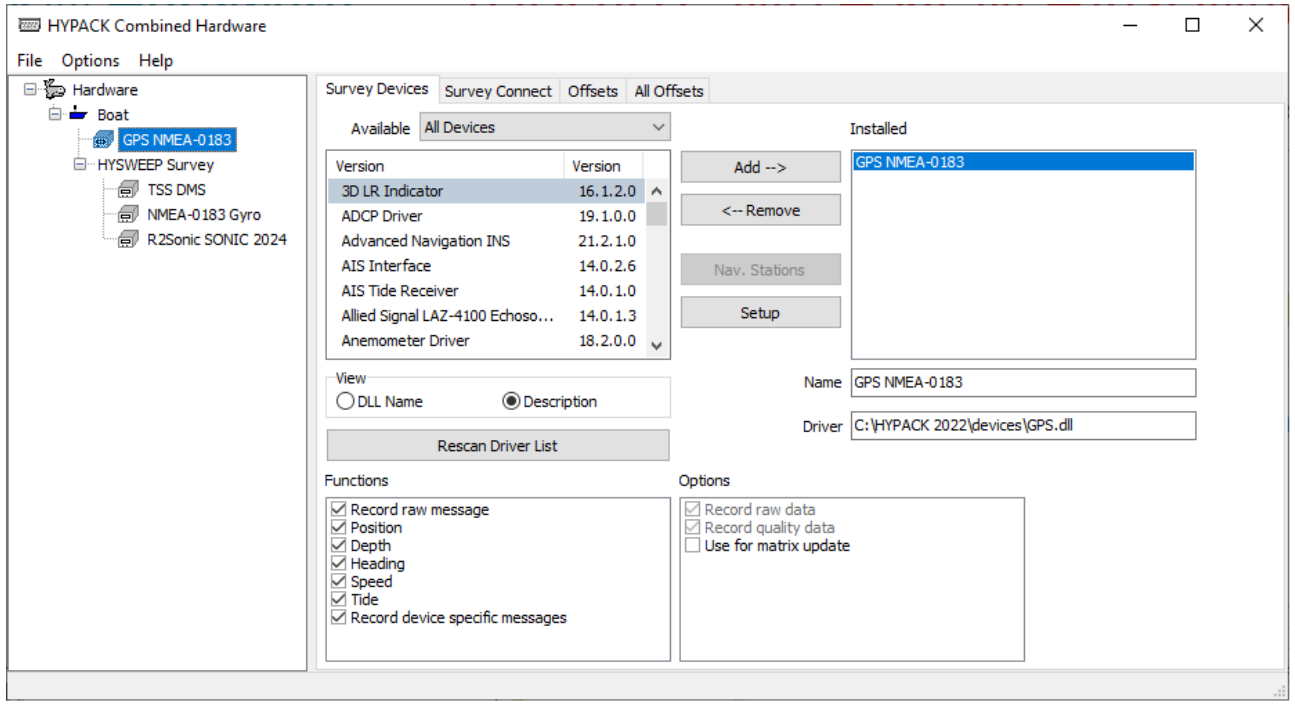
HARDWARE (Configure HYSWEEP®)

Configure the **HYSWEEP® Survey** section for:

- Multibeam, Motion sensor and Heading.

Select from Manufacturer/Model list and “Add” to the INSTALLED section.

Note: Some multibeam systems may include MRU and Heading within their driver



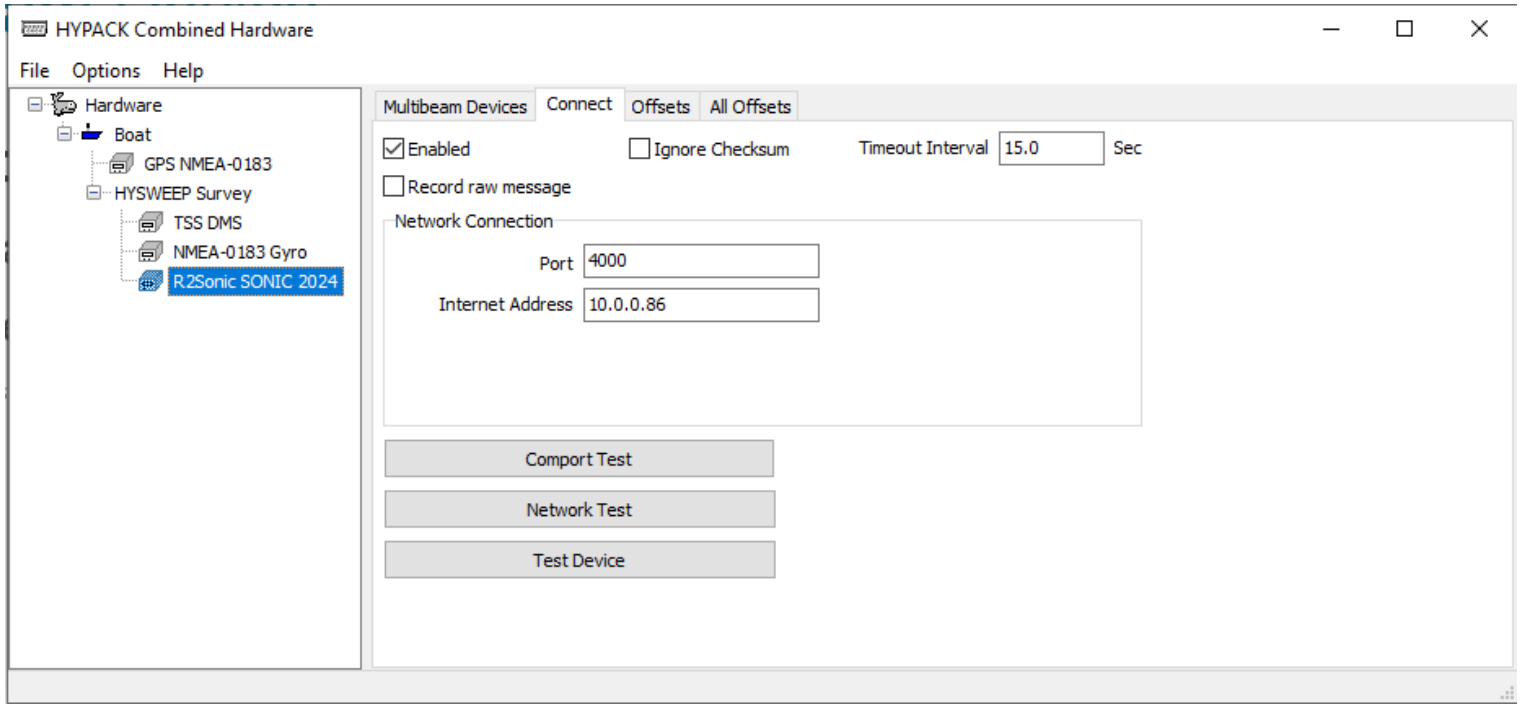
No HYPACK® Navigation device under the HYWEEP Survey section.

It is automatically included in the Hardware program.

Multibeam Device

Connect:

- Most sonars are network. (Enter the correct Port # and Internet Address, if not correctly defaulted)
- TCP/IP devices ‘require’ the specific IP Address
- Refer to “HYSWEEP Interfacing.pdf” for details (C:\Hypack 20xx\Documentation)



Multibeam Device – Offsets Tab

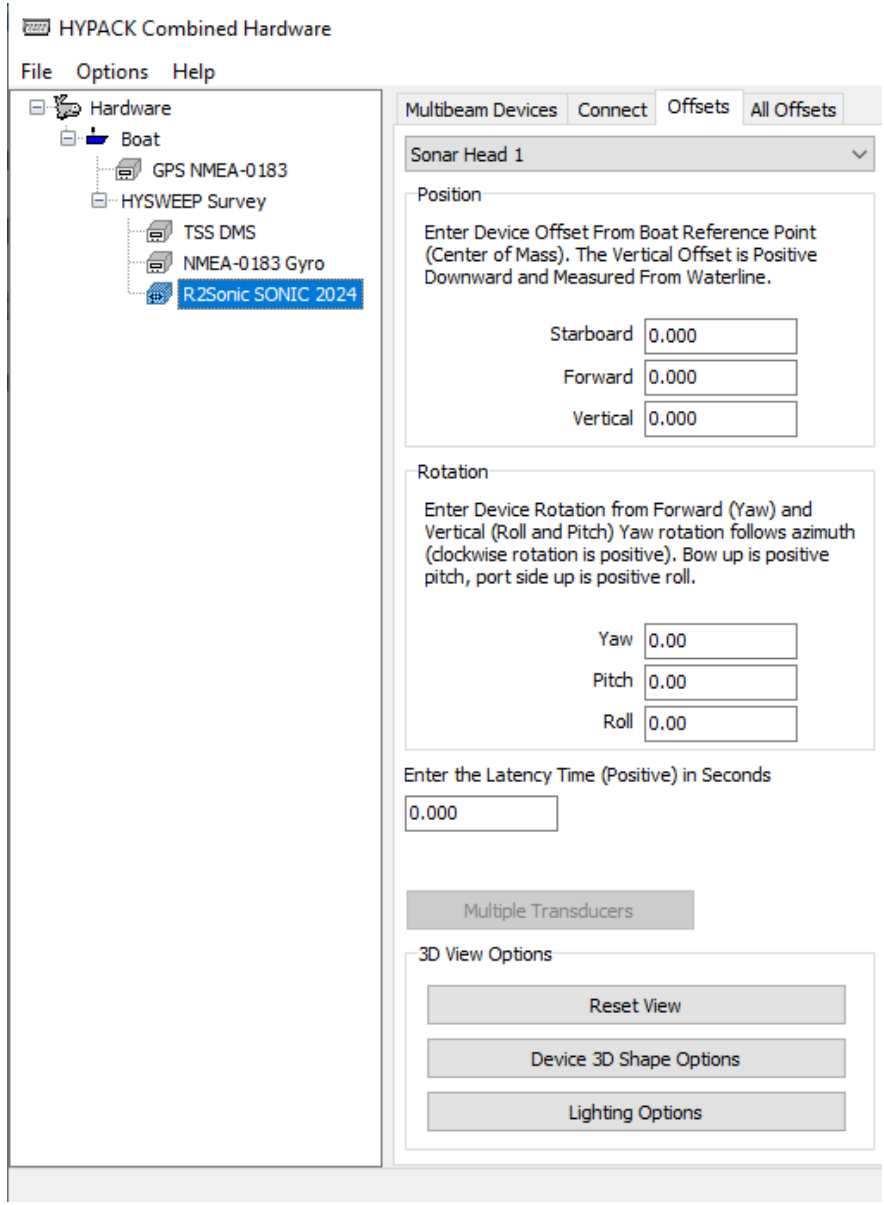
- Select **Sonar Head 1** or **2**.

- Enter **Location** offsets (Starboard, Forward, Vertical) as measured from Boat Reference Point.

- Enter **Rotation** offsets (Yaw, Pitch, Roll) from Patch Test.

- **Latency** should be 0.00.

(Navigation Latency is entered in the Positioning Device's Offsets)



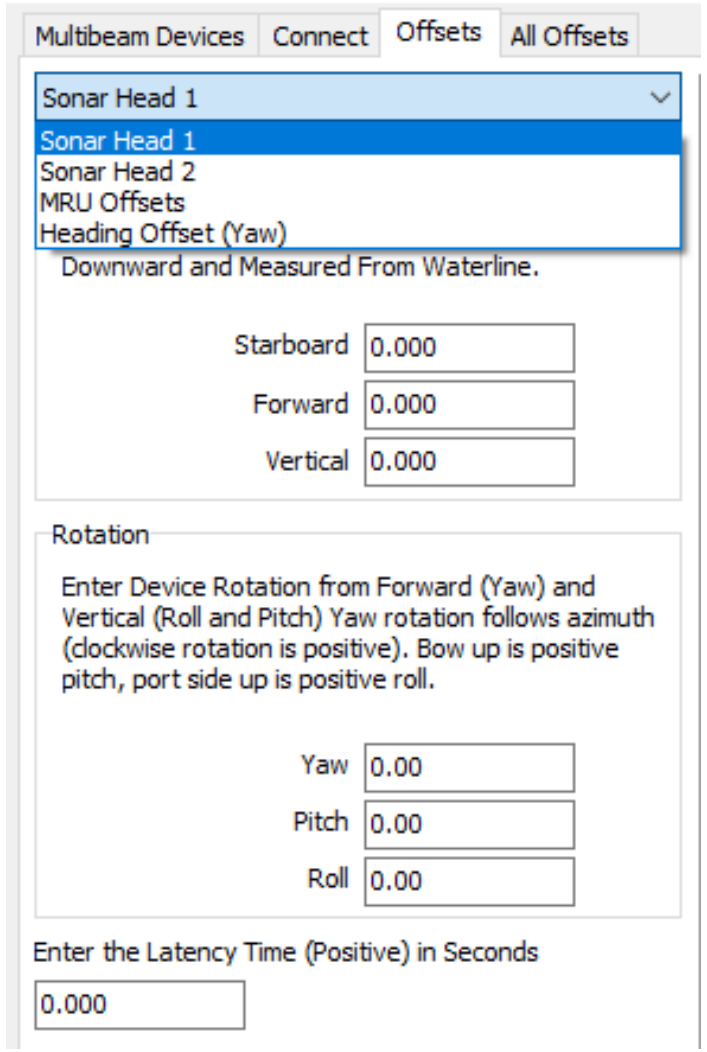
Multibeam Device – Offsets Tab (continued)

For multibeam sonars that include the Motion Sensor data embedded in their data packets, select **MRU Offsets** from the pulldown menu:

- Enter **Location** offsets (Starboard, Forward, Vertical) as measured from Boat Reference Point.

- Enter **Rotation** offsets (Yaw, Pitch, Roll) from Patch Test.

- **Latency** should be 0.00, unless otherwise stated by the manufacturer.



Motion and Heading Sensors

Devices:

Select the driver, if listed. If not…

- The “TSS1” message is standard for Heave, Pitch and Roll (**TSS DMS** driver).
- The NMEA “HDT” message is standard for Heading (**NMEA-0183 Gyro** driver).
- The **Generic Attitude** driver can be configured to parse ASCII datagrams

Connect:

Enter Network or COM settings. (Consult the “HYSWEEP Interfacing.pdf”.)

Offsets:

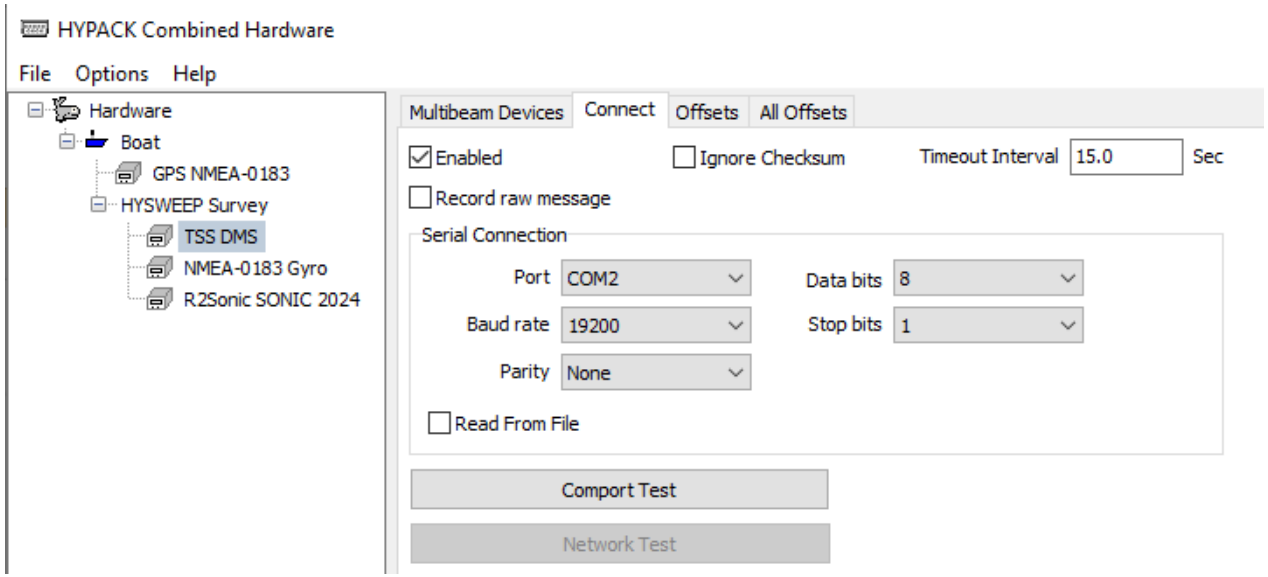
MRU Location offsets measured from boat reference.

MRU Rotation offsets can be used to “zero” Pitch and Roll.

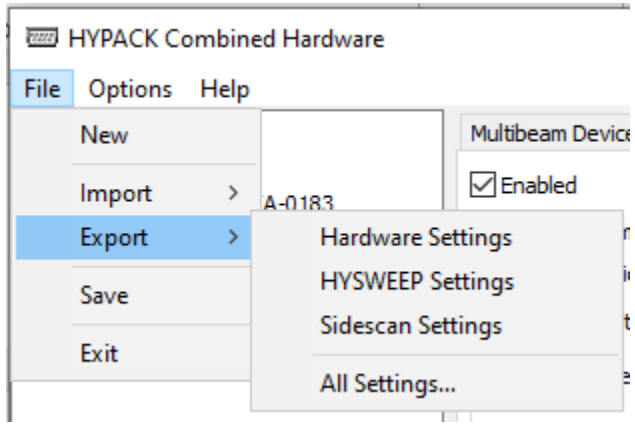
(https://www.hypack.com/File%20Library/Resource%20Library/Technical%20Notes/11_2017/HYSWEEP-Angular-Offsets---Static-Pitch-and-Roll.pdf)

Heading Rotation (Magnetic Declination) offset (Yaw) can be used to correct to Grid North.

Testing and Saving…



CONNECT Tab: Use COM Test and Network test to verify sensor is sending data



Alternate Hardware Configurations:

Open and Save alternate configurations using the IMPORT and EXPORT

Calibration Tools

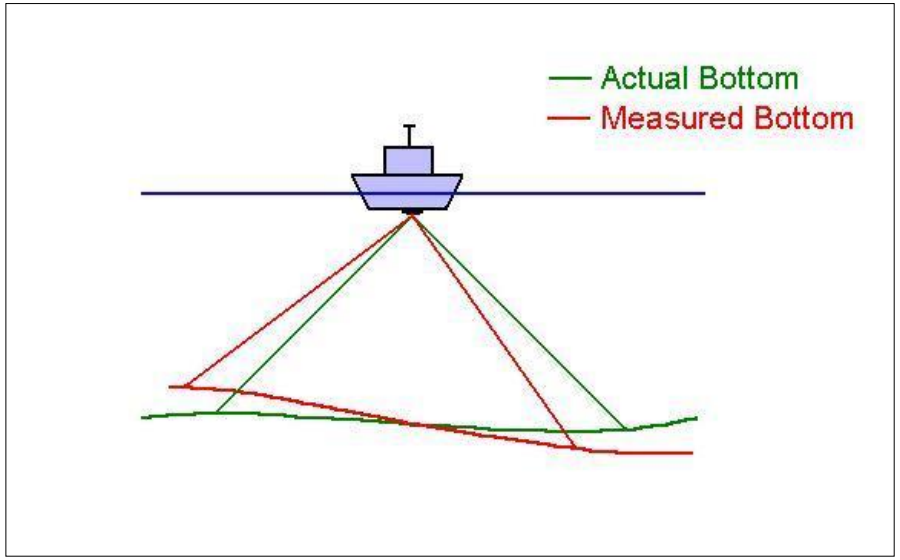
Multibeam systems need calibration!

HYSWEEP® Patch Test

Roll, Pitch, and Yaw angular alignments.

Determine the orientation of the sonar, with respect to the MRU and Heading devices.

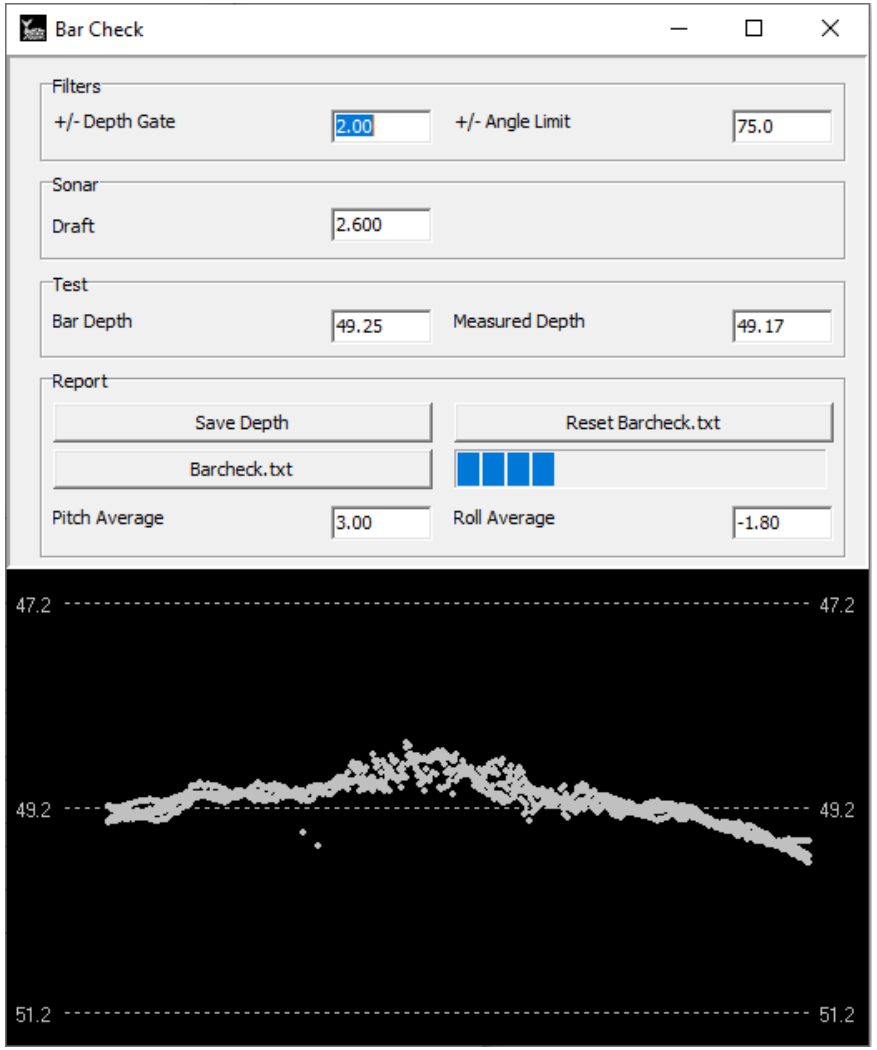
Account for GPS Latency, if needed.



Why we need to Patch test.

HYSWEEP® Bar Check

Much like single beam - verify draft measurement.



Bar check window.

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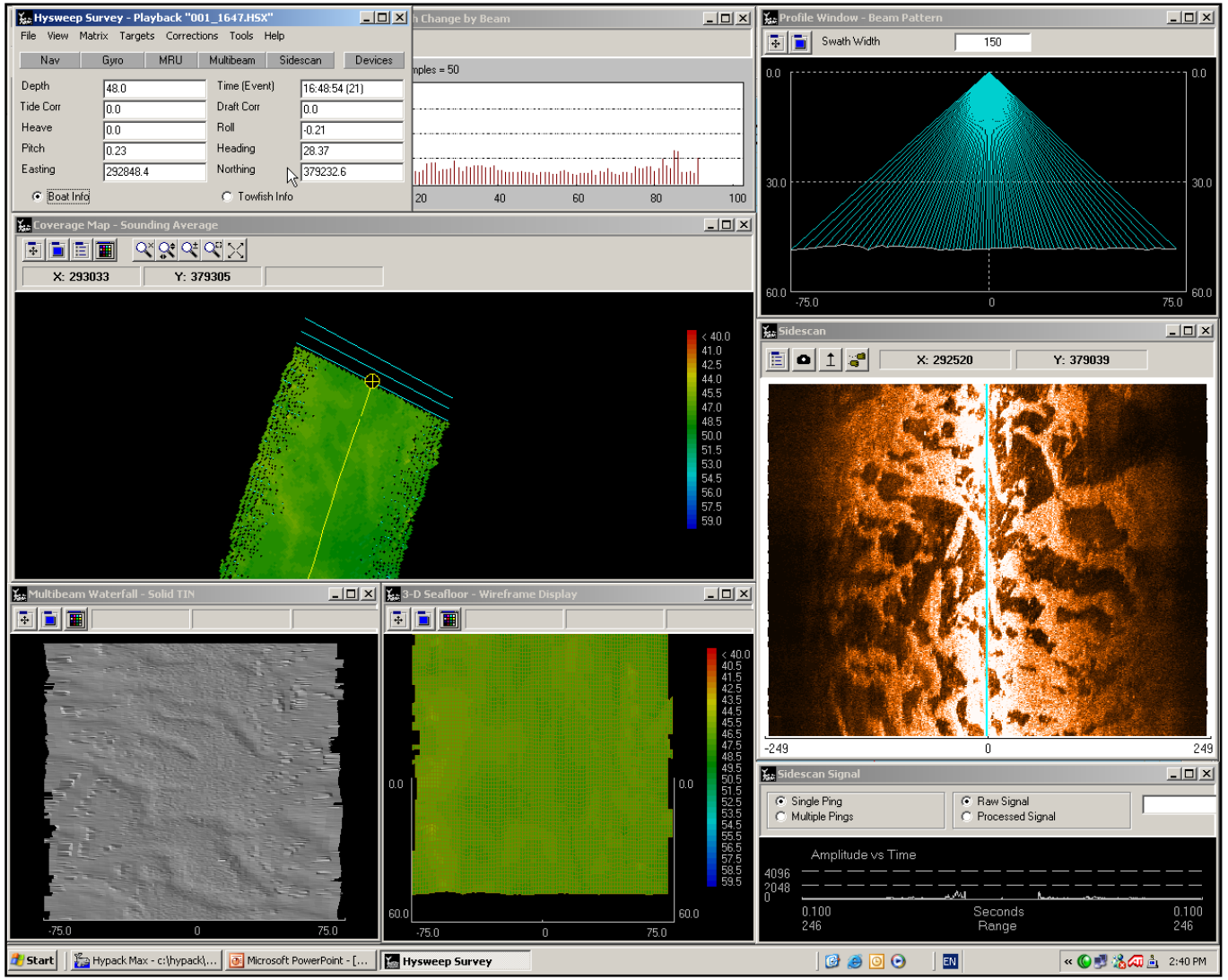
HYSWEEP® SURVEY

HYPACK 2022 – Training Event

HYSWEEP® Survey

Multibeam Survey Program

- Collects and logs multibeam and support sensors.
- Displays are Real-time corrected and provide QC info.



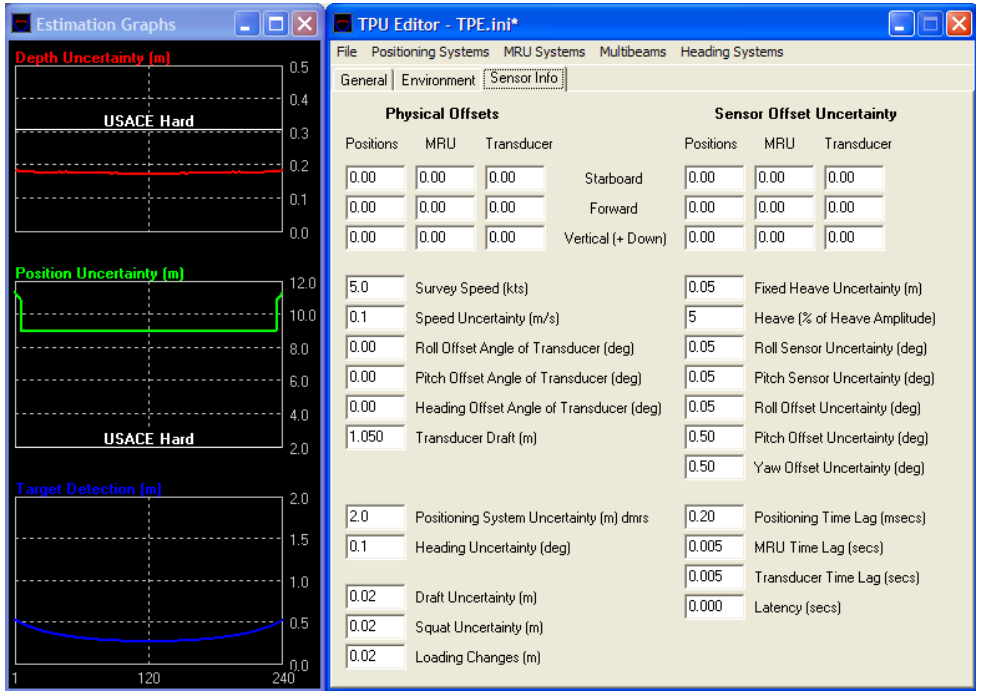
For Simulation and Survey Practice:

https://www.hypack.com/File%20Library/Sounding%20Better%20Newsletter/2014/MB-Simulation_Playback_Automtx.pdf

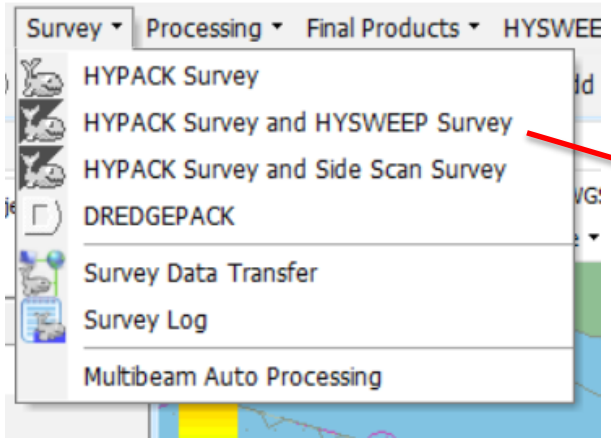
HYSWEEP® Survey

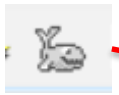
Survey Preparation:

- Geodetic parameters and HYPACK® and HYSWEEP® hardware configuration
- Planned lines or matrix for navigation
- Pre-set TPU parameters in the TPU EDITOR if you want to use Total Propagated Uncertainty
- Create Sound Velocity and Tide file to be used during survey



TPU setup





Launch Survey:

- Use menu to run HYPACK® SURVEY and HYSWEEP® SURVEY together.
- Use Smart Launch icon to run both.

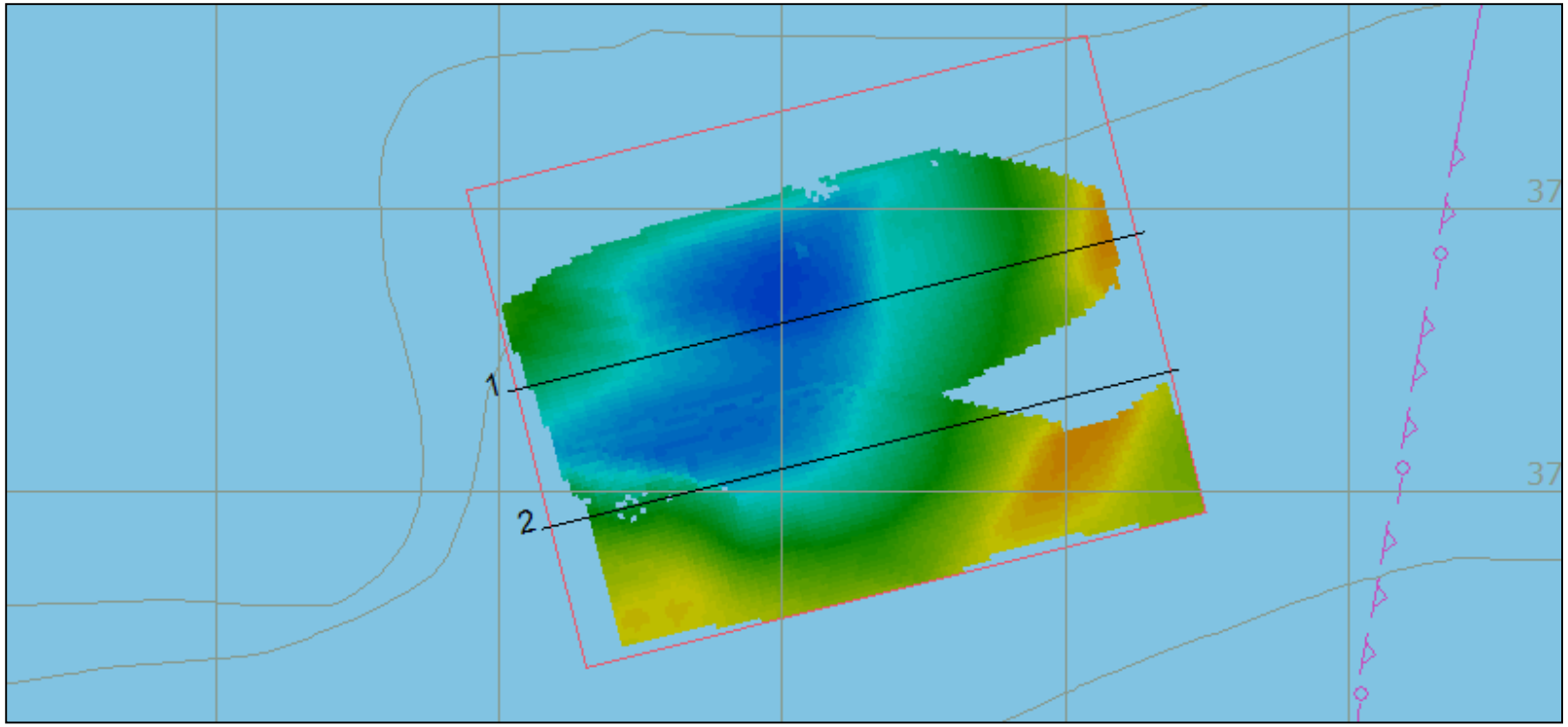
Survey Preparation

Planned Survey Lines

- Make parallel lines spaced for target coverage.
- Sometimes difficult with multibeam, as coverage changes with depth.

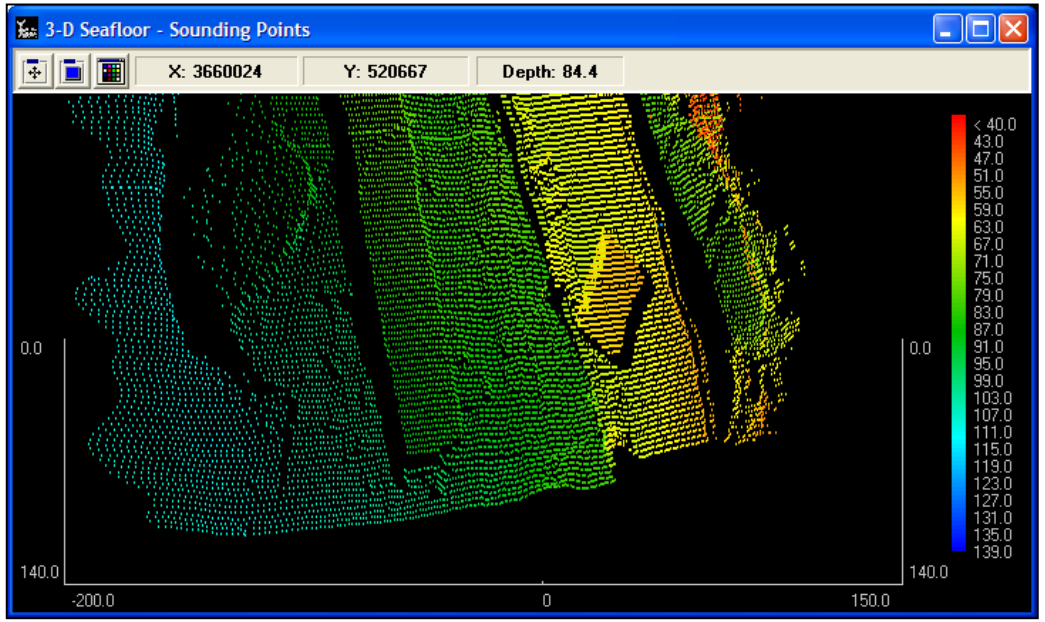
Coverage Matrix

- Alternative to planned lines.
- “Mow the Grass” and ‘paint the bottom’ to assure proper overlap and 100% ensonification is achieved.

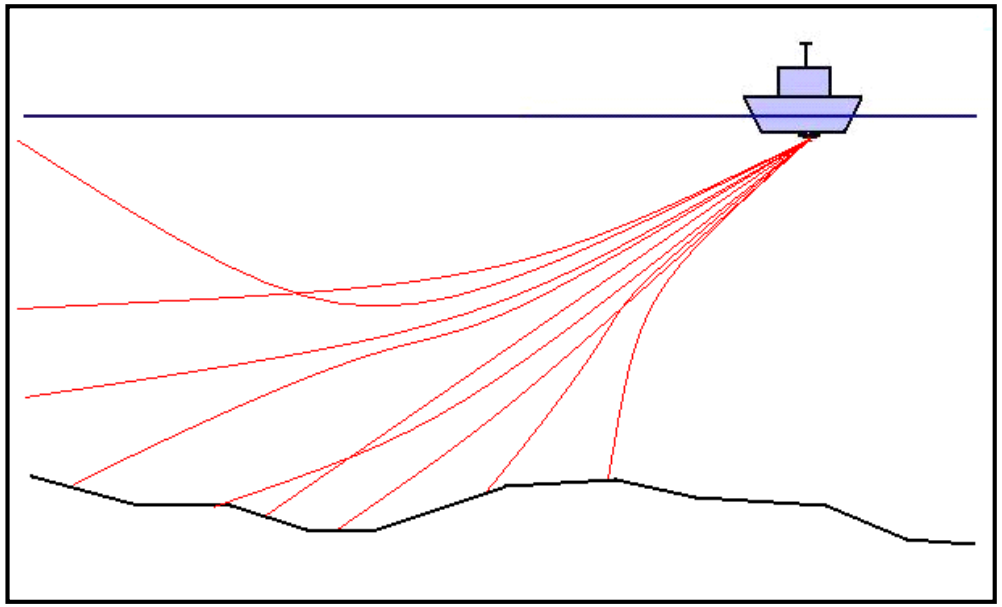


Large depth changes make line planning difficult. Alternative is “Mowing the Grass”.

HYSWEEP® Survey



HYSWEEP® 3-D Seafloor



Same take-off angle, different ray paths.

Features

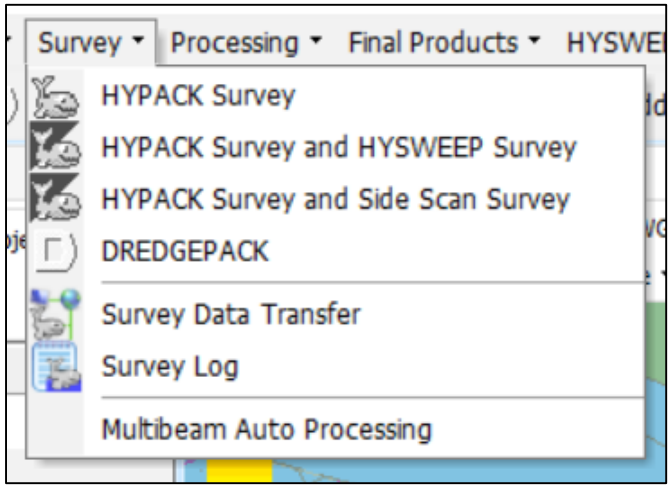
- Data collection and logging.
- Targeting and coverage mapping.
- TPU and other QC checks visible in over 30 real time displays

Refraction Errors seen in real time

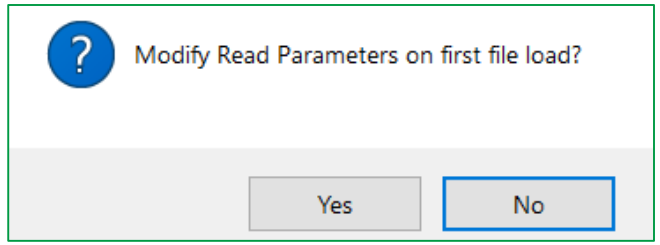
- Refraction occurs at changes in sound velocity.
- Errors when SV profile doesn't match conditions – estuaries can be troublesome.
- Look for 'smiling' or 'frowning' sweeps.

Multibeam Auto Processing

Allows surveyor to ‘set’ pre-filtering processing parameters, so that a preliminary, Final data set can be ready, immediately after the Survey has been collected.

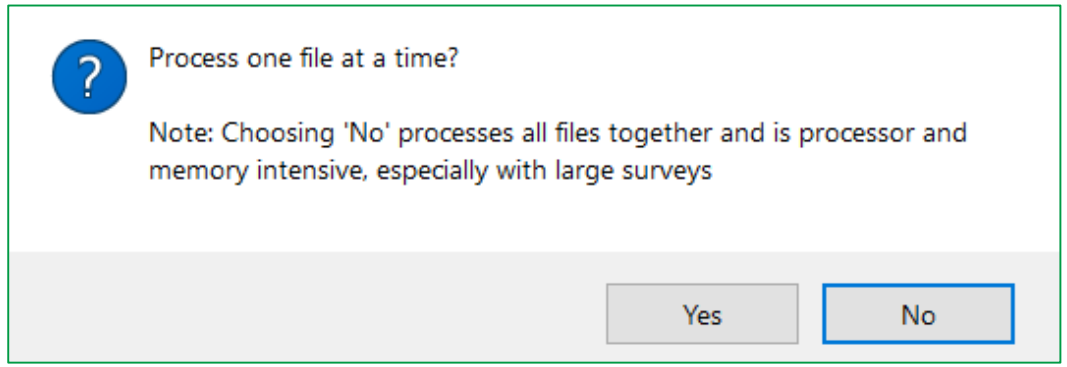


Launch Auto Processing before data collection begins, preferably before launching SURVEY.



Yes: Use this first time to select devices and setup filters.

No: Use when there are no changes in device or filter settings.

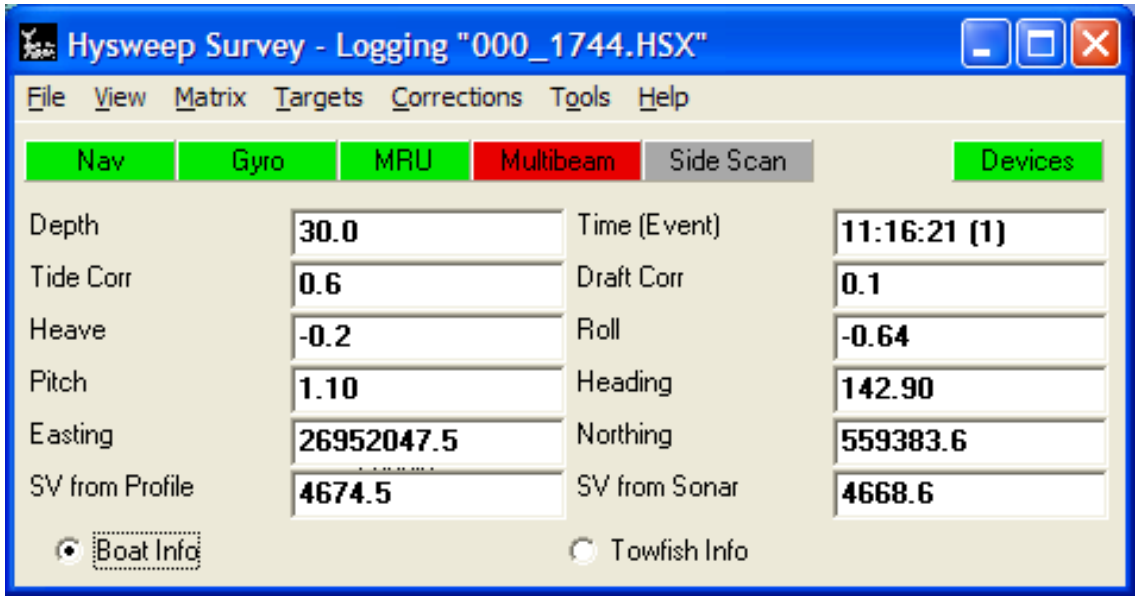


Yes: Loads, filters and saves survey files on end logging. Resets memory for the next file.

No: As above except files are retained in memory for coverage mapping.

HYSWEEP® Main Window

Data Filename or “Offline” in title area.



Various system measurements updated once a second.

Alarm Indicators

- Green = OK.
- Yellow = Something’s not right here.
- Red = Look Out!

(Click on the ‘button’ to read the Alarm details)

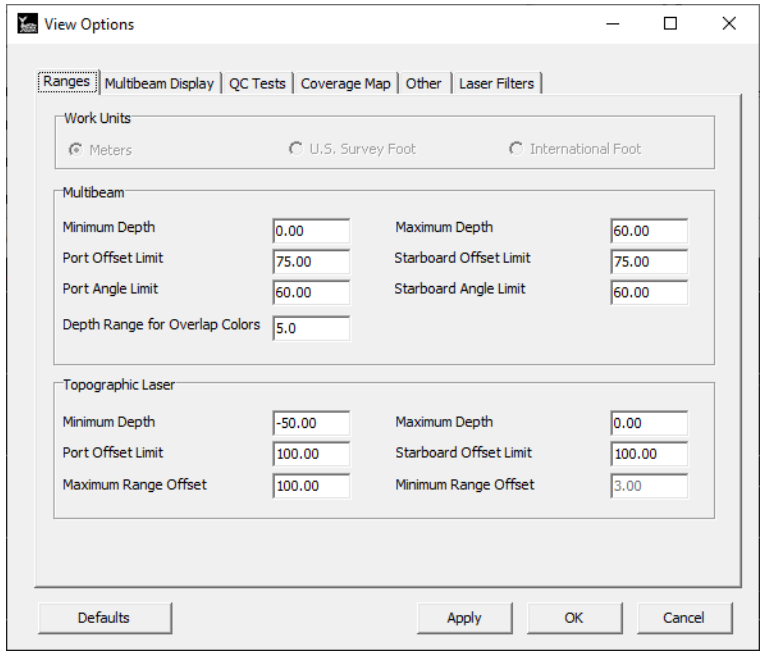
Select Boat or Towfish for display of sensor data.

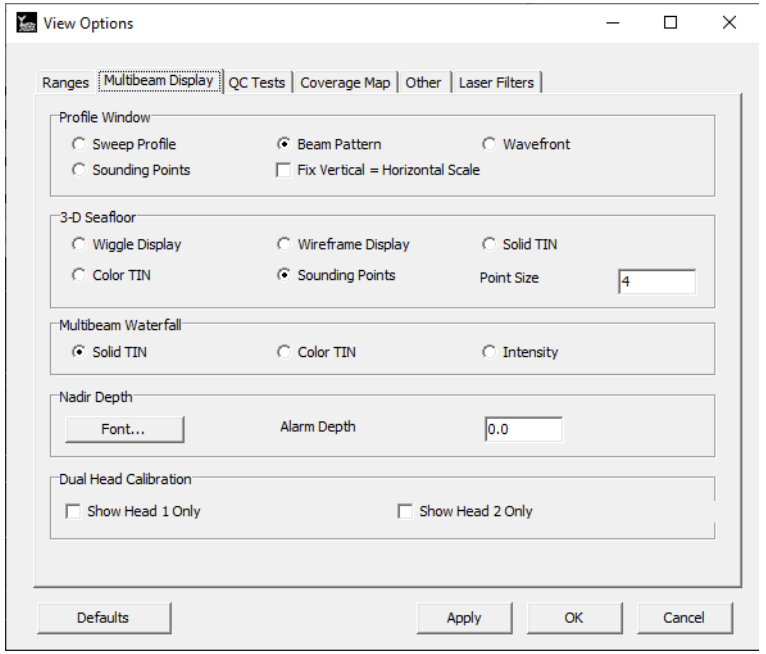
Typical Alarms:

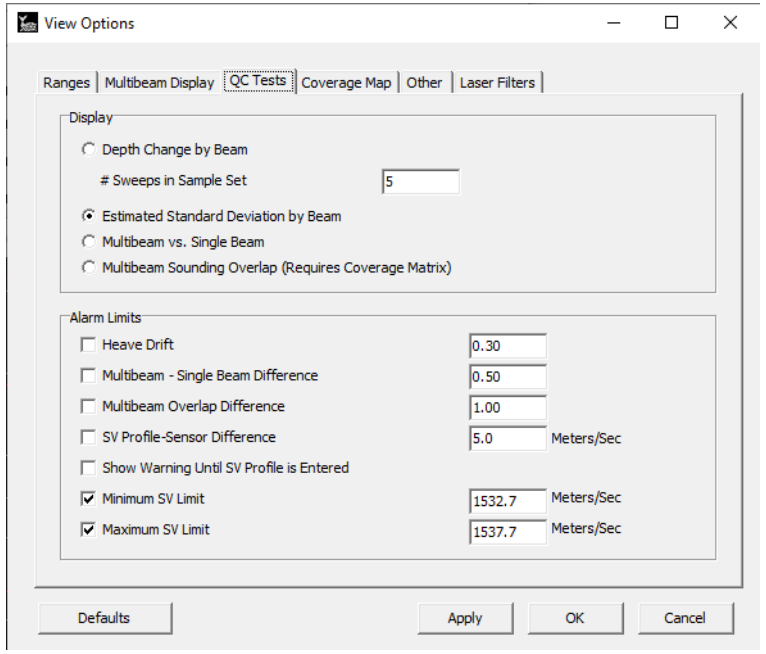
- Devices: Timeout, COM or Network port open error, checksum error.
- QC: Heave drift, SV profile no longer valid (doesn’t match the sensor).

View Options (F9)

- Set Depth and Angle Limits.
- Select Different Window Displays.
- Select and Set Different QC Tests and Alarms.



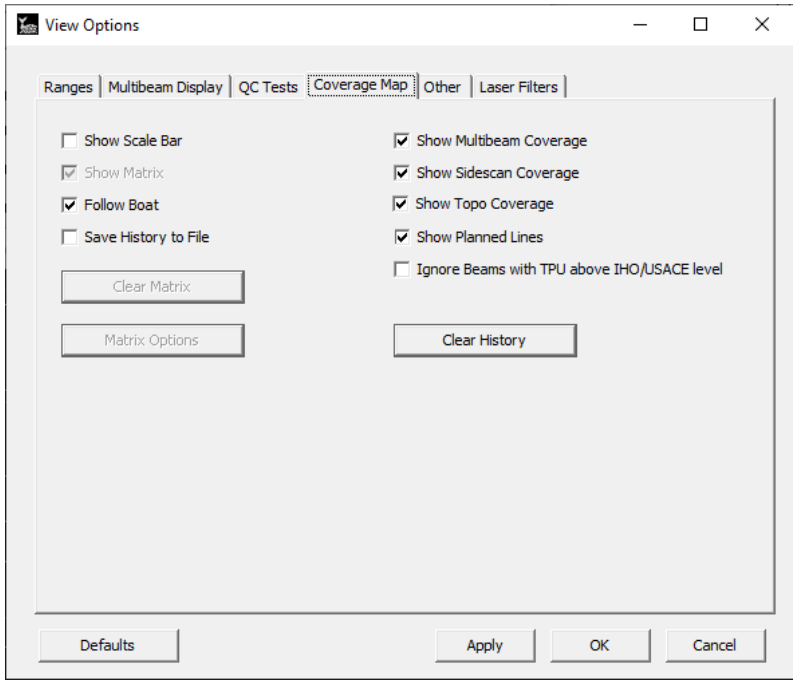




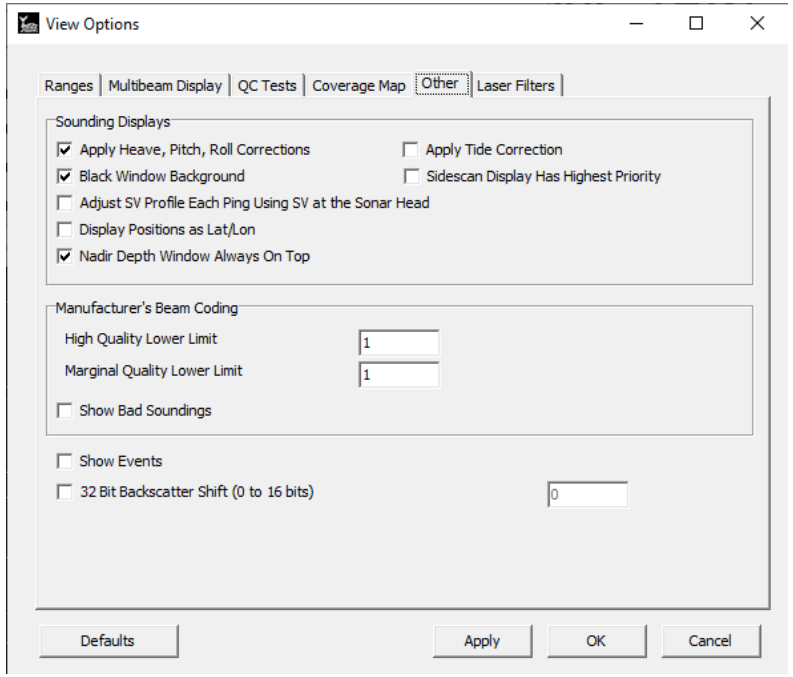
Important NOTE: The 'View Options' ONLY affect the 'display of the Real Time data'. It does NOT affect the 'actual data' that is being collected. Even if you incorrectly set one of these options, you will NOT affect the data being stored in the files.

View Options (F9) (Continued)

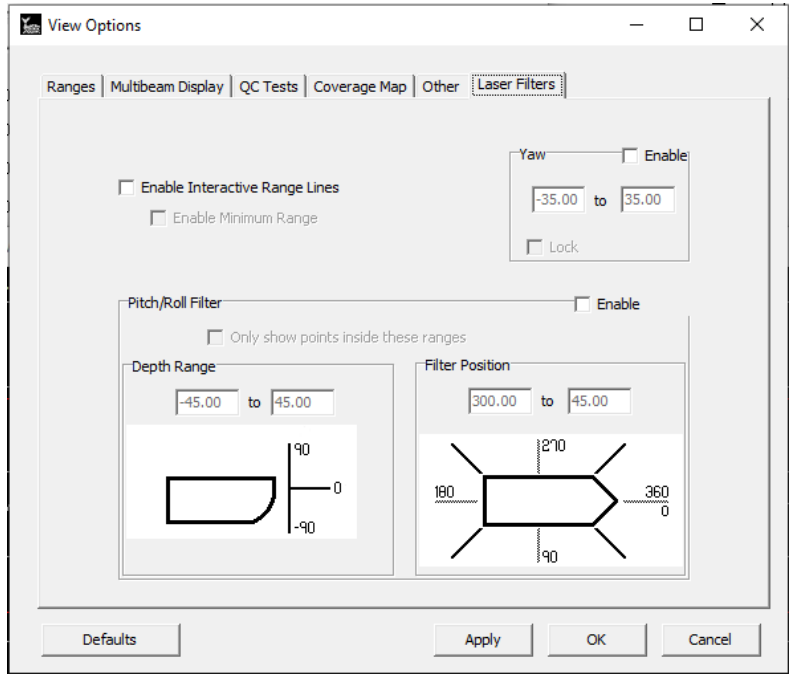
- Select which Coverages to Display.



- Select which corrections to apply in Real Time.

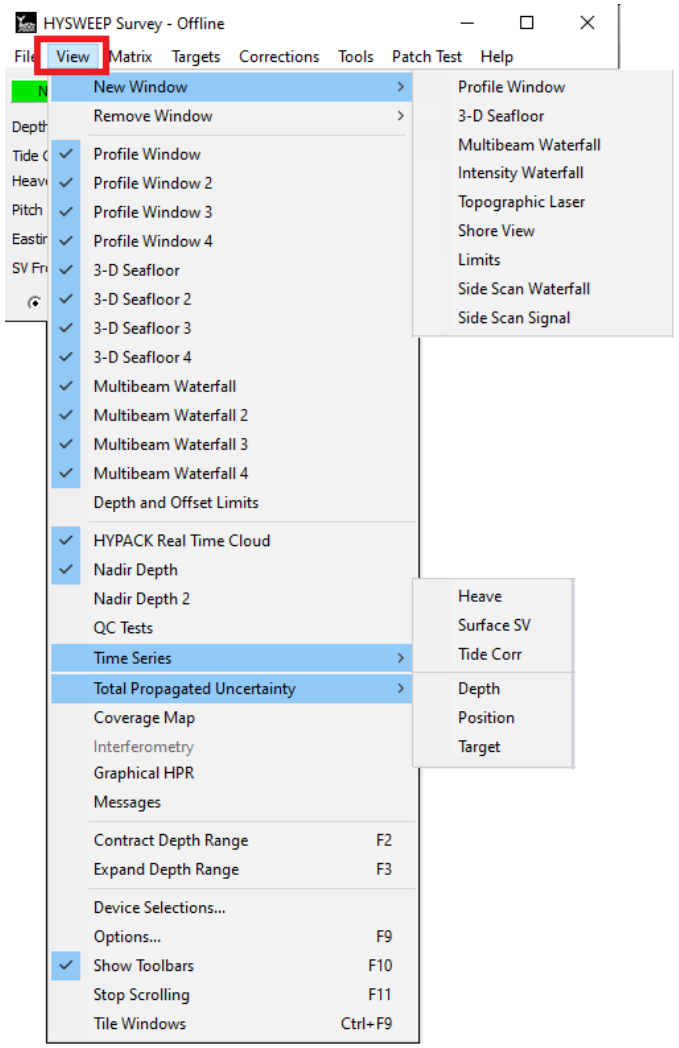


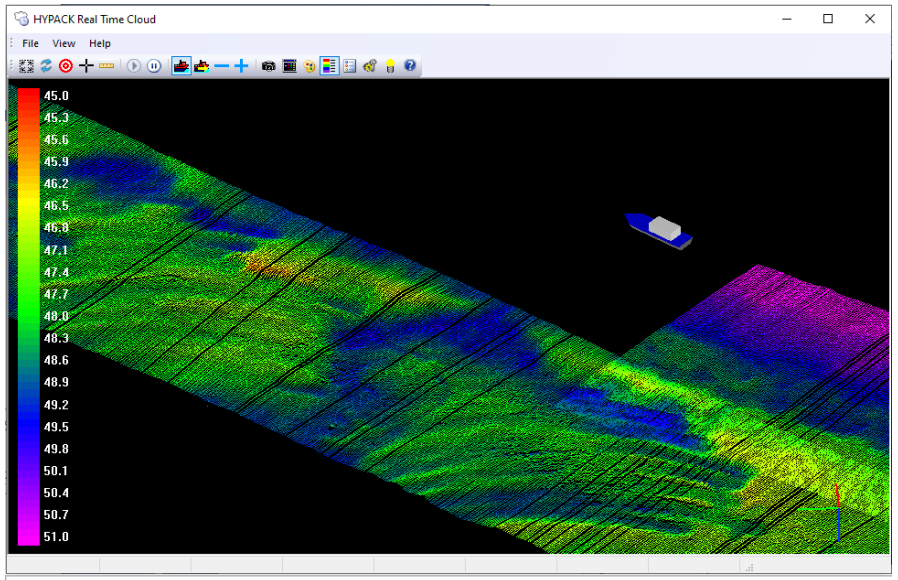
- Select and Set Different Laser Filters

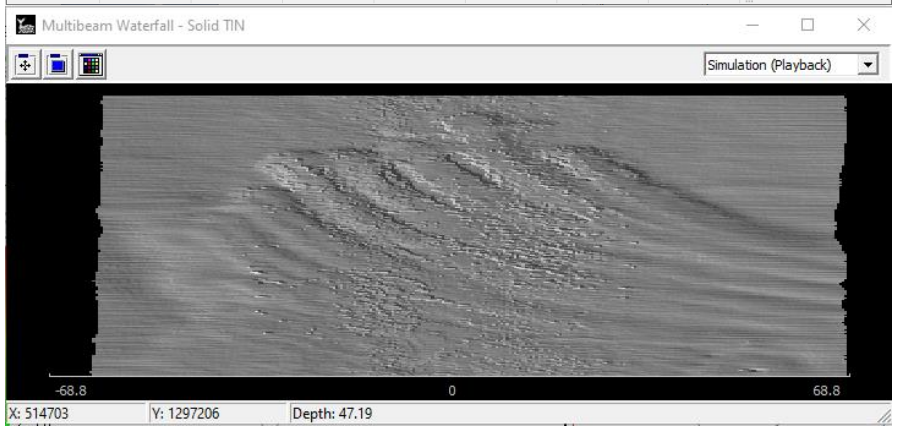


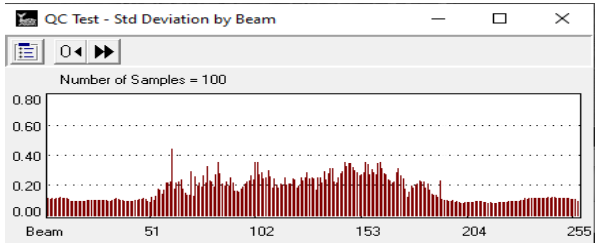
Important NOTE: The 'View Options' ONLY affect the 'display of the Real Time data'. It does NOT affect the 'actual data' that is being collected. Even if you incorrectly set one of these options, you will NOT affect the data being stored in the files.

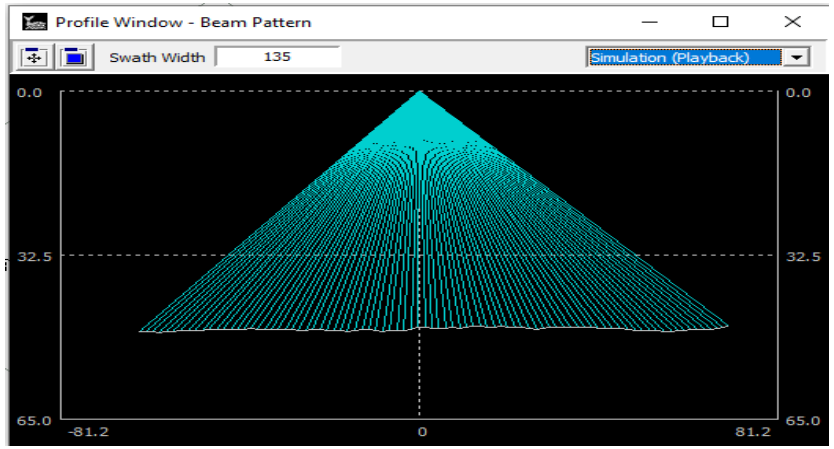
HYSWEEP® Survey (over 30 Display windows)

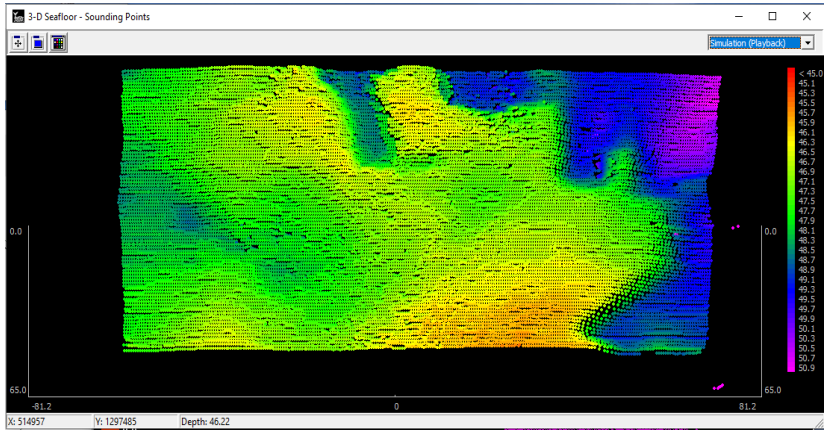


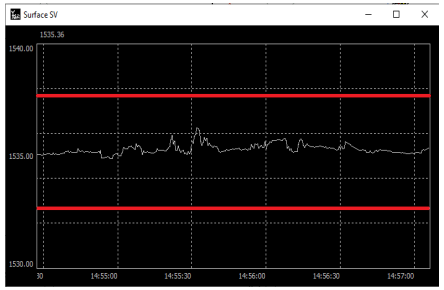


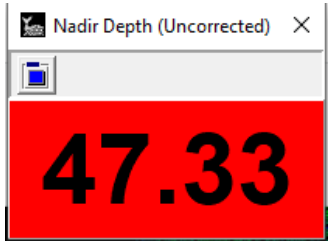










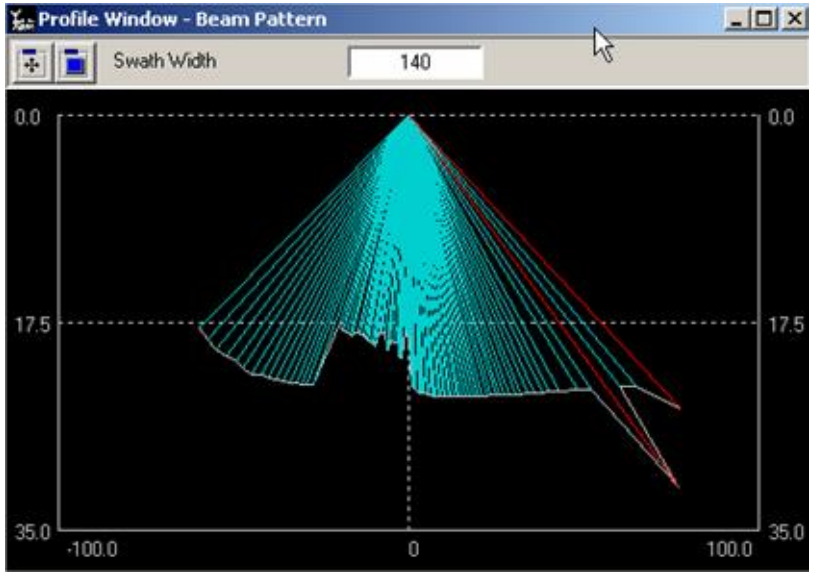


xylem
Let's Solve Water

Profile and 3-D Seafloor

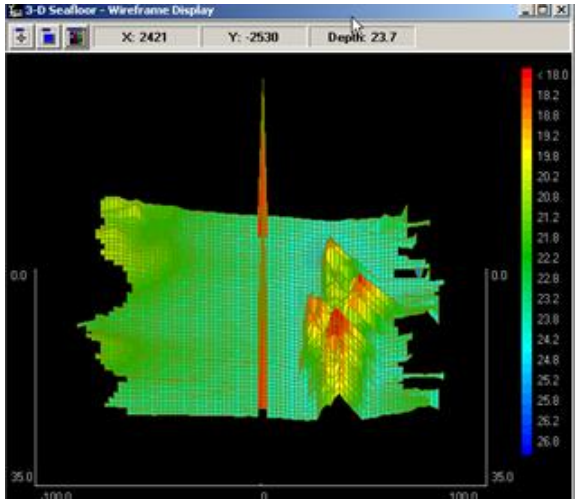
Profile Window

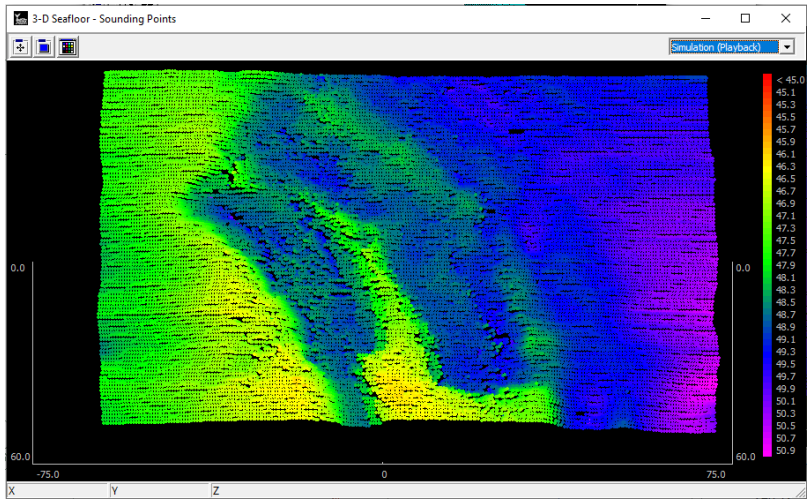
- Single sweep from aft looking forward.
- Color coding can be based on beam quality.
- Useful QC.
- Swath Width at top.
- User defined scale for depth and swath



3-D Seafloor Window

- Styles: Wire frame + solid / color TIN
- Individual Sounding Points
- Mouse targeting and measurement.
- Great tool for bottom visualization.

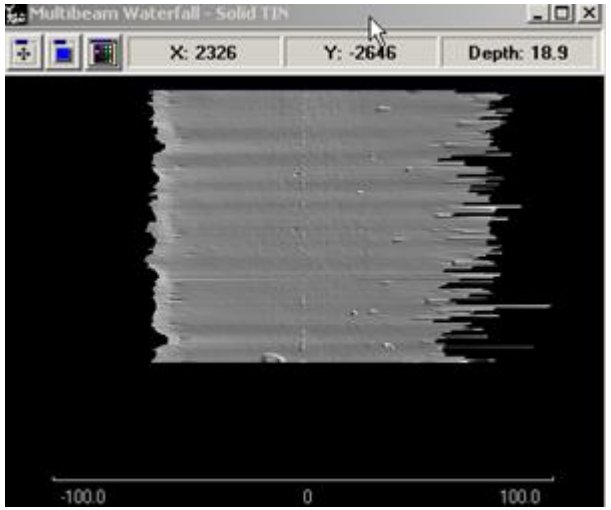




Waterfall Windows

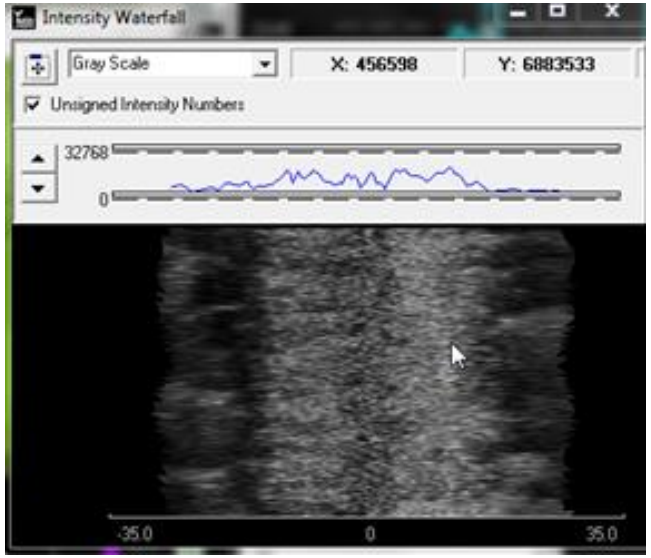
Multibeam Waterfall

- Color or solid TIN display.
- Good for visualization, targeting and comparison to sidescan.



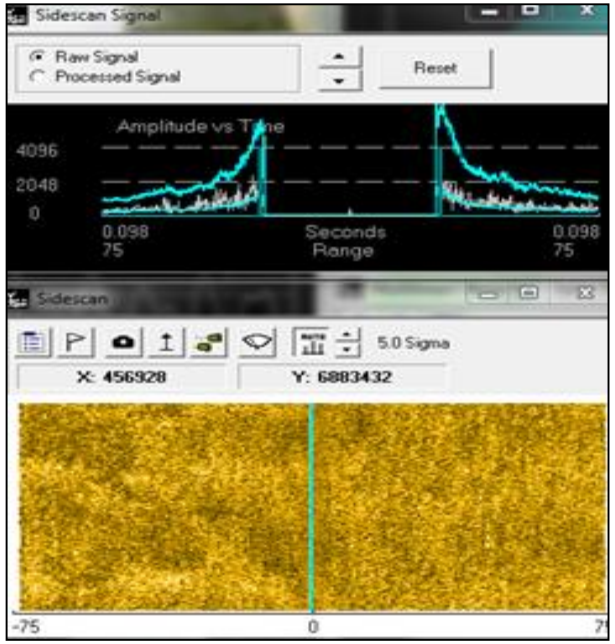
Intensity Waterfall

- Imagery. No depth info.
- Average backscatter (one sample per sounding) or snippets (many samples).
- Apply TVG Gains



Sidescan Waterfall

- Sidescan data from the multibeam.
- Full image control; colors, gains, bottom tracking, etc.



Interferometry

Processing the raw data from interferometry (bathymetric sidescan) systems

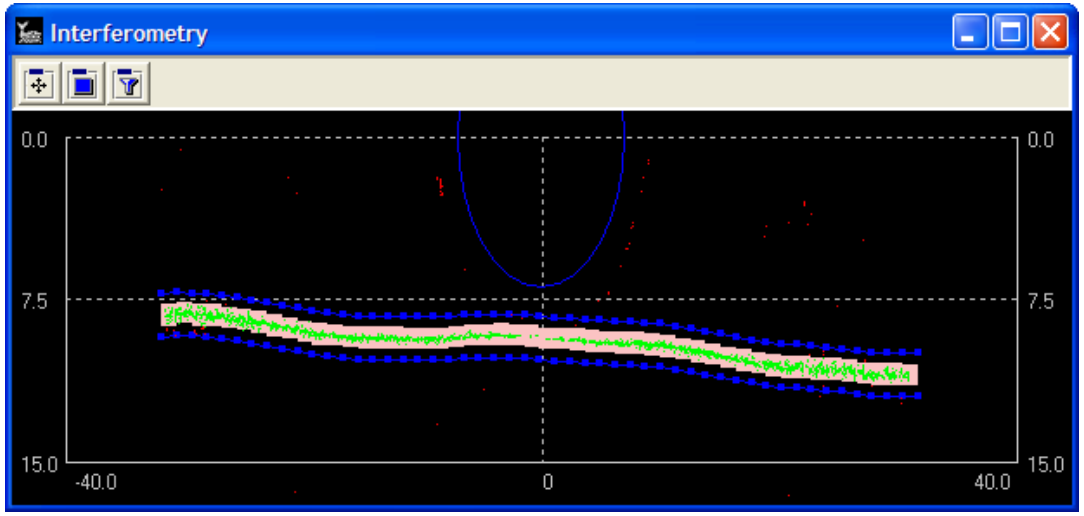
Select from many raw data filters. For example:

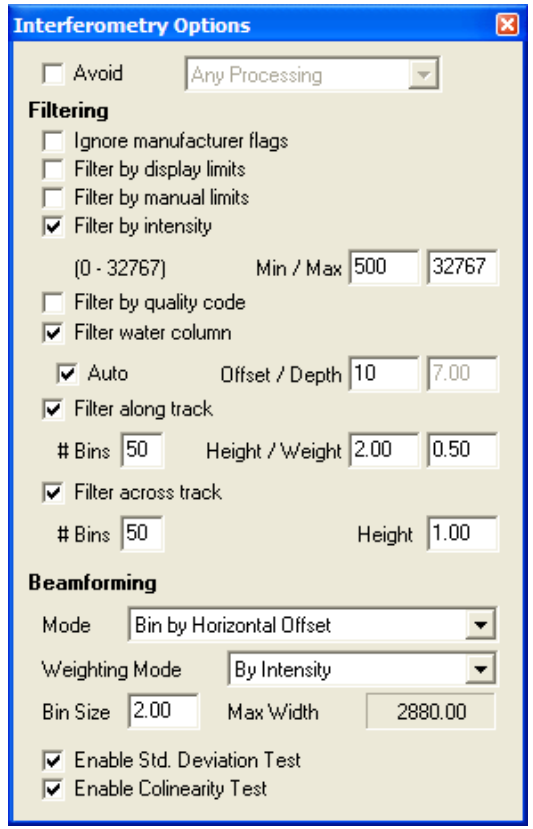
- Filter by Intensity: Simple filter - rejects data outside intensity limits.
- Filter Along Track: More complex – gating filter based on along track history.

Select beamforming method and settings

- Bin size and Max Width: Beam footprint and total swath width. Use this to manage file size and edit time.

Alternately, you can use simple downsample and store a maximum of 1440 points per ping - very large files.

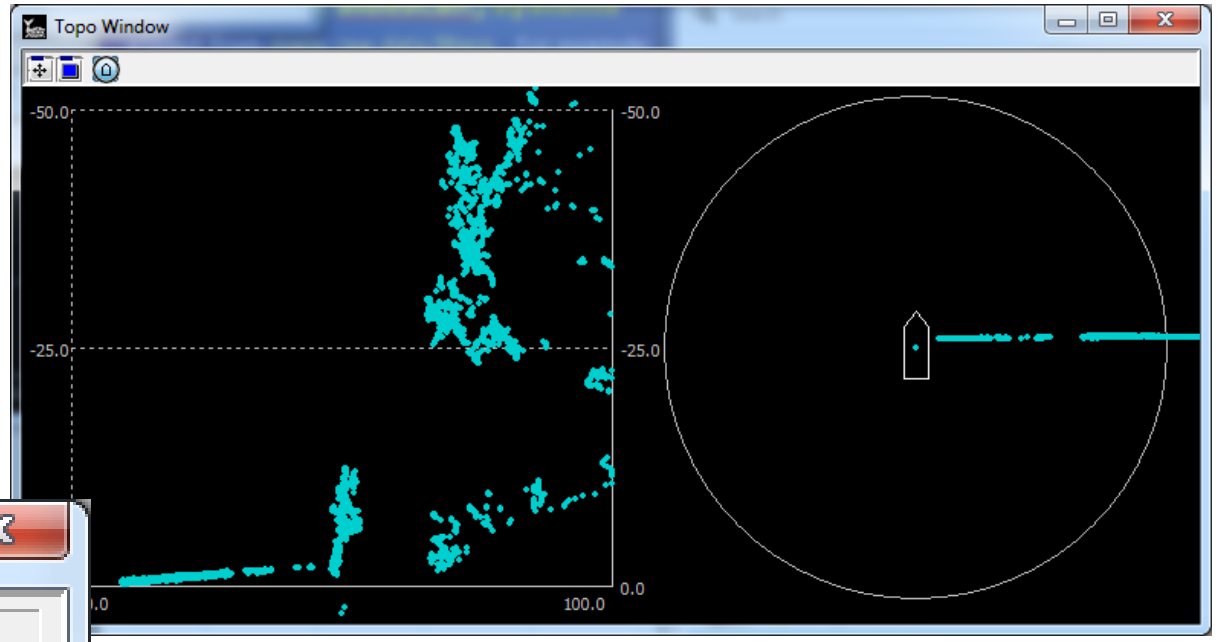


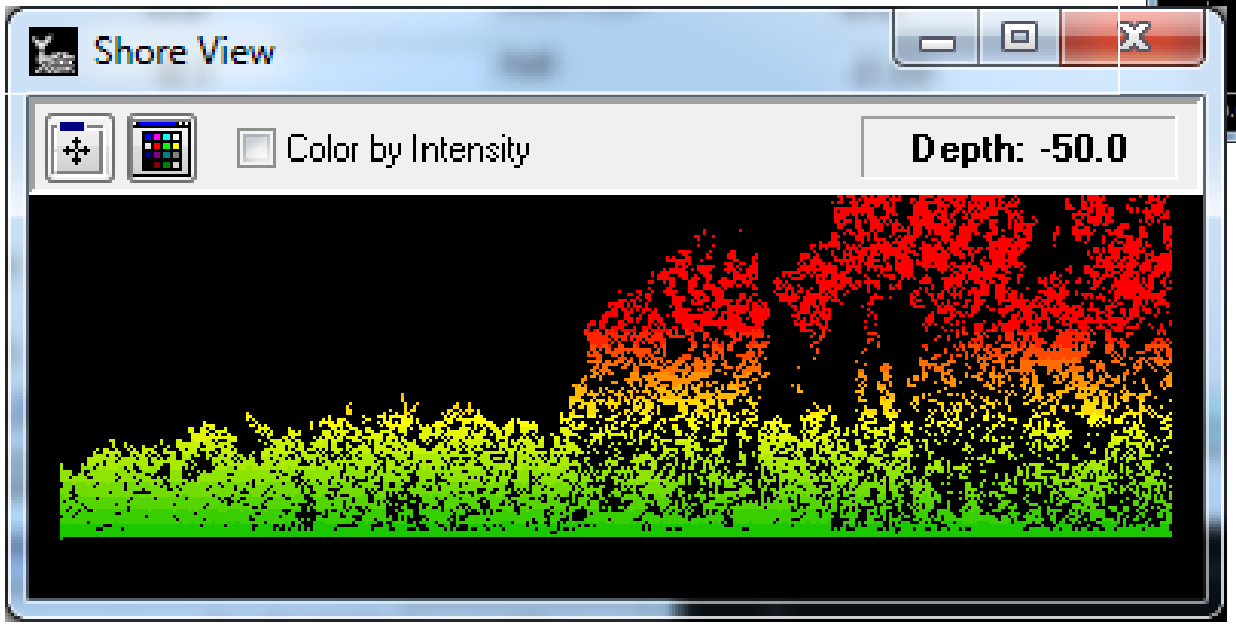


Interferometry Window:
Combines filter limits, raw data and beams.

Laser Scanner Data (Topo)

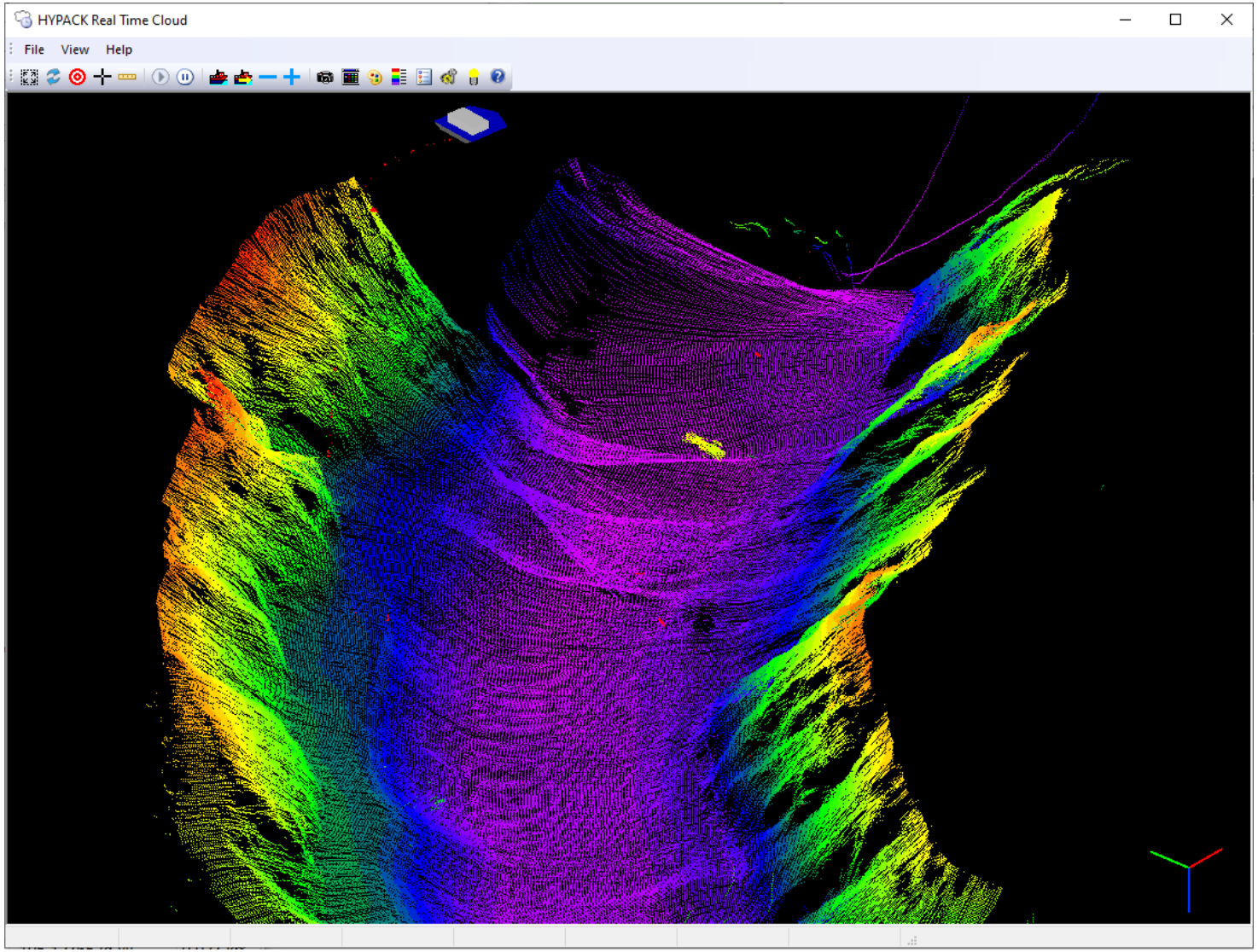
- Inside HSX data is stored in new message type (TOP)
- Can run concurrent with a multibeam sonar
- Works with Velodyne, Optech, Leica, Carlson/Merlin, RIEGL and more





HYPACK® Real Time Cloud

- Fully corrected – sound speed, tide, motion, etc.
- Simultaneous Multibeam + Topo Laser data.
- Selectable 3D boat shapes
- User defined number of points, (default is 4,000,000)
- Tiltable and Rotatable
- Take ‘still shot’ BMP’s
- Create Targets of objects
- Measure between points

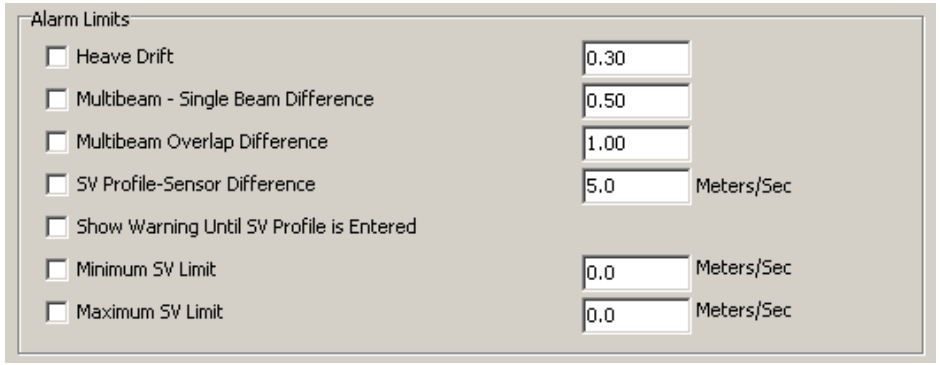


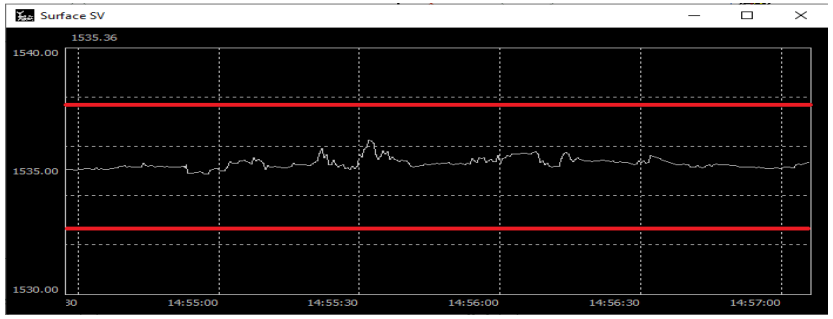
HYSWEEP® SURVEY QC Tests

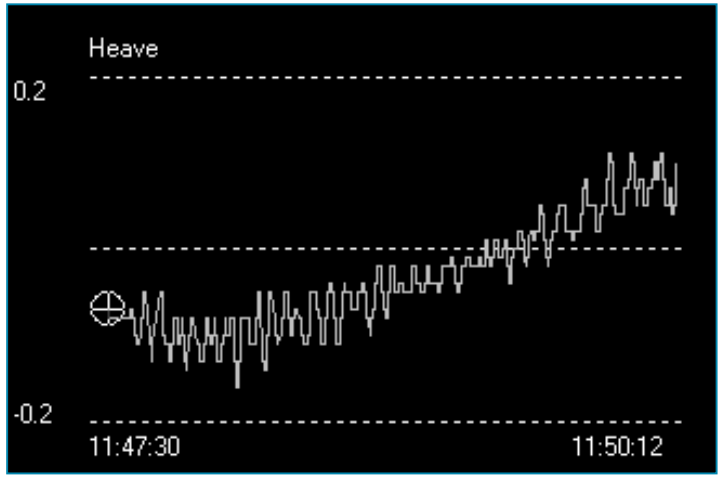
Some Useful Alarms

- **Heave Drift**: Alarm if average heave exceeds threshold.
- **SV Profile Minus Sensor Difference:** Alarm if difference exceeds threshold.
- **Min/Max Sonar SV Probe Limits**

(Warning that your Probe may be fowled with debris or reading a significant SV change)



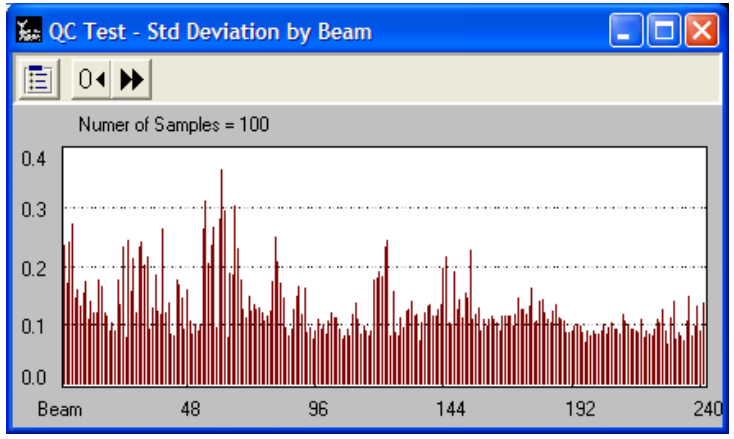




Evidence of heave drift.

QC Test Window

- Select from four test displays.
- "**Std. Deviation by Beam**" is a nice estimation if the bottom is reasonably flat.



TPU – What is it?

Total Propagated Uncertainty

- A method to account for all sources of measurement uncertainty in a sounding
  - Echosounder uncertainties
  - GPS accuracy
  - Motion sensor accuracy
  - Offset measurements
  - Sound velocity profile corrections

Three major components

- TVU – Vertical only
- THU – Horizontal only
- Target Detection Size Limit
  - Smallest target that can reliably be detected

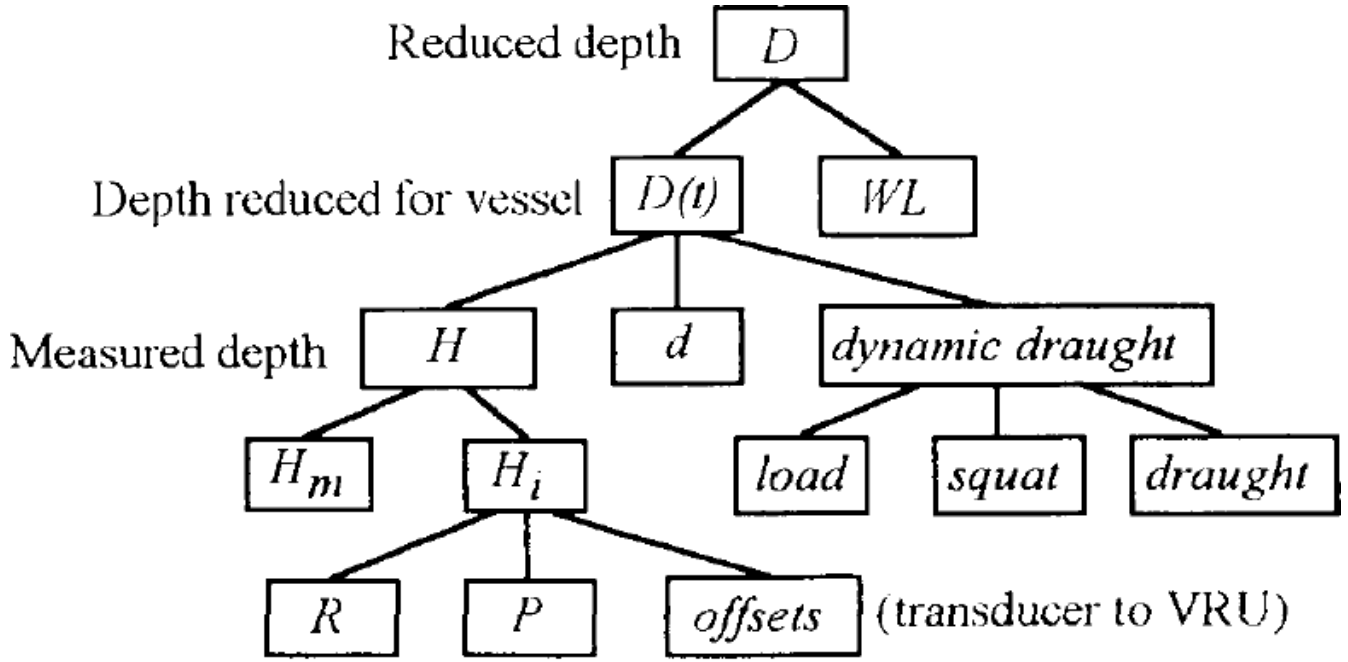
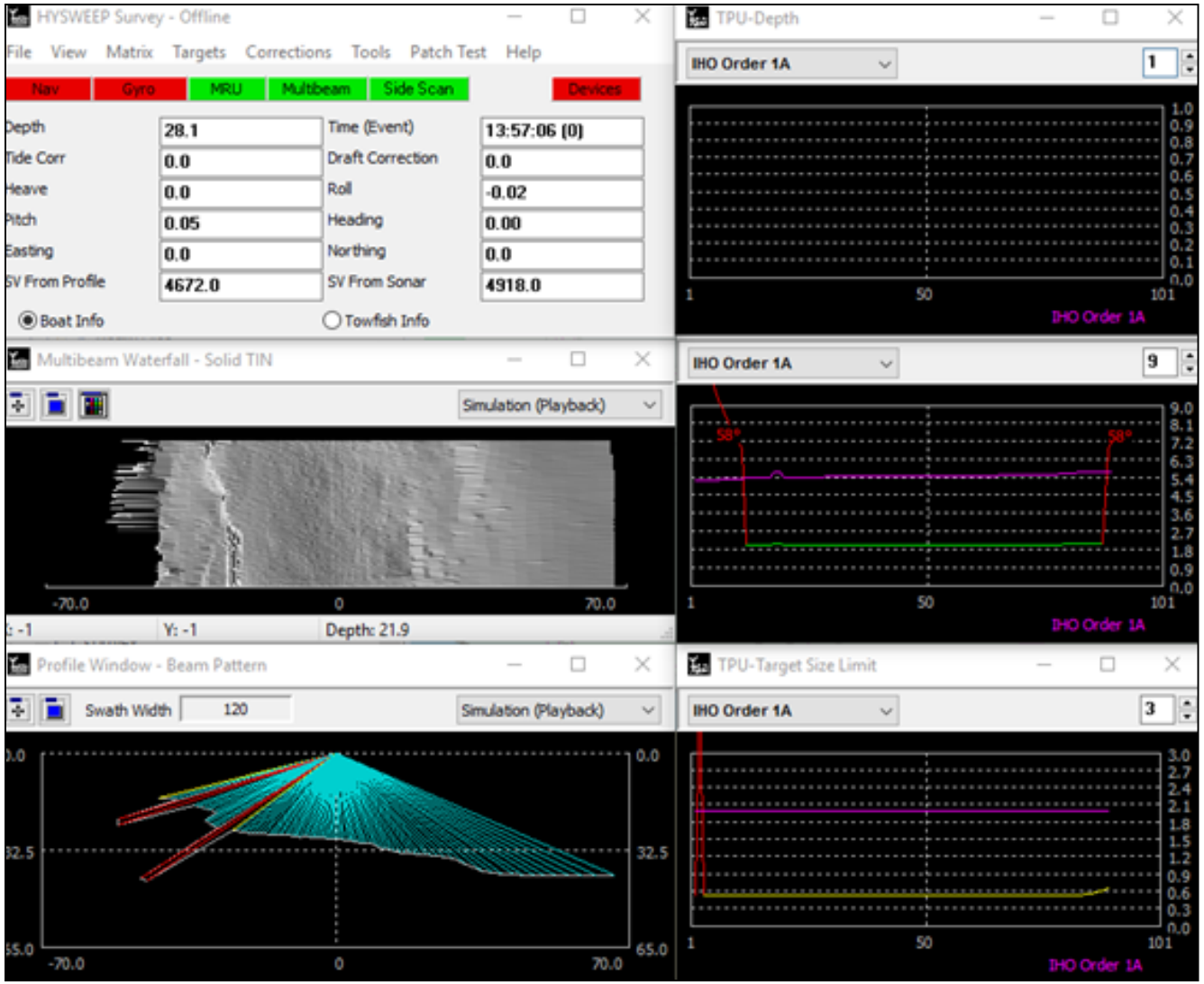


FIG. 8.- Flow diagram of contributions to reduced depth error.

Hare, Rob. "Depth and Position Error Budgets for Multibeam Echosounding." *The International Hydrographic Review* 72.2 (2015).

TPU in Real Time



In real time, HYSWEEP® SURVEY can display graphs of the Depth and Position Uncertainty, along with the Minimum Target Detection Size.

Non-compliant soundings can be excluded from the coverage matrix

TPU Windows

Parameters are entered in the HYPACK SHELL under:

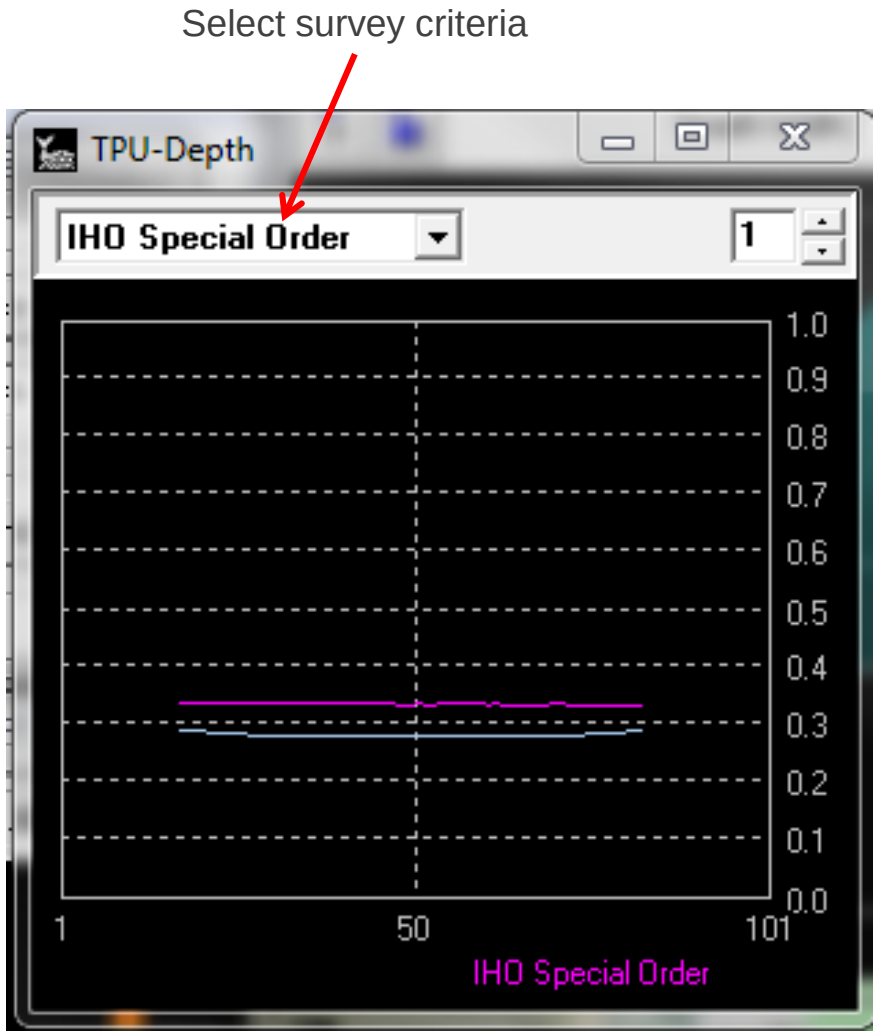
- EDITORS – TPU Editor

Based on the TPU Parameters and real time sounding info, you can calculate and display:

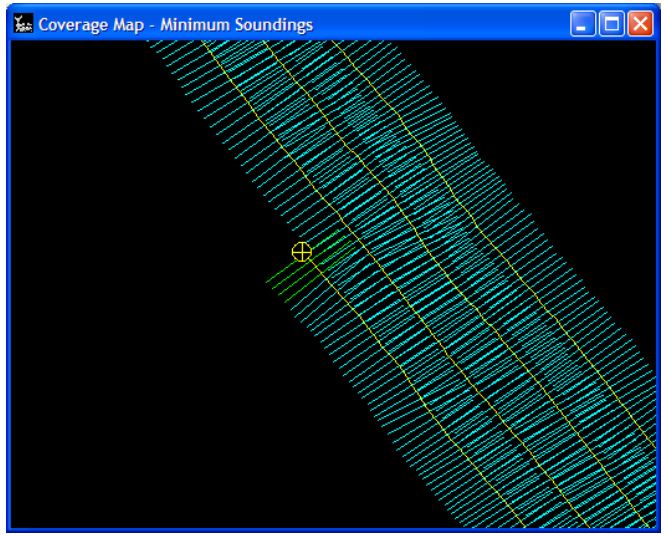
- Total Sounding Uncertainty (Vertical)
- Total Positioning Uncertainty (Horizontal)
- Target Size Limit Value

Can display against:

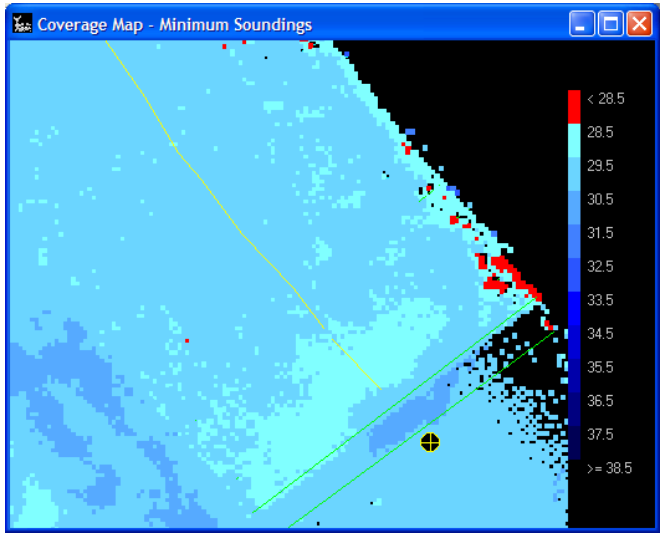
- IHO Special Order Requirements
- IHO 1st Order Requirements
- USACE Hard Bottom Requirements
- USACE Soft Bottom Requirements



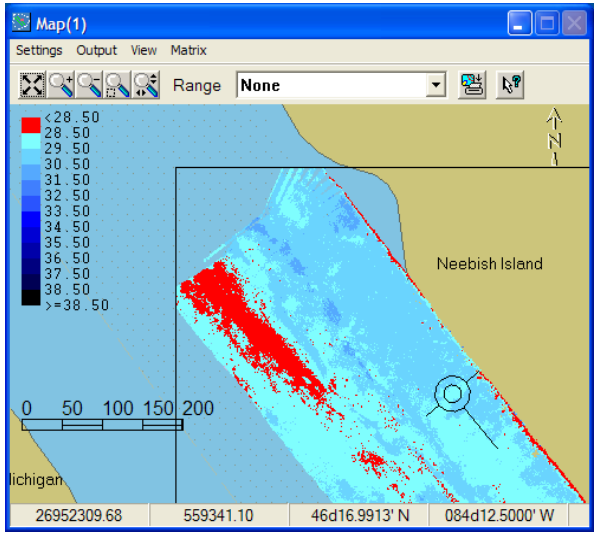
Coverage Map



(1) HYSWEEP® Coverage



(2) HYSWEEP® Filled Matrix



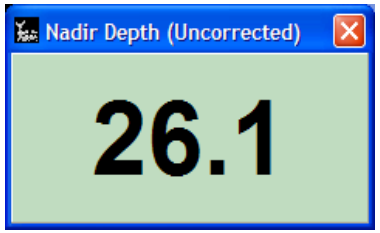
(3-4) HYPACK® Filled Matrix

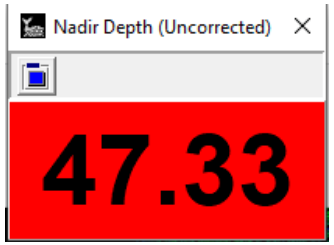
Show Multibeam Coverage Four Ways

1. Multibeam Coverage in HYSWEEP®: Fast and easy 'stick' plot. No setup is required. Great for showing overlap.
2. Filled matrix in HYSWEEP®: Cut cross sections through the matrix and track overlap QC.
3. User-defined matrix in HYPACK®: Overlay on background files. No sections or QC.
4. Auto matrix in HYPACK®: Automatic matrix creation in HYPACK SURVEY. No need to create a Matrix before starting survey. MTX files will only be shown in HYPACK SURVEY.

(Use View Options and Matrix Options to configure the coverage map.)

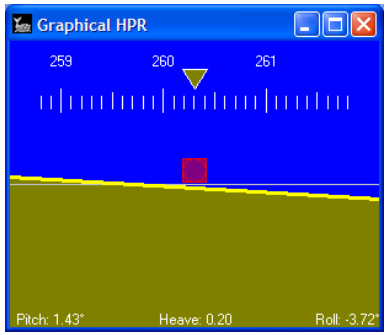
Other Windows (ENLARGE SCREEN CAPS)





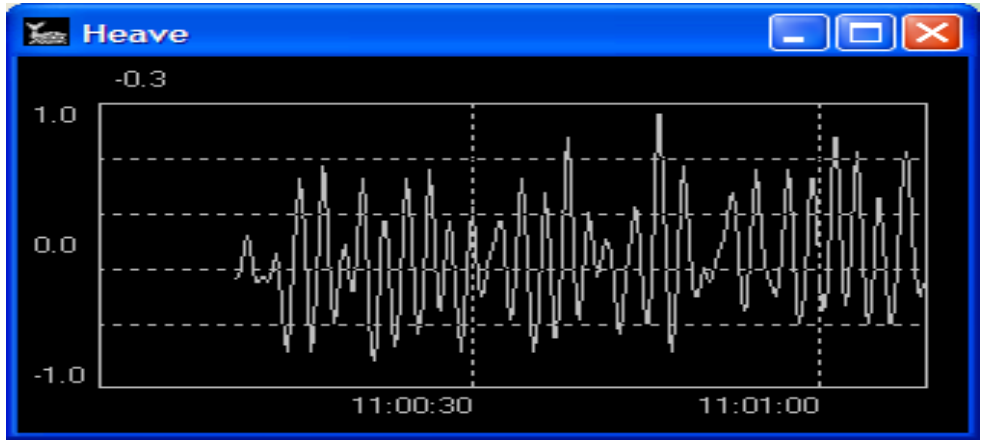
Nadir Depth 1 and 2

Distance between your expensive sonar head and the bottom - turns **RED** when too shallow.



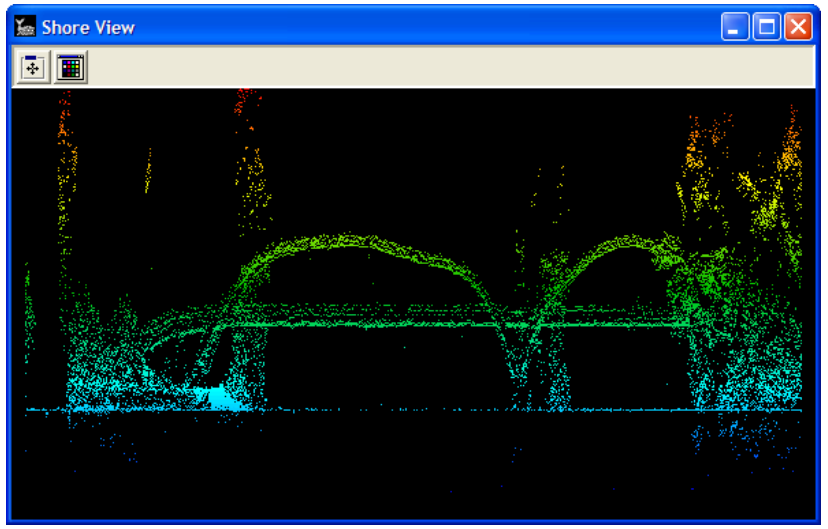
Graphical HPR:

Heading, Pitch, Roll and Heave. Cockpit style display.



Time Series:

Track Heave, Surface SV and RTK Tide in Real Time. Great for showing problems, as they happen.



Shore View

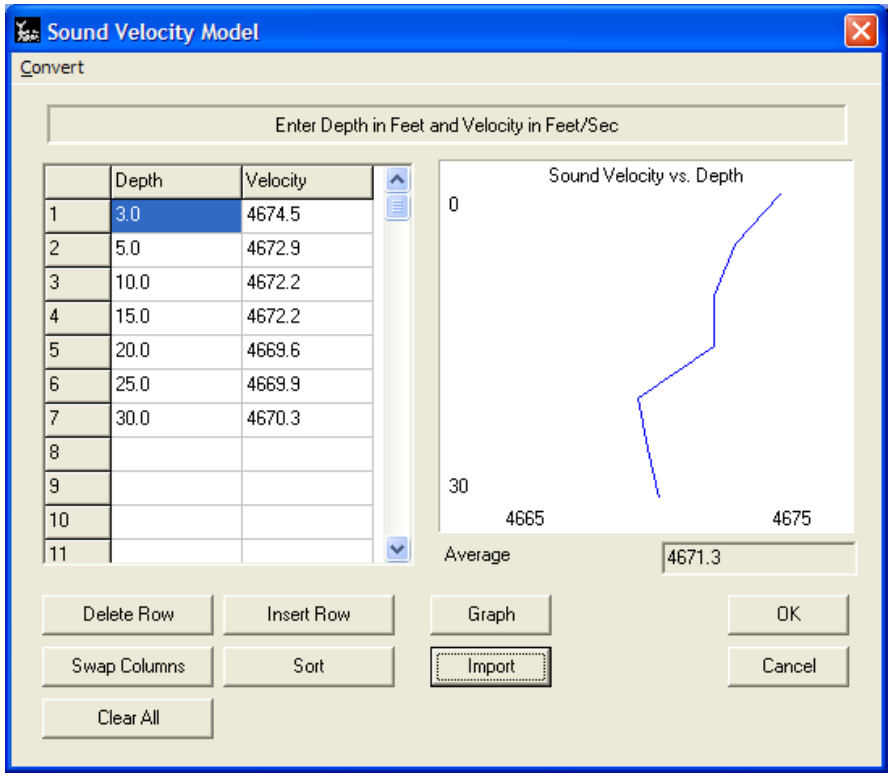
Laser scanner topographic display.

Corrections

Sound Velocity

- Type in depth and sound speed data or,
- Import the profile from file or
- Receive automatically from MVP.
- The profile is applied in Survey for real time QC. Also saved for post-processing.

SONTEK CASTAWAY SV Probe.
Simplified Bluetooth Upload.



HYSWEEP® Sound Velocity Editor

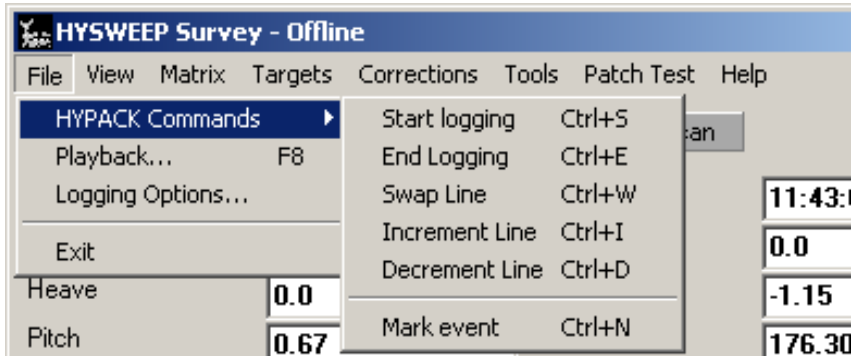
Squat and Settlement

- Enter a table of draft adjustment vs. speed.
- Draft lookup is based on speed over ground, which does not account for current

Logging Data

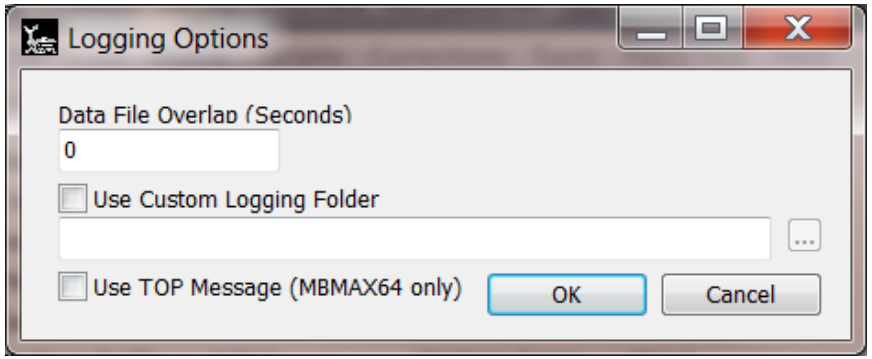
HYPACK® Commands

- Ctrl-S to Start, Ctrl-E to End logging.
- Data logged to ASCII *.HSX file by HYSWEEP® Survey.



Logging Options

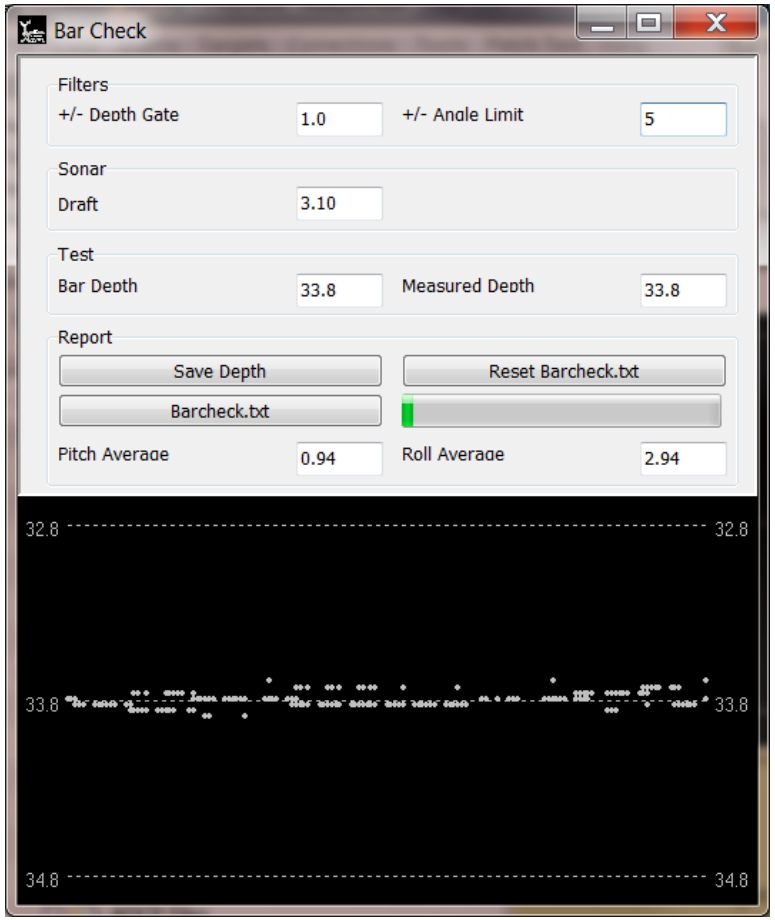
- File Overlap to avoid gaps between files..
- Custom Logging folder selection.
- TOP message. For logging > 1440 shots per topo laser scan.



Two Data Files per Survey Line

- Same root name (e.g., 002_1116), different extension (HSX and RAW).
- HSX logged by HYSWEEP® Survey: All data required to process multibeam. Offsets, soundings, positions, motion and heading data, tide, draft, SV …
- RAW logged by HYPACK® Survey: Navigation and detailed position information.

HYSWEEP® Bar Check



Bar Check averages depths for three seconds then saves and graphs the result.

Setup

+/- Depth Gate: Soundings outside bar depth +/- the gate are ignored.

+/- Angle Limit: Soundings with beam angle outside limits are ignored.

Running The Test

Run Bar Check from the Tools menu.

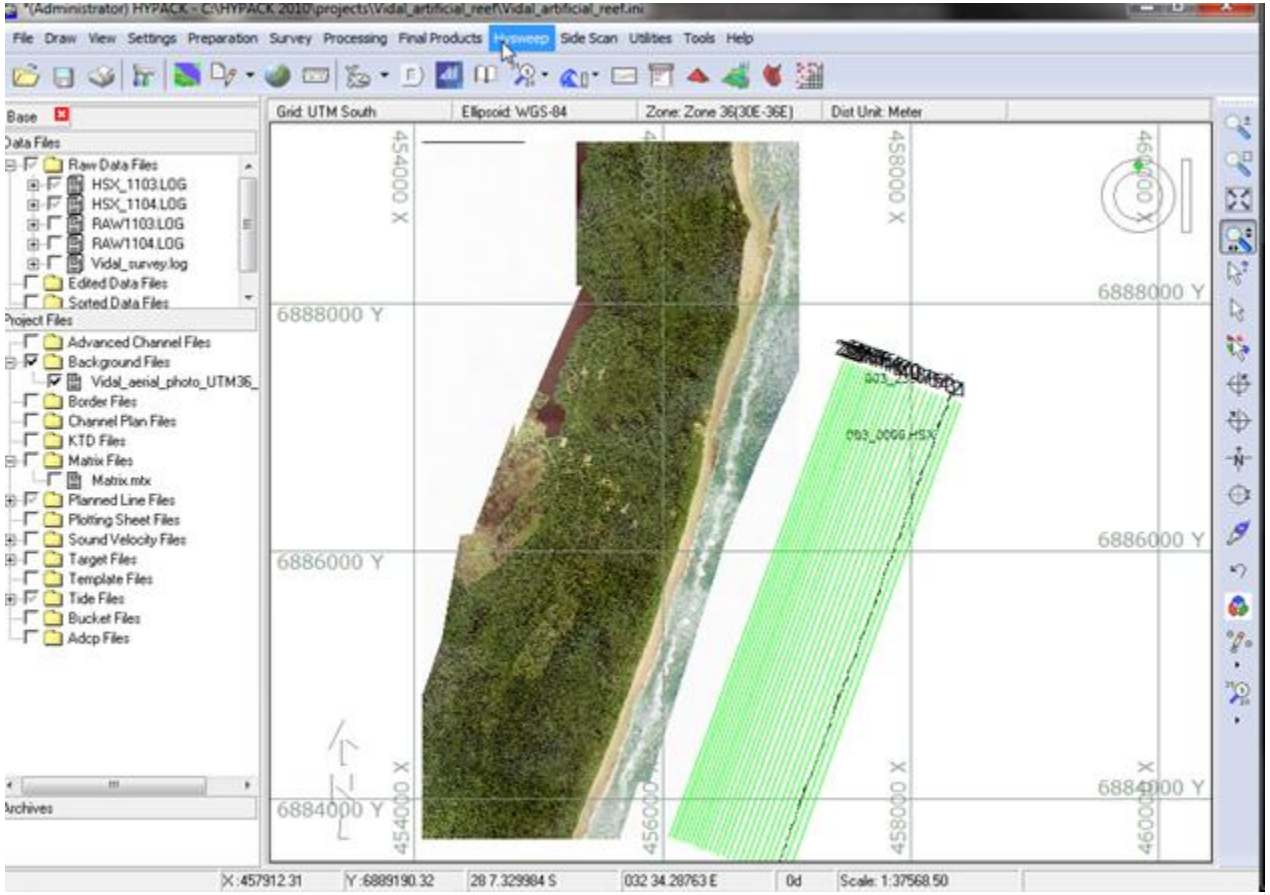
Click “Reset Barcheck.txt” to clear the report.

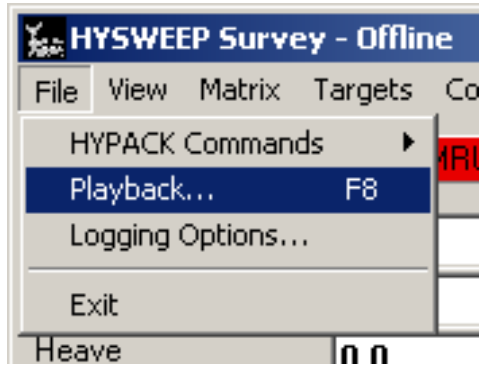
- ➢Lower the bar and enter Bar Depth.
- ➢When Measured Depth stabilizes, click “Save Depth”.
- ➢Repeat for each bar depth.
- ➢Adjust Sonar Draft if needed.

When done, click “Barcheck.txt” to view or print the report.
Option to save Sonar Draft to HYSWEEP.INI on exit.

Important NOTE: Takes Pitch and Roll of the Vessel into account, which is why the ‘Pitch Average’ and ‘Roll Average’ are displayed, so that you can figure out what ‘Offset values’ to plug into Hardware, for the MRU device.

HYSWEEP® Playback





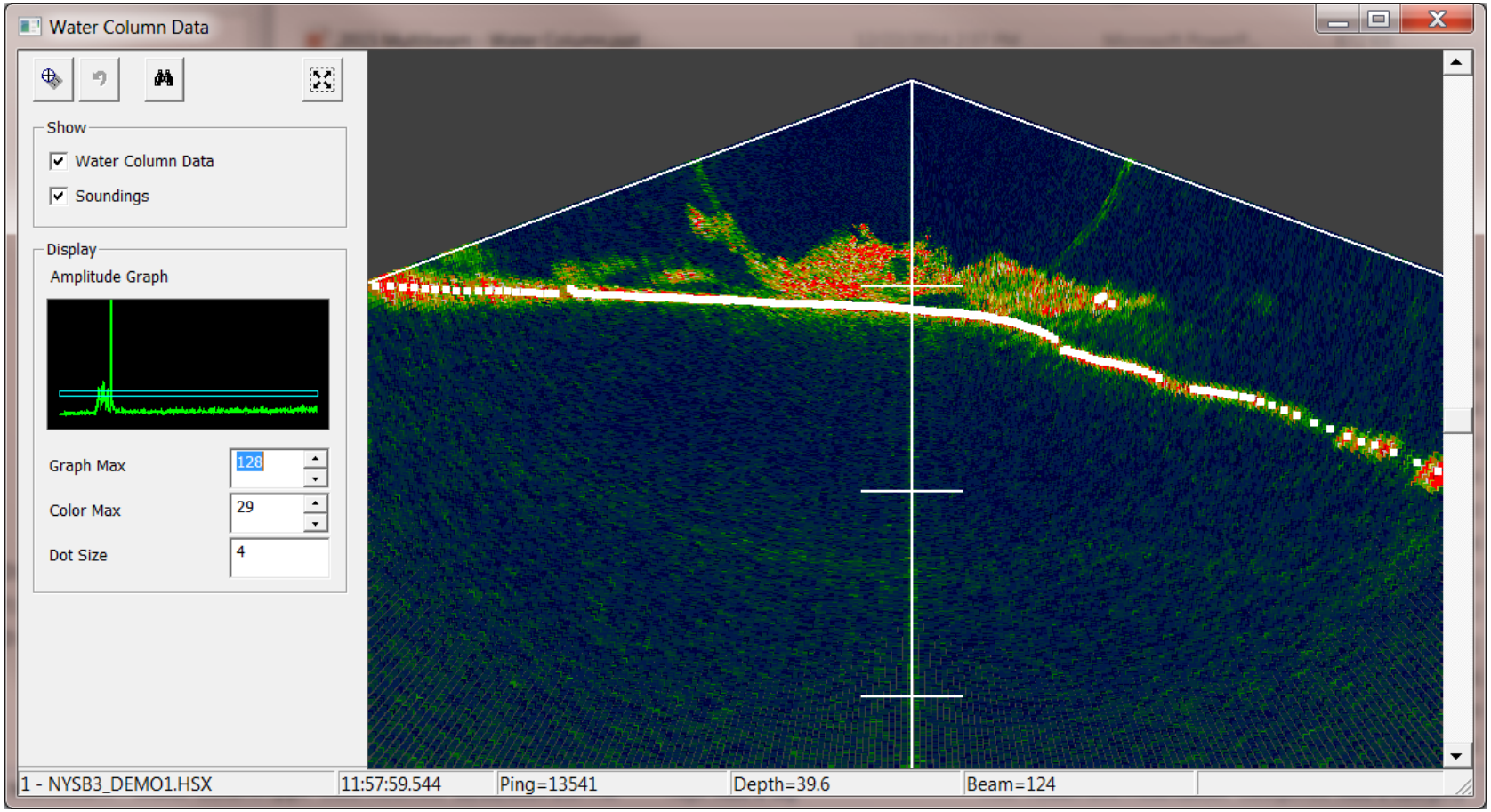
HYSWEEP® SURVEY can replay HSX files by clicking ‘File – Playback’

xylem
Let's Solve Water

HYSWEEP® Water Column

HYPACK 2022 – Training Event

Water Column Data



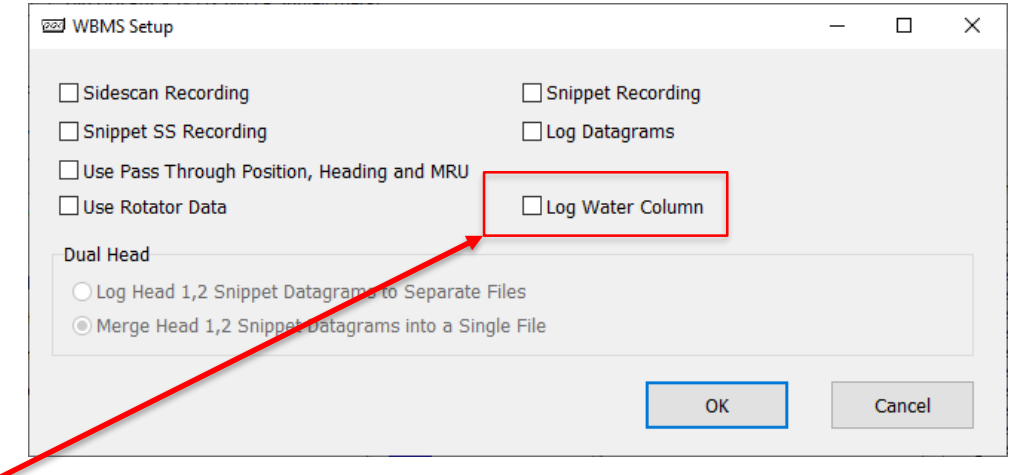
Multibeam Backscatter Throughout the Water Column.

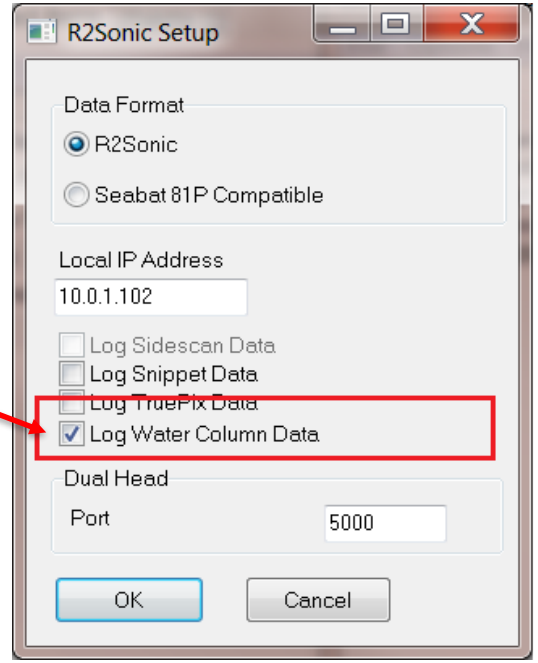
- Use HYSWEEP® Water Column Logger to log the data.
- Playback Program for quick replay and exam.
- You can re-digitize soundings in MBMAX64.

Hardware Configuration

HYPACK® Hardware Setup

- Water Column is Supported for R2Sonic, Reason, and NORBIT Multibeam Systems.
- Configure Sonar for Normal Bathymetry then,
- Check the Box in Driver Setup.

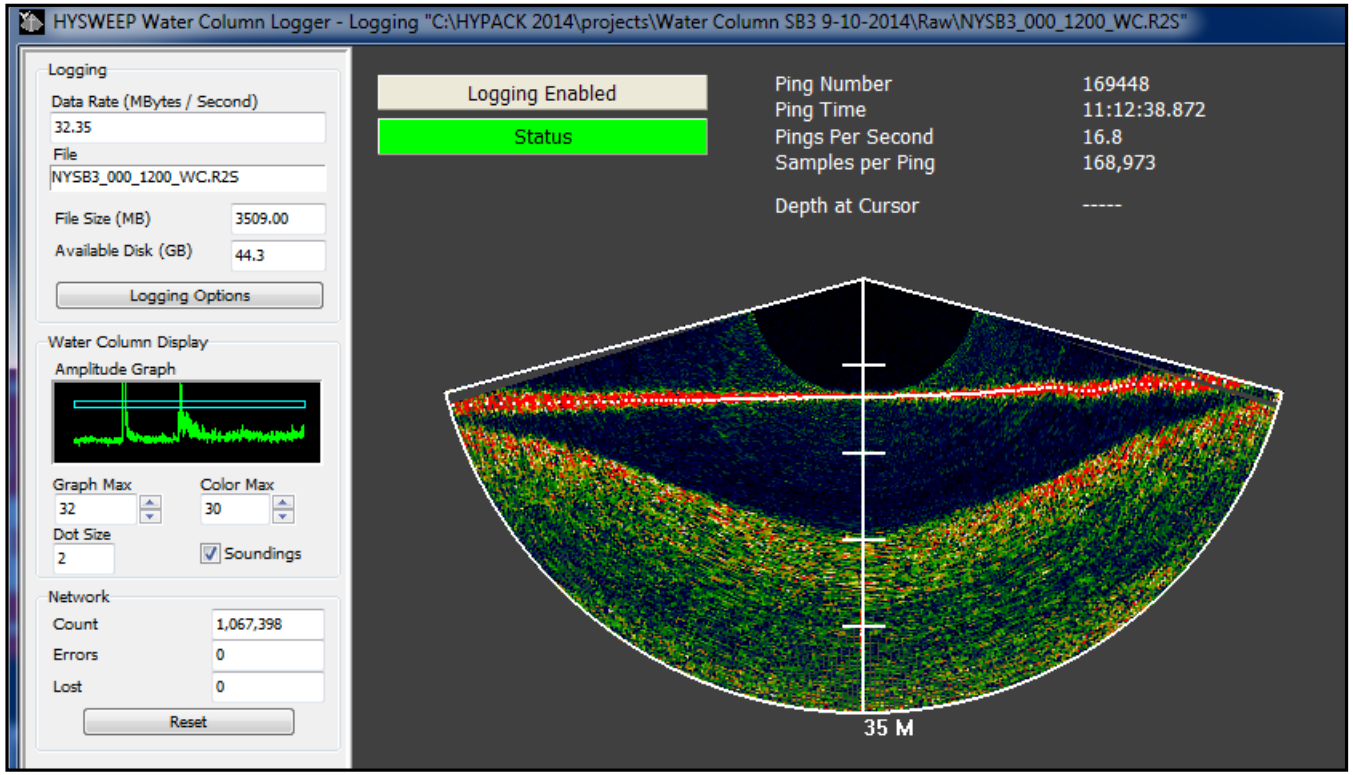




Logging File Types:

- R2Sonic: *.R2S
- Reson, NORBIT: *.7K

HYSWEEP® Water Column Logger

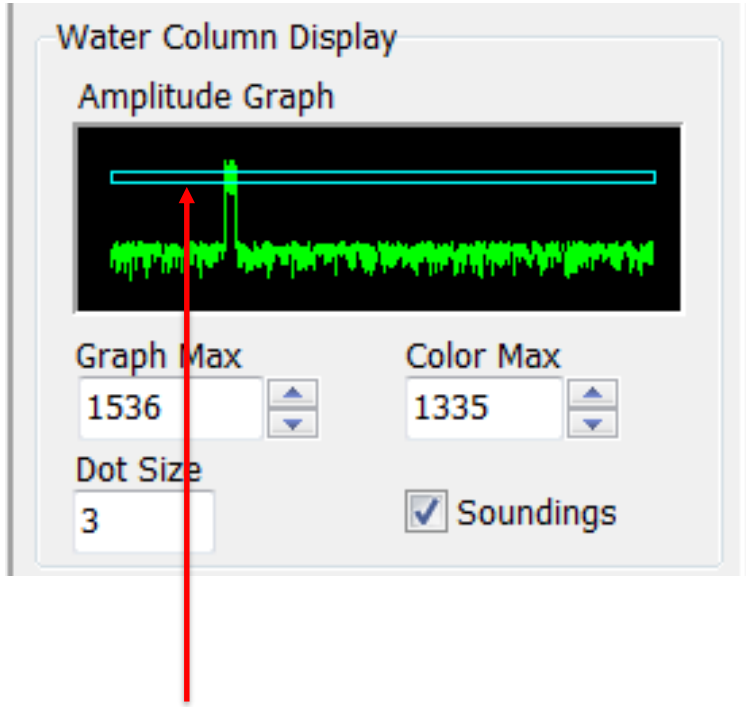


Typical Data Rate = Two Giga Bytes per Minute.

- Logger Runs Automatically with HYPACK® and HYSWEEP® Survey.
- Real Time Display and Color Configuration.
- Continuous and On Demand Logging.
- Alarms. (For Example; *Low Disk Space*)

WC Logger – Color and Display Settings

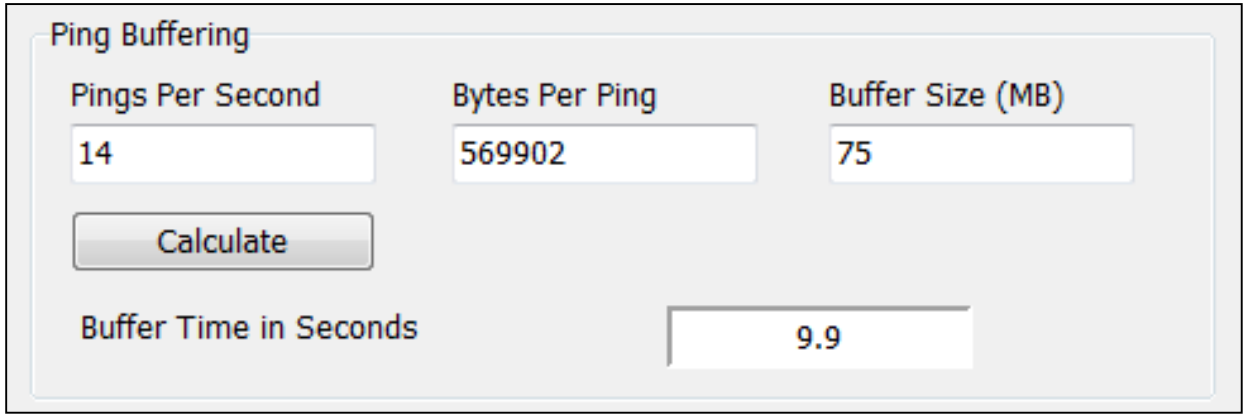
- Amplitude Graph: Backscatter Amplitude of the Nadir Beam.
- Graph Max: Set scale limit of the amplitude graph.
- Color Max = Color Saturation Limit: Any amplitude > this setting is shown in Red.
- Dot Size: Of individual samples.
- Soundings: Check this to overlay soundings in white.



Click and Drag the Blue Bar to quickly change the Color Saturation limit.

WC Logger – Ping Buffering

- Find this in Logging Options
- Number of seconds of WC data saved in program memory.
- Gives the surveyor some leeway with On Demand Logging.
- Equals the number of seconds between (1) spotting a feature and (2) clicking the Logging button.

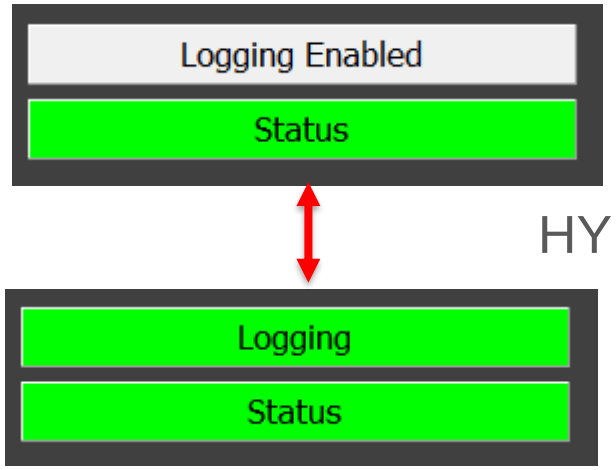


- Pings per Second: Filled in by program.
- Bytes per Ping: Filled in by program.
- Buffer Size (MB): Entered by the surveyor.
- Buffer Time in Seconds: Calculated by the program.

WC Logger – Data Logging

Automatic Mode

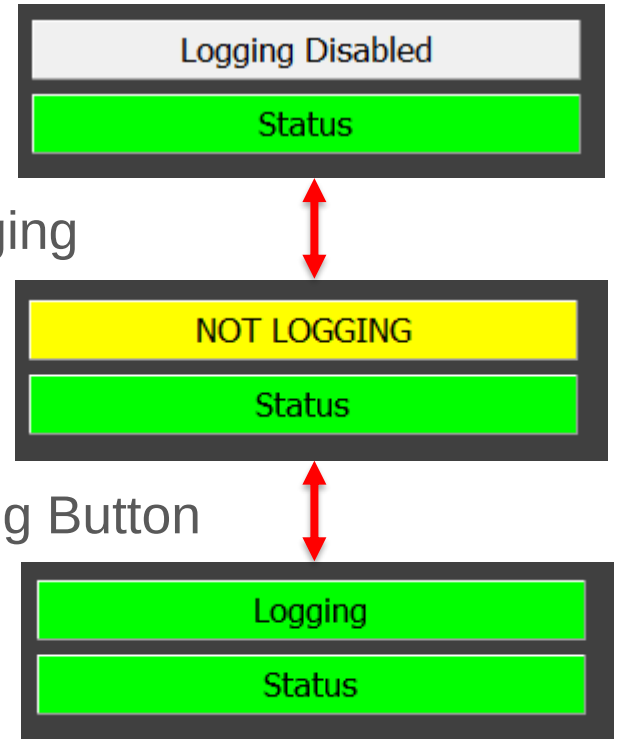
- WC Logging mirrors HYPACK® Survey.



HYPACK® Start / End Logging

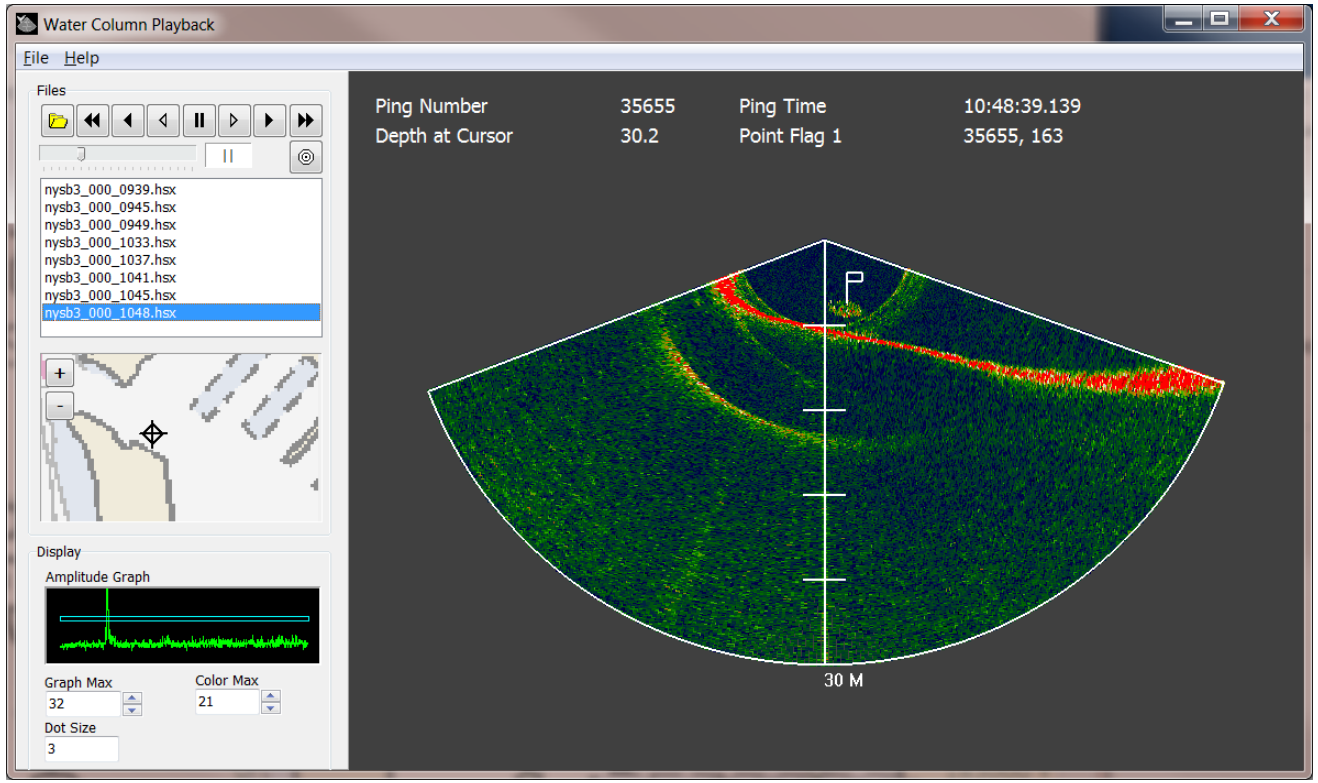
On Demand Mode

- Only Logs areas of interest.



WC Logging Button

Water Column Playback



- Quick survey review.
- Play / Pause / Fast buttons and shortcut keys.
- Display setup like WC Survey.
- Thumbnail map for referencing.
- HYPACK® Targets.
- Flag points for MBMAX64 editor search.

Thank You !

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(860) 635 - 1500

Links to more information:

HYPACK on Youtube.com (Historical Sessions)

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