The Latest Trend for Bathymetry…. Interferometry

By Harold Orlinsky

Over the past few years the interferometry system has made impressive inroads in data collection. Offering wide-swath bathymetry and side scan imagery collection has benefits over some widely-used systems today. Over the years, HYPACK® has increased its capabilty to interface with more systems on the market today (and the list continues to grow).

In the next few months, we will be investigating some aspects of using HYPACK® with these systems.

How HYPACK® Handles the Data

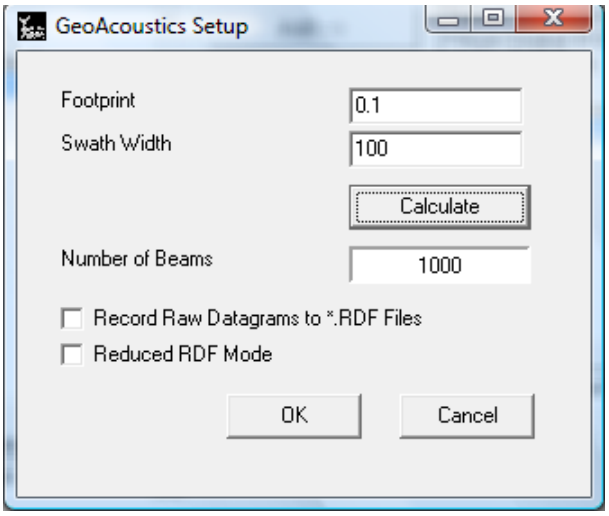
I admit we make the interferometry work in HYPACK®, rather than HYPACK® work with interferometry. Confused? To put it simply, HYPACK® has all the tools for a multibeam system that has been developing and improving for the past 15 years.

We do limit the total number of beams in the across track direction to 1440 – a value we implemented years ago, and that limit remains at present.

So how do we get an interferometry system into 1440 beams? We first consider the data points as discrete individual beams with an angle, across track and range. While logging, the data is down-sampled a user-defined amount, to get the thousands of points from an interferometry system into a swath if data no larger then 1440 beams.

In the device driver set-ups for the interferometry systems, you select two items: sonar range and foot print size. This will define how many points are stored for each swath. At 100 meter swath and 0.5 meter foot print, HYSWEEP® will log 200 points. At a 10 cm foot print size of the same range, there will be 1000 points. Reduce the swath to 50 meters and you will have a footprint less then 5cm. Does anyone see a problem with that? You have to admit that, at some point, there needs to be a finite point for a footprint size. So even “down-sampling” the data to 1440 points, we probably cover pretty much the entire seafloor.

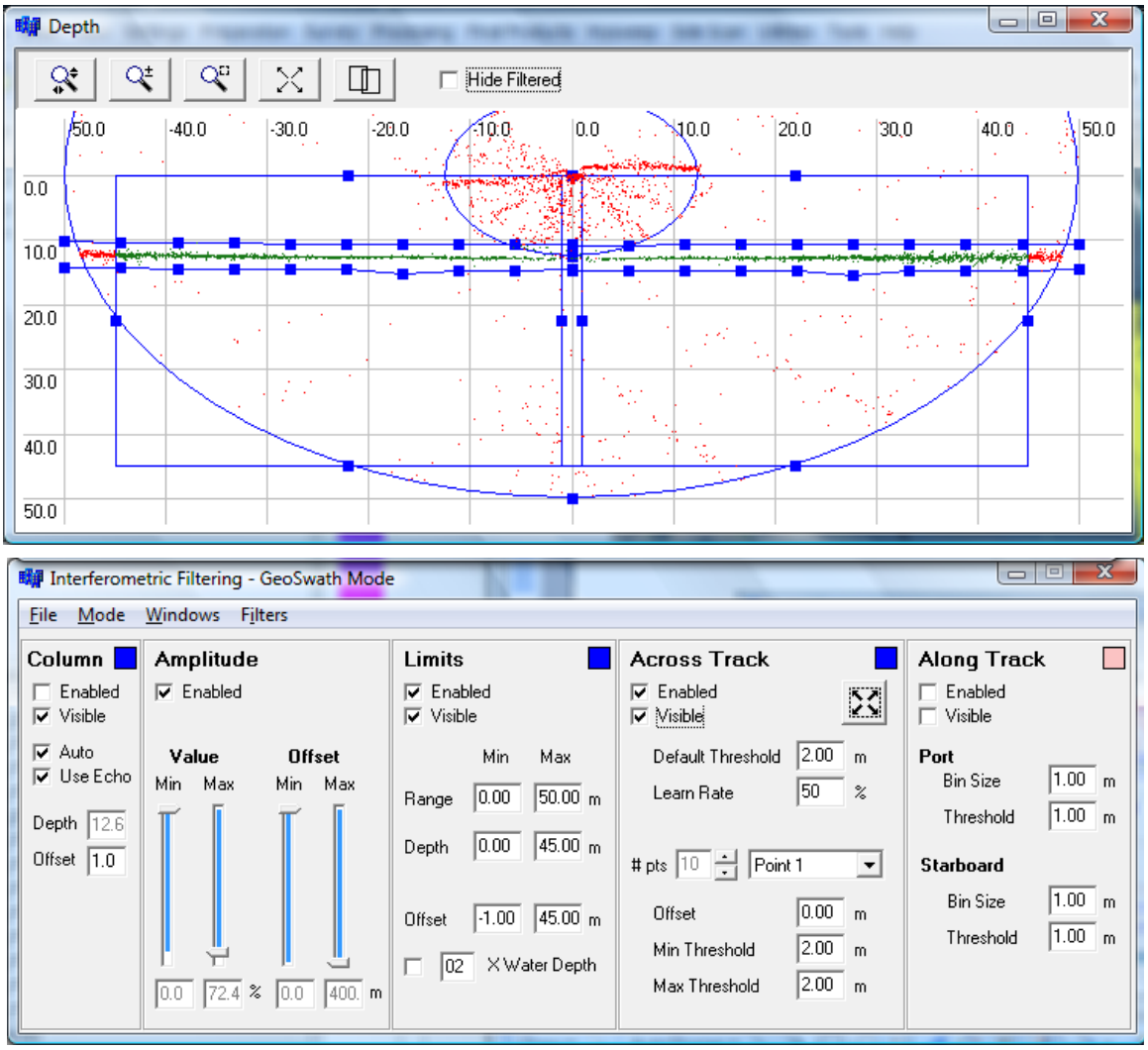
FIGURE 1. *HYSWEEP® Device Driver Setup*



In the drivers, we also provide a mechanism to store all the data in the native format of the sonar. So, even through the HSX file holds the down-sampled portion of the data, HYSWEEP® SURVEY is still able to record the full data set for those that require it.

HYPACK® has tools to clean the data before we get to this point. During data collection, the IFFILTER program allows the operator to select 5 different filters on the raw data, to remove the flyers and extraneous points. If we didn't do it on the acquisition side, there would be a lot more time spent processing the data in the HYSWEEP® EDITOR.

FIGURE 2. *IFfilter program. Used while logging data, and also to create HSX files from RDF files*



Some systems require more filtering on the acquisition side, while others have very good bottom detection and require only the editing tools available in the HYSWEEP® EDITOR.

The system is seen now in HYSWEEP® as a Multibeam device, with all the windows and displays that we are used to seeing.

FIGURE 3. *3D Seafloor Window*

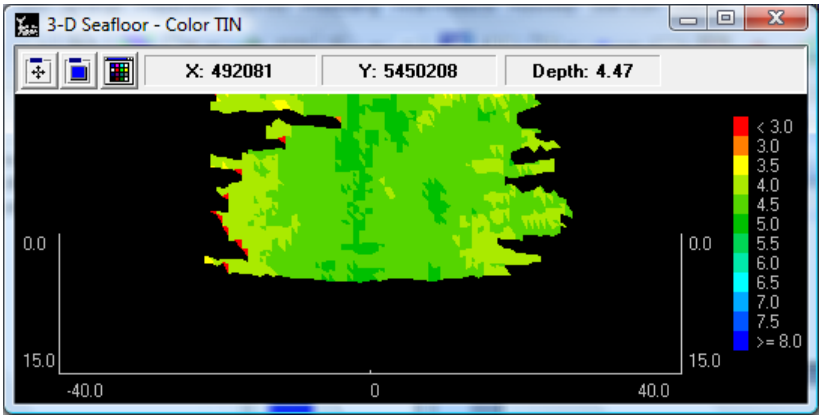


FIGURE 4. *Side Scan Waterfall Window*

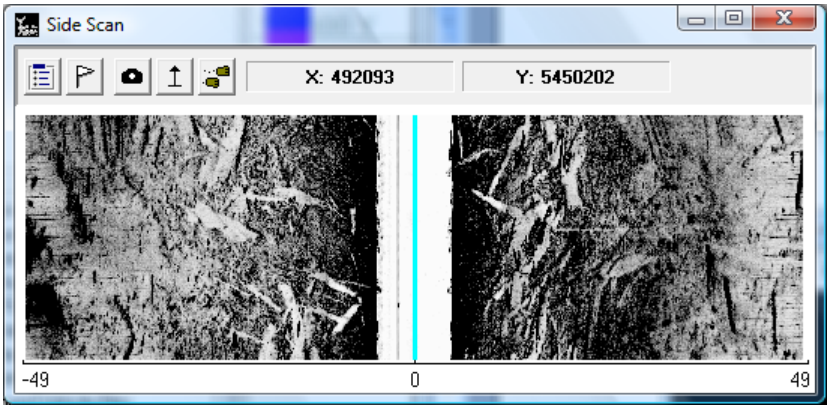
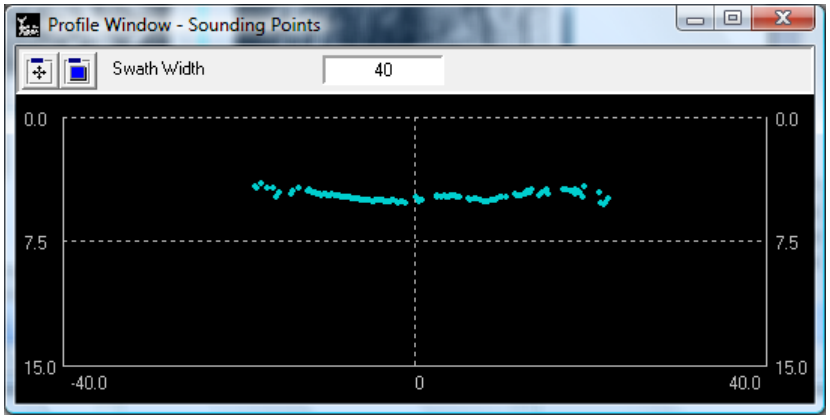


FIGURE 5. *Profile Window*



One nice feature of these systems is a wide swath bathymetry and concurrent sidescan imagery.

Next month, I'll go through some methods of cleaning the data, and using methods to combine the side scan mosaic with the bathymetry data.