



Patch Testing Topographic Lasers

By Dave Maddock

HYPACK has supported acquiring and processing topographical laser data for quite awhile now. Generally, laser data is processed the same way bathymetric data is processed: same acquisition software (HYSWEEP® SURVEY), same editor (MBMAX), and same patch test tools. However, this type of data does require a modified patch testing procedure and it was pointed out to me recently that this procedure has never been properly documented. So, here it is: a step-by-step guide to patch testing your topographic laser using HYSWEEP® SURVEY and MBMAX64 (64-bit HYSWEEP® EDITOR).

FIGURE 1. Any Ol' Pole will do...

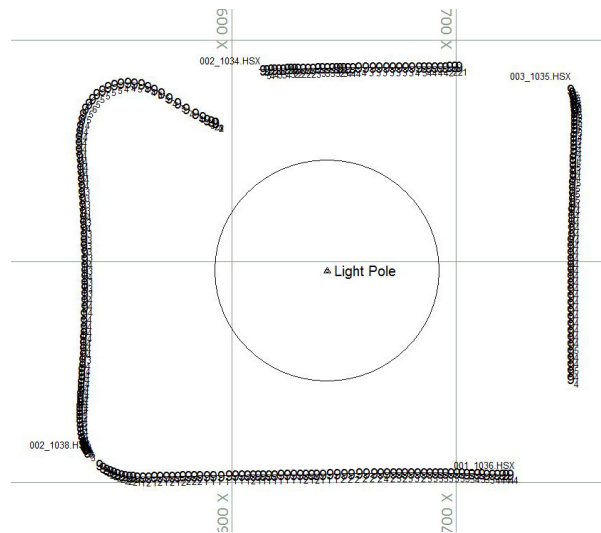


ACQUISITION

The first obstacle to patch testing a laser is to choose an appropriate feature as a reference for the test. In the case of multibeam patch tests, we select a convenient bit of seafloor (flat for roll, sloped for pitch & yaw) and run reciprocal lines or parallel lines across it.

For fixed-mounted lasers it can be a bit tricky to find a feature on the shoreline that you can survey from both directions *without* changing the mount of the laser. The taller the feature, the easier it will be to see the patch test working. (Think flag pole, not parking cone.) If you are lucky enough to have some piles or similar feature in the water to use, great. Mostly likely, you don't.

FIGURE 2.

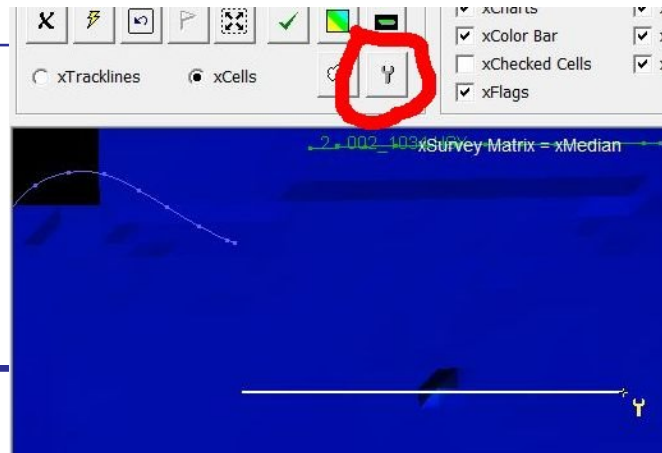


We solved this problem by performing the patch test in a parking lot while the boat was still on the trailer. Once you've identified your feature, run four equidistant lines around it, boxing it in. The aim of the patch test is to match the position of the pole in all lines.

RUNNING THE PATCH TEST TOOLS

FIGURE 3. Starting the Patch Test

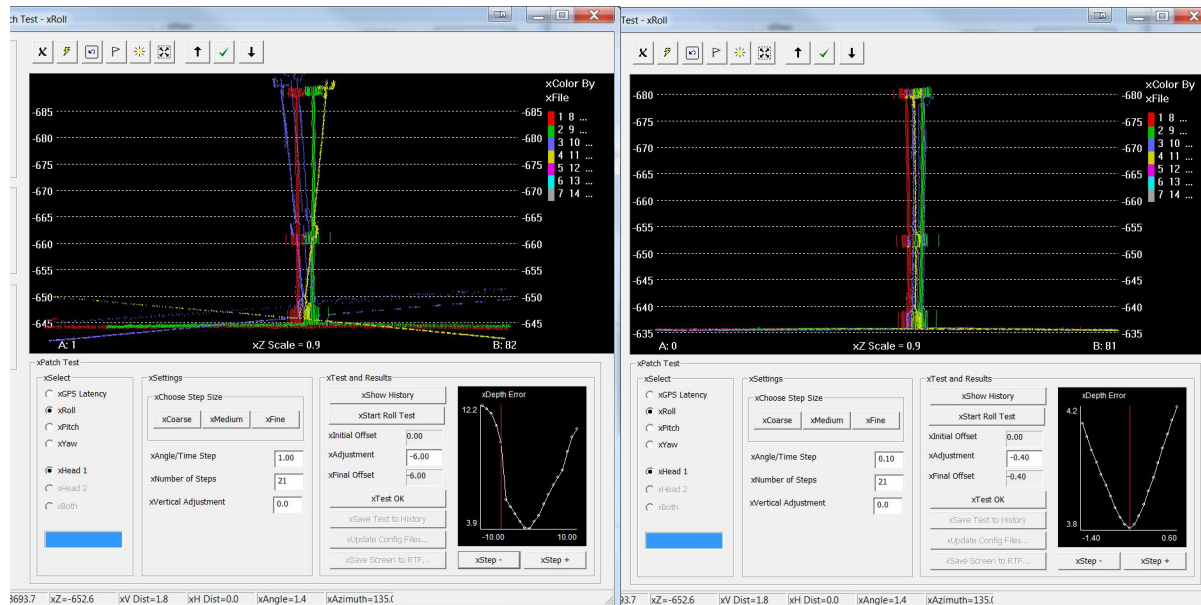
To begin processing, load all four lines into MBMAX. (Either 32-bit or 64-bit versions will work.) Selecting the patch test tool, click and drag a line across the top of the pole, parallel with two of the four lines.



ROLL TEST

Although the roll test doesn't strictly need to include the pole, it doesn't hurt so I usually leave it in. Just like with multibeam, the roll test attempts to line up the flat "bottom" of the road. If the pole is visible during the test, a roll offset will cause the bottom to make X's and affect the position of the poles somewhat:

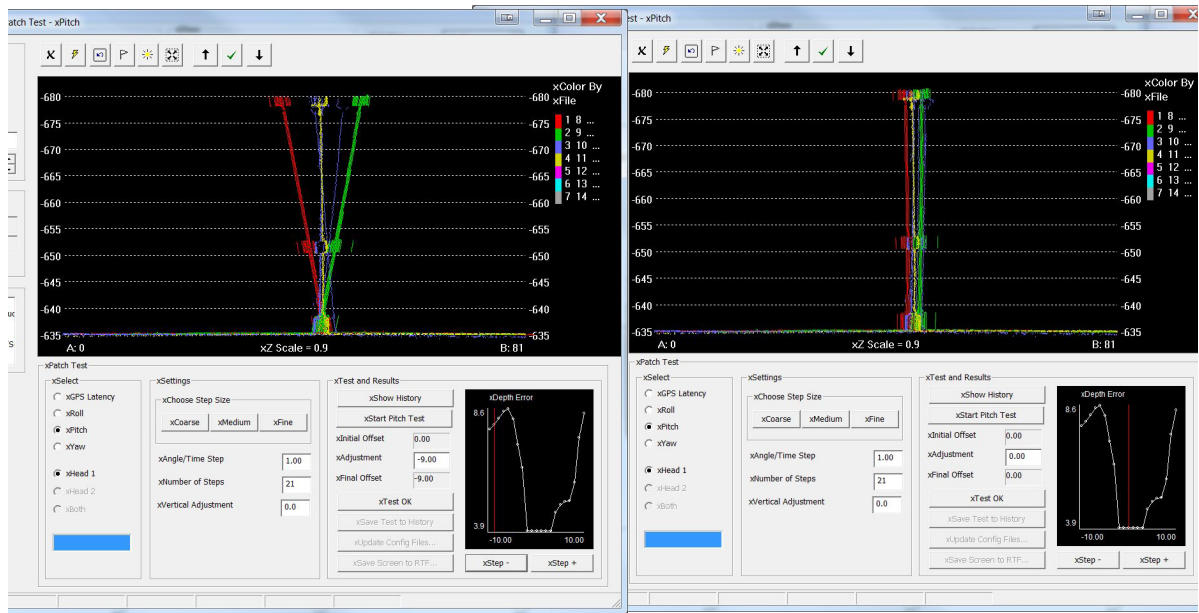
FIGURE 4. Sample Roll Tests



PITCH TEST

Next up is the pitch test. A pitch offset will show up in the data as a series of poles which spread out from the base like a bunch of flowers:

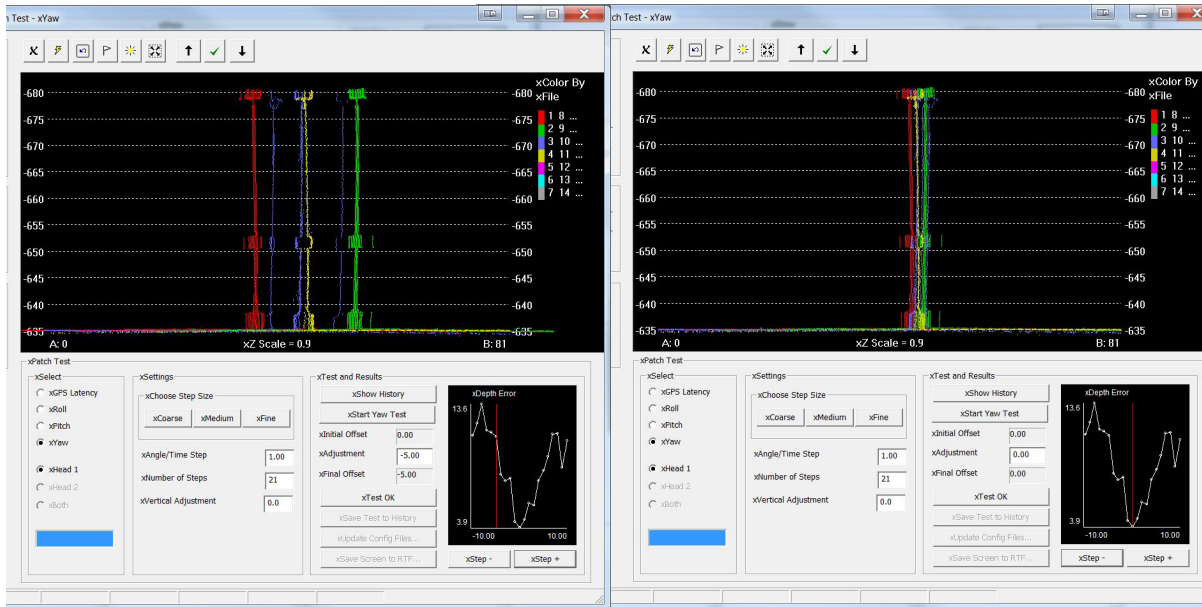
FIGURE 5. Sample Pitch Test



YAW TEST

Finally, the yaw test. A yaw offset will show up as a series of parallel poles that are separated horizontally from each other:

FIGURE 6. Sample Yaw Test



FINAL COMMENTS

After you have run through all three tests and applied the suggested offsets, I recommend that you go back through the tests a second time and refine the values. The "Fine" step size defaults to 0.05°, 0.5°, 0.5° resolution respectively. This is optimal for multibeam sonars, but you can expect better accuracy from these devices. Experiment with 0.05° resolution on all tests as a final "Ultra-fine" mode.

Just like with multibeam projects, add these patch test values to your HYSWEEP® HARDWARE configuration and they will be logged in your HSX files. They are valid as long as your mounting stays the same.