



Dual Head Patch Test – Odom MB1

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INTRODUCTION

A recent patch test of the Odom MB1 dual head makes an interesting topic. Certainly interesting if you're thinking of buying! Also as an example of the difference between single and dual head patch testing.

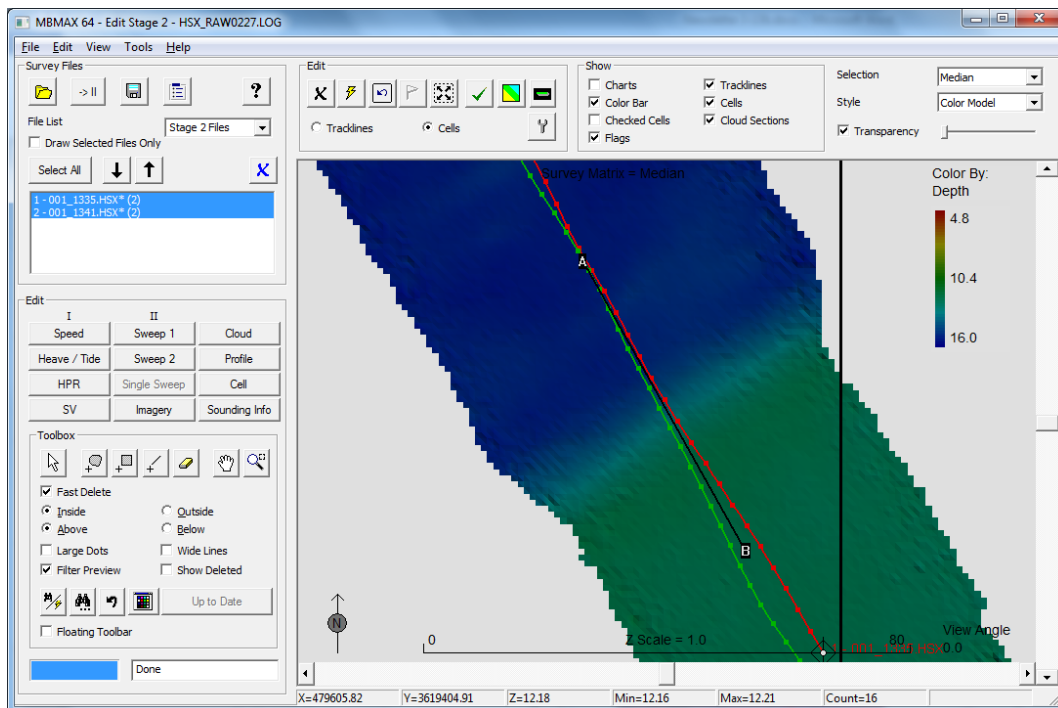
A very sturdy pole mount supports two MB1 multibeam sonar heads, each head rotated 30 degrees. Because a single MB1 spans 120 degrees, the dual configuration gives angular coverage of +/- 90 degrees with +/- 30 degree sector covered by both heads.

LATENCY TEST

The latency test is straight forward in that there is no need to distinguish between heads one and two. That is, the rules for single head latency testing (two survey lines run over varying depth in the same direction at different speeds) apply.

Figure 1 shows the survey lines run over a channel side slope. The speed differential is 3.5 knots, track lines are in red and green, and A-B connects the patch test cross section.

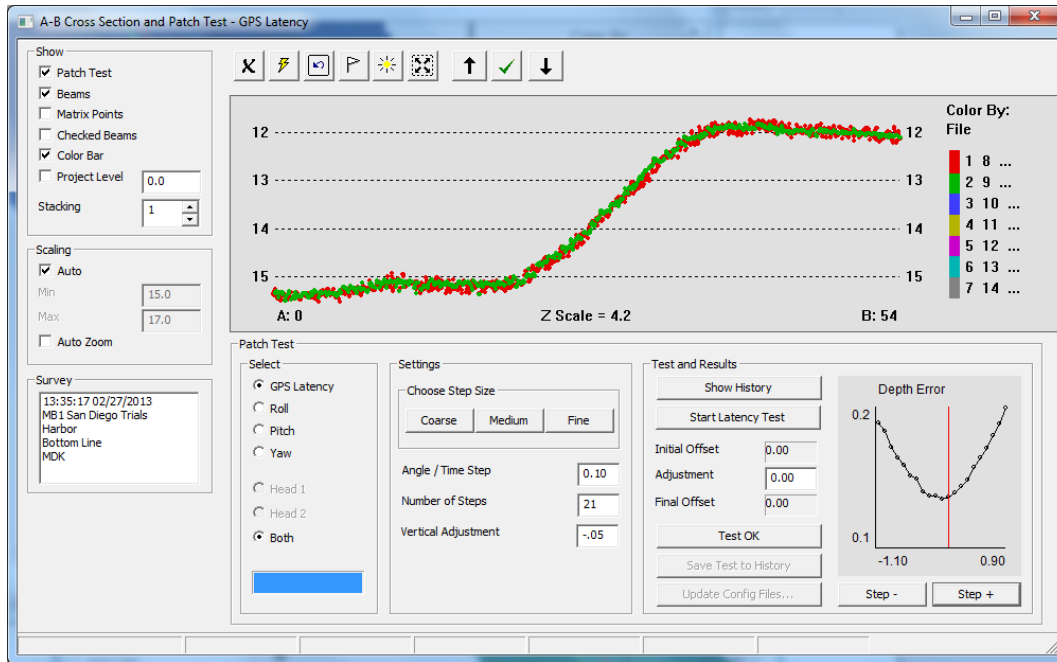
FIGURE 1. Latency Test Map View.



In Figure 2, the Latency Test confirms there is no GPS latency. The settlement difference between fast and slow lines is something to watch for in latency testing. A 50 cm vertical

adjustment is required in this example. The test results are biased without the adjustment. That is, depth difference is compensated with latency, which is clearly not good.

FIGURE 2. Patch Test Results from HYSWEEP MBMAX64.!



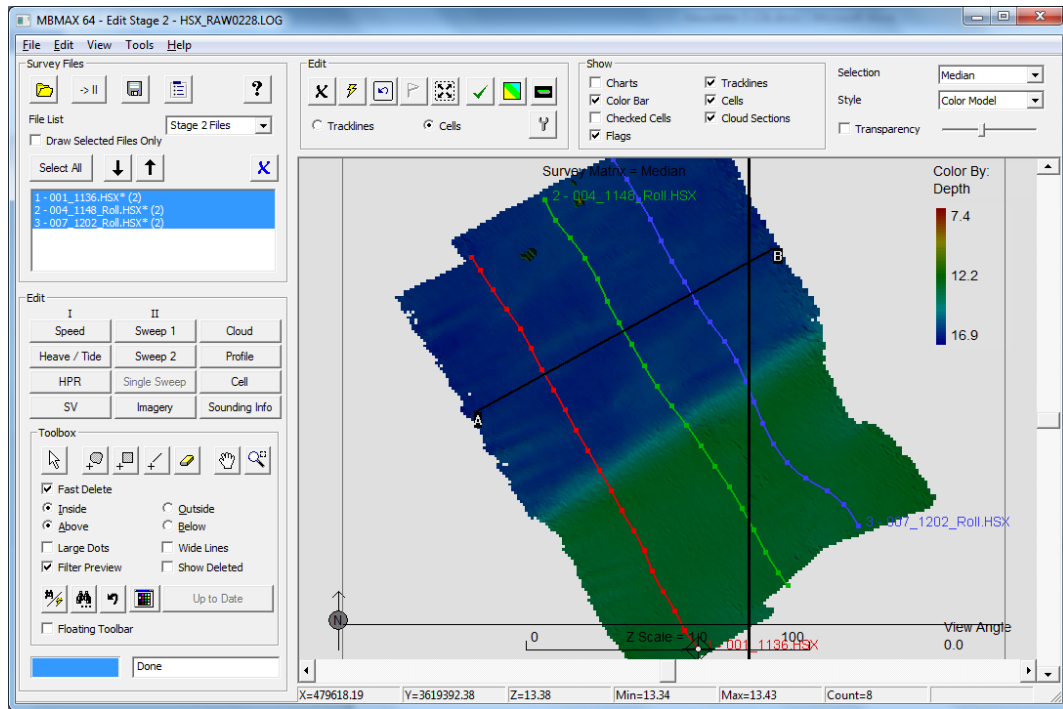
ROLL TEST

The latency test was easy, the roll test requires some thinking and planning. We want to use trusted beams, so trimming is done at +/- 65 degrees, giving coverage of 2.14 times the water depth [$\tan(65)$]. In 16 meters of water, optimal line spacing is 35 meters.

Lines are run over a flat bottom in a serpentine pattern. Simply put, we want to overlap head one beams for head one roll bias, then do the same for head two.

Figure 3 shows the survey lines and the location of the (A-B) cross section. Note that while the lines are run over a bank, the patch test cross section is cut in the channel flat area.

FIGURE 3. Roll test lines. The serpentine pattern overlaps the starboard looking head (red and green) and port looking head (green and blue) separately. That's a requirement for dual head roll testing.



Figures 4 and 5 show the test results. They are not as distinct as roll testing with a single head because the overlap is limited to one side.

FIGURE 4. Roll Test Result; Head One.

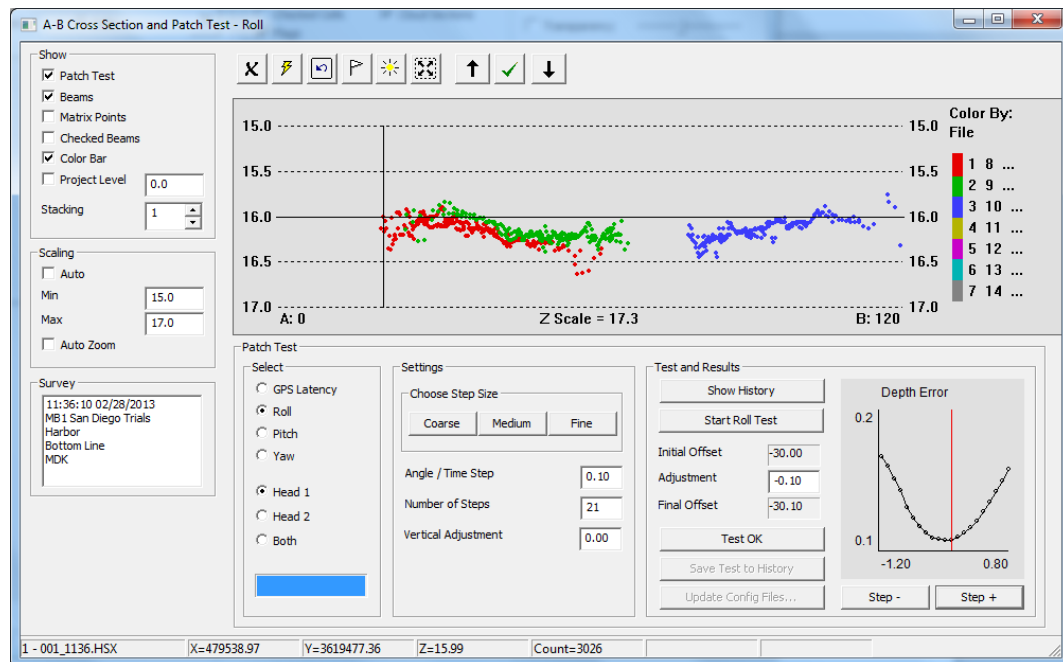
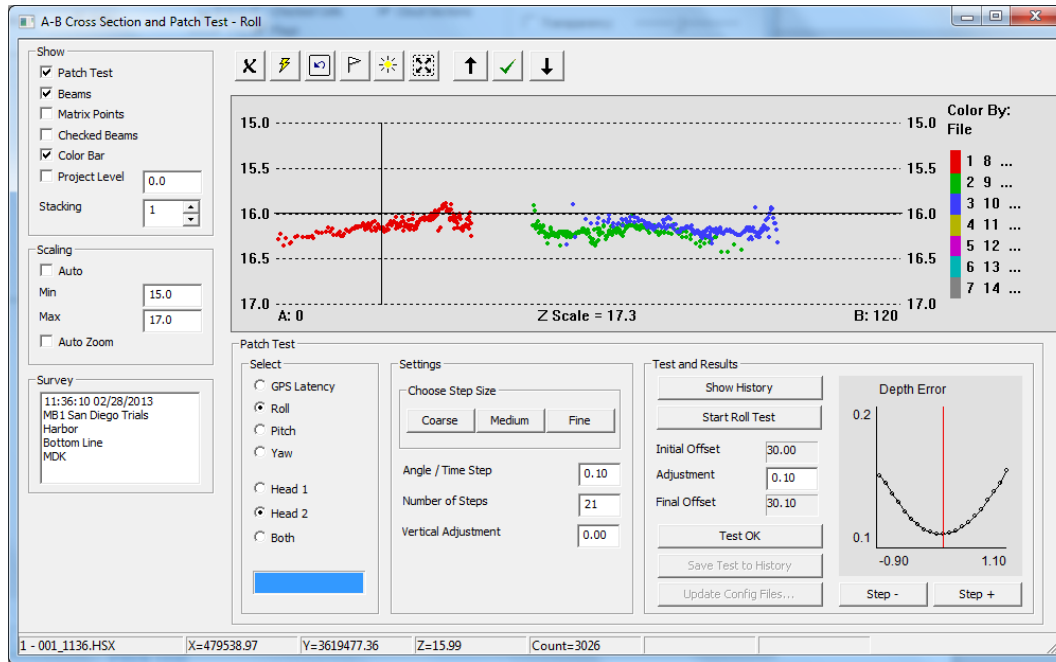


FIGURE 5. Roll Test Result; Head Two.



PITCH TEST

The pitch test can be run testing heads separately or together. Either way, the rules are the same as with a single head system – run reciprocal lines at survey speed over a variable depth.

With the dual MB1 the result is the same whether heads are tested together or separately: 1.5 degrees (Figures 6 and 7).

FIGURE 6. Pitch Test Lines and Location of A-B Cross Section.

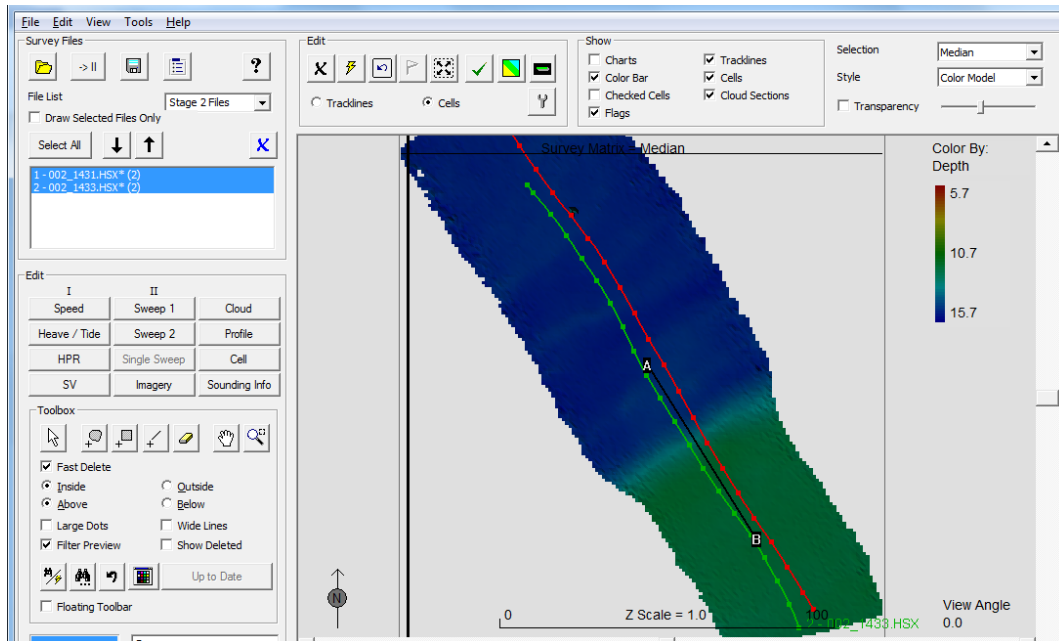
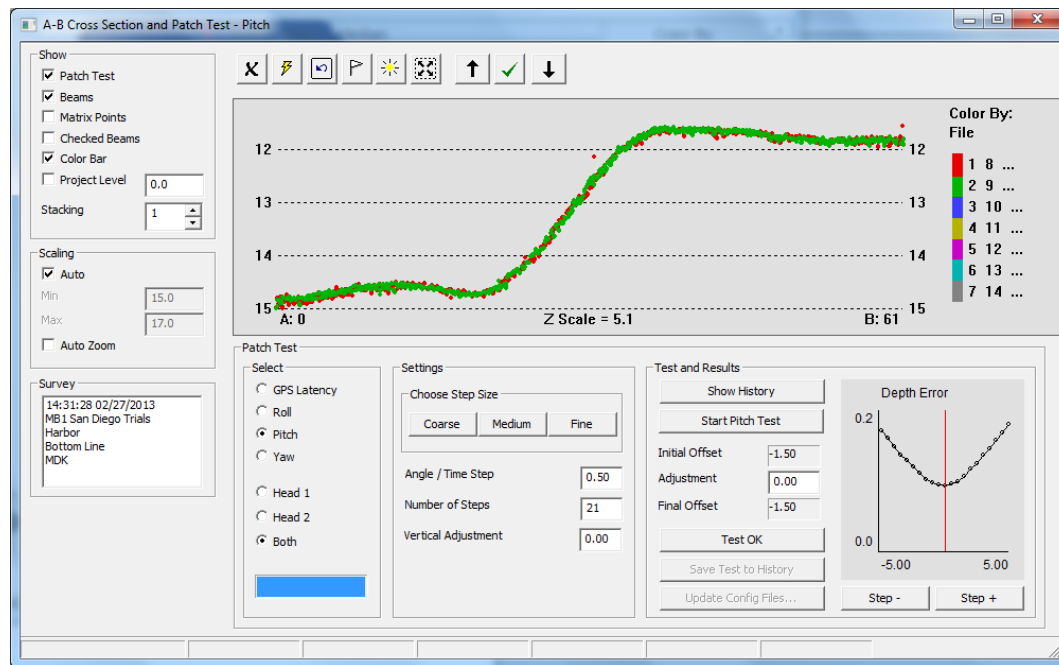


FIGURE 7. Pitch Test Result Testing Both Heads Together.



YAW TEST

Whether you use single or dual head devices, it's hard to get yaw alignment pinned down. Perhaps that's because **misalignment doesn't affect depth, only depth position.** Depth

position is important though, so we push forward and do the best we can. As with the other tests, the right answer comes from **averaging multiple patch test surveys!**

As with single head, the dual head yaw test uses parallel lines run in the same direction over depth changes at survey speed. The question is “What is the correct line spacing?”.

In this instance, depth varies from 16 to 12 meters, with an average of 14 meters. We want beams near nadir from the first line to overlap beams at 45 degrees from the second at the average depth. That’s simple then, line spacing = average water depth.

Figures 8 and 9 show survey lines run over the channel side slope and the patch test cross sections (A-B) cut for testing heads one and two respectively. Figures 10 and 11 are the results.

As mentioned, the only way to find true patch alignment is to average multiple tests. Figures 12 and 13 show the average from four tests done with different line pairings.

FIGURE 8. A-B cross section overlays head 1 beams near nadir (red) with outer beams from the second line (green).

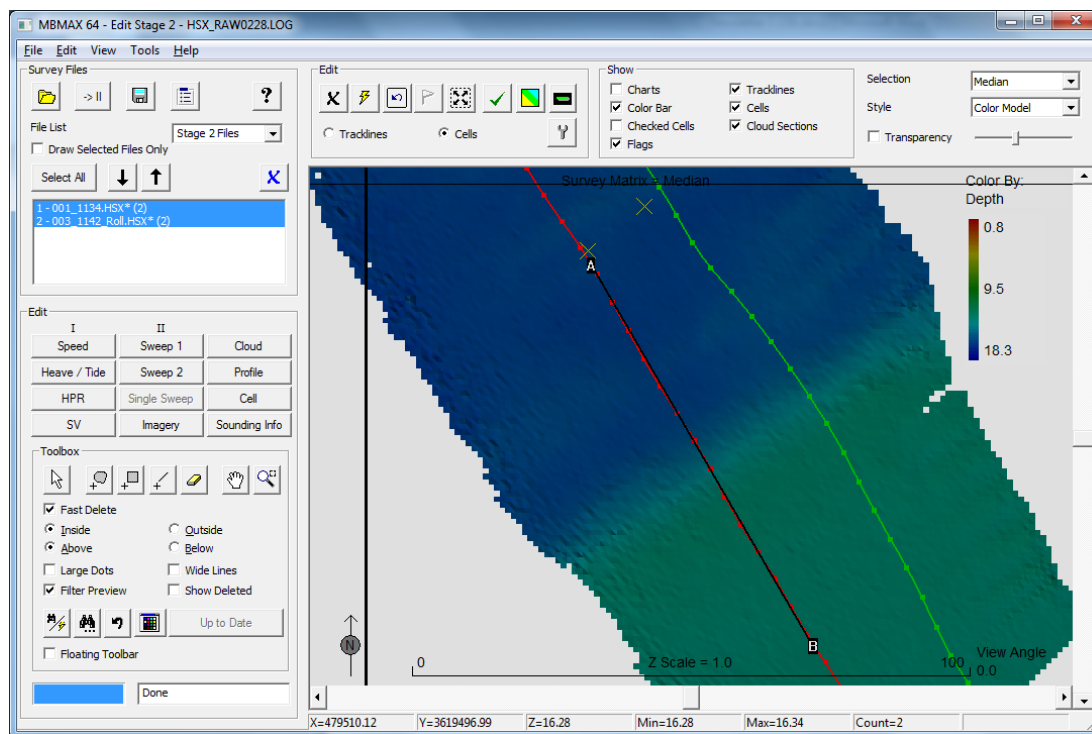


FIGURE 9. A-B cross section for head 2 yaw test.

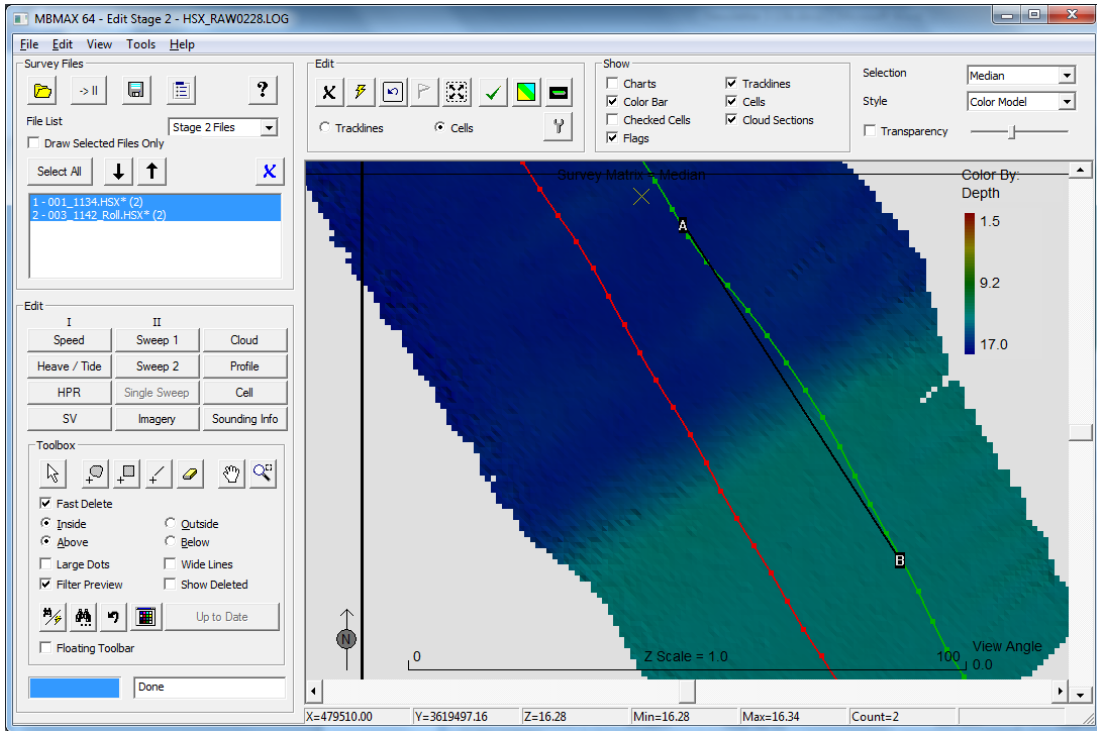


FIGURE 10. Head one results from a single test.

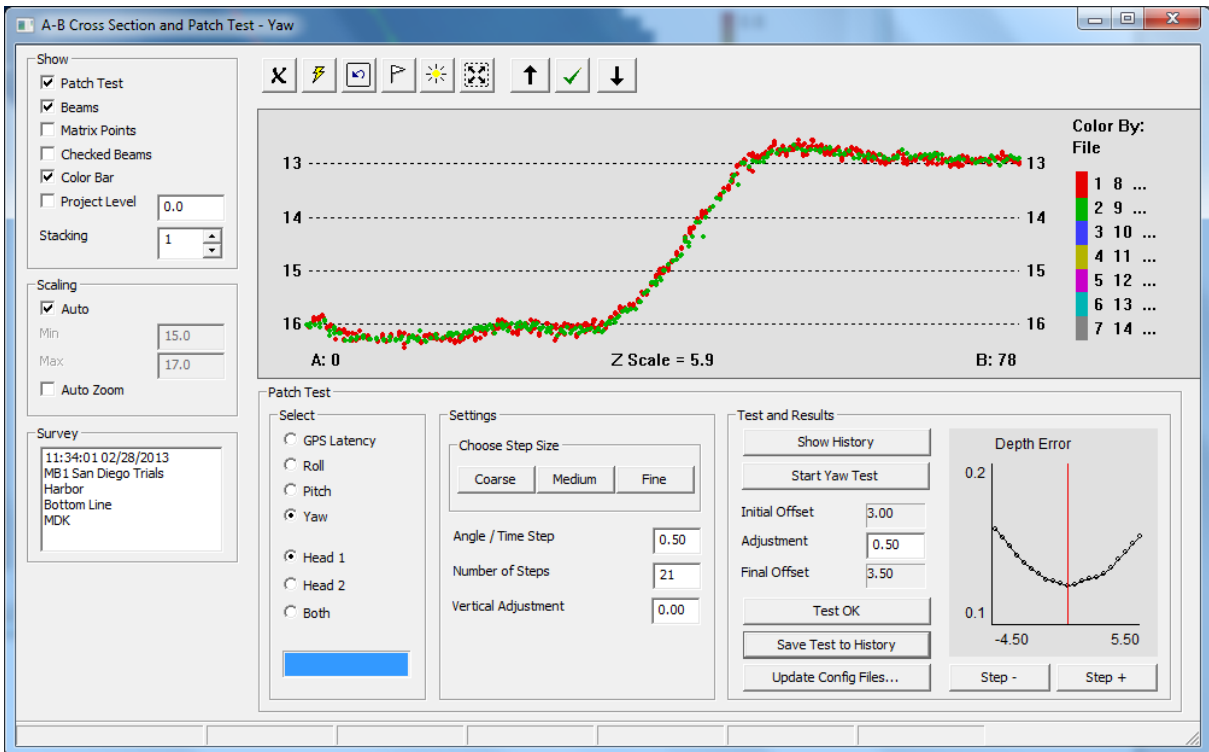


FIGURE 11. Head two results from a single test.

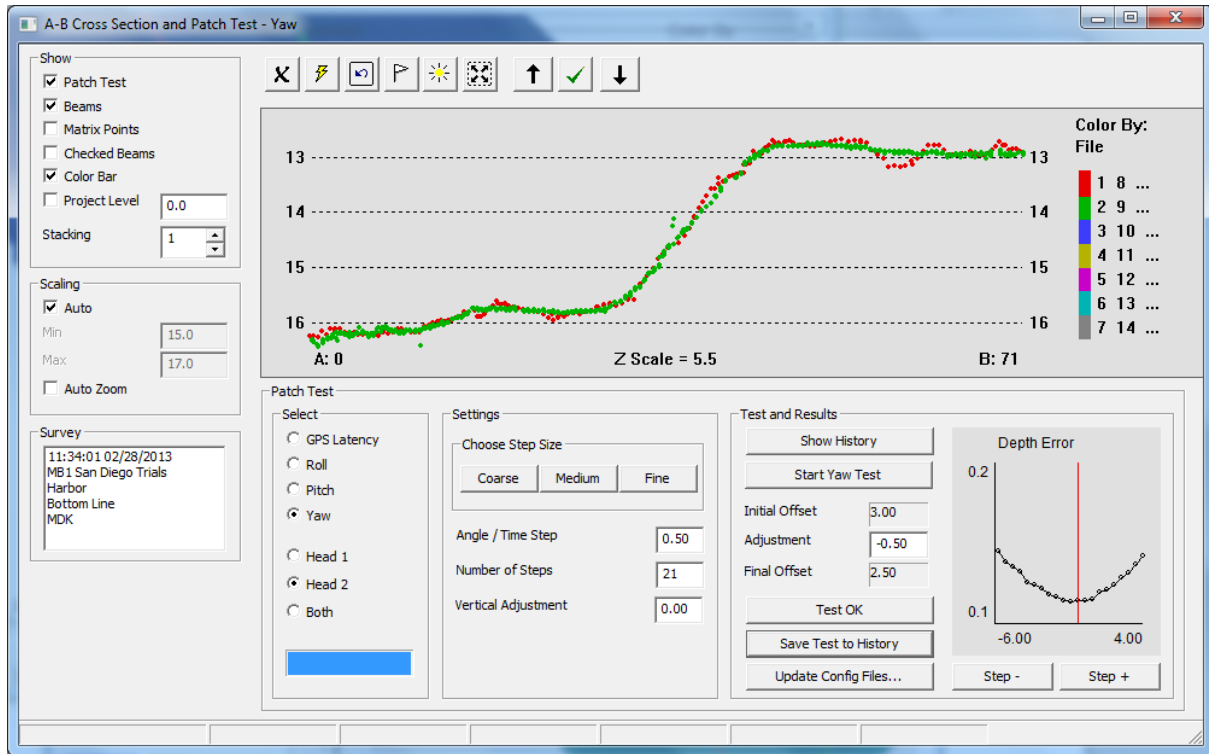


FIGURE 12. Head One (left) and Head Two (right)—Average Result from Four Tests.

