The Effect of Data Editing on Patch Test Results

By Ivan Isaak

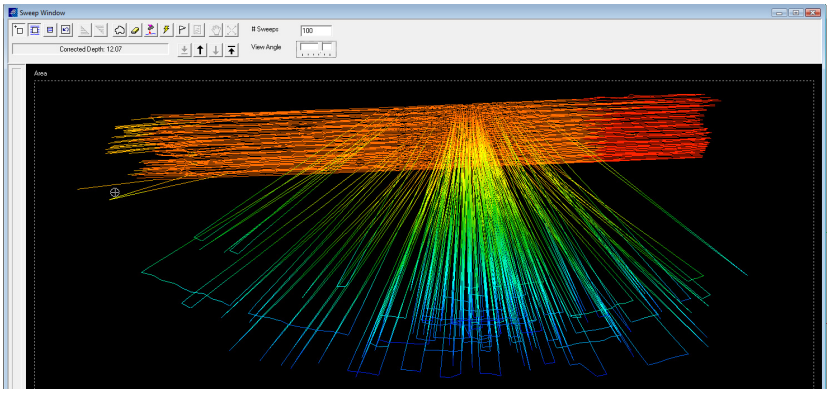
How much editing is necessary in the Phase 2 and 3 inside MB MAX to get the reliable results of the Patch Test?

I'll take the data from Reson Seabat 8101 system patch test and will try to perform a Patch Test without any editing, then with just removing the biggest outliers and after all I'll perform a fine editing to see if this will have any effect on the Patch Test results.

I used automatic cross sections selection for all the tests.

NO EDITING

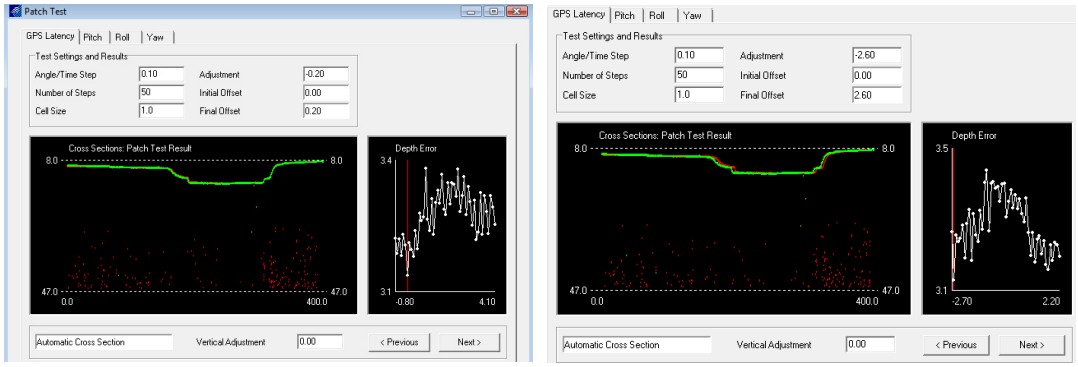
FIGURE 1. *Sweeps in Phase 2 in MB MAX.*



The data is quite noisy. But let's go directly into phase 3 and do the Patch Test from this data.

The result for the **latency** is awful:

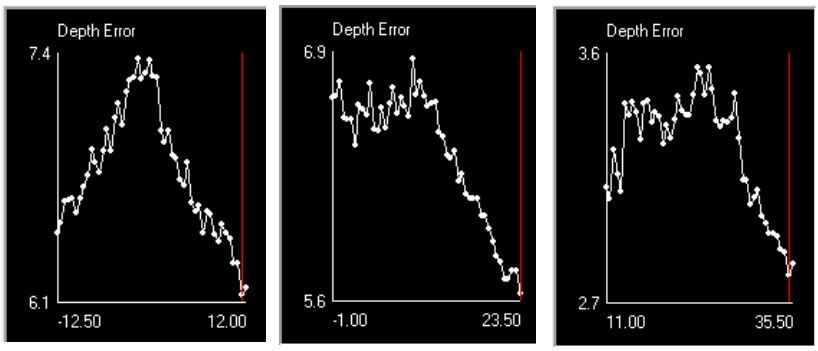
FIGURE 2. *Latency Test Results with Unedited Data.*



I've run a Latency Test three times. Each time the program gave me quite different results and none of them was acceptable –none of the error curves looked normal.

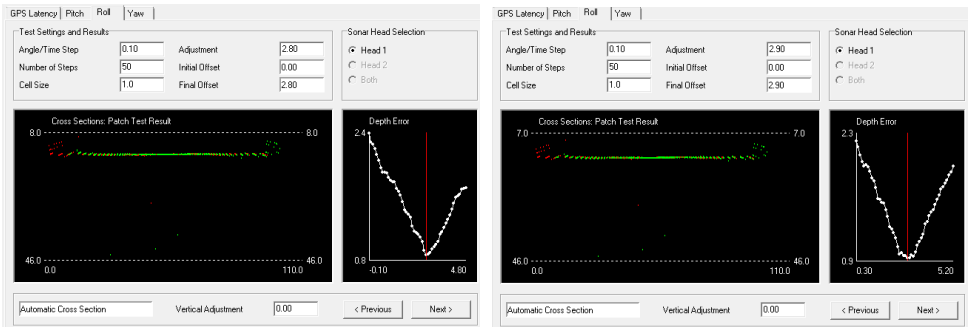
I can say the same about the **Pitch** testing:

FIGURE 3. *Pitch Test, Depth Error curves.*



And here comes the **Roll**:

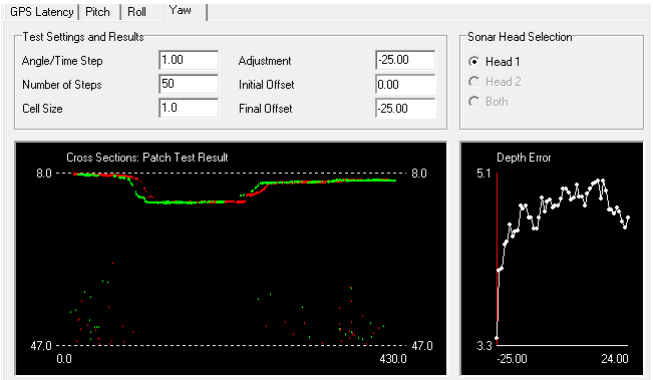
FIGURE 4. *Roll test Results Without Editing.*



Three runs gave the following results: 2.80, 2.90, 2.85 with 2.85 as an average. The Error Curve is much better and such a test can be accepted. But we will compare the Roll results with the edited data test later on.

The result of the **Yaw** test is the same as for the Latency and Pitch – it is ugly.

FIGURE 5. *Results for the Yaw with not edited data.*

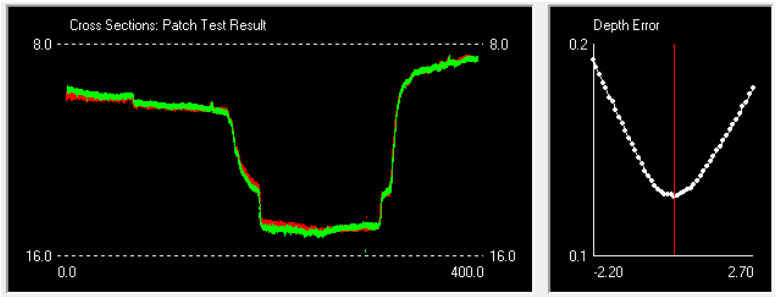


MINIMUM EDITING

Now I took the same set of data but this time I've done some minimum editing. I've used Min-Max filters and have omitted 5^0 from outer beams on both sides.

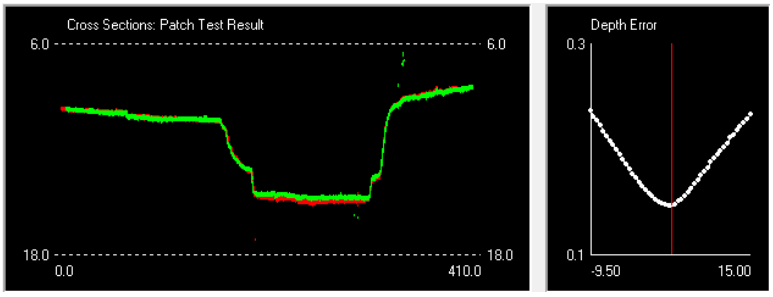
Latency:
Now the results are much better. The resulting latency from the three tests was -0.30s. Not bad!

FIGURE 6. *Fig. 6Latency Test results after minimum editing*



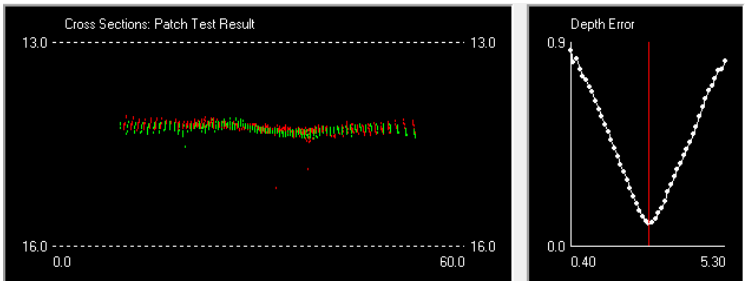
Pitch:
I can say the same about the Pitch test – it is acceptable. The average from the three tests was 3.0^0 and the error curves have good V-shape.

FIGURE 7. *Fig. 7Pitch Test results after minimum editing*



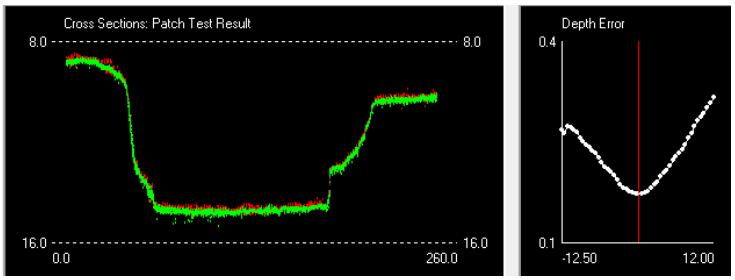
Roll:
The error curves after minimum editing are much smoother than without editing (Compare with the Figure 4). But the resulting roll values are almost equal. After minimum editing the average Roll value is 2.90^0 whereas without editing it was 2.85^0.

FIGURE 8. *Fig. 8Roll Test results after minimum editing*



Yaw:
As in the tests for Latency, the error curve for the Yaw Test is ok. The average Yaw is 0.00

FIGURE 9. *Fig. 9Yaw Test results after minimum editing*

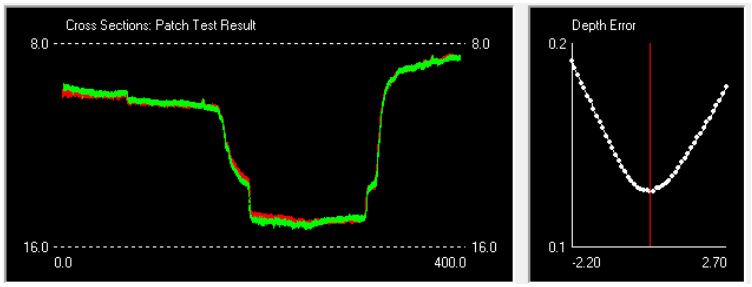


FINE EDITING

During the last session I've carefully removed all possible outliers with the Savitsky-Golay filter, which usually does a good job during fine editing, and also manually. In the phase 3, I've applied statistical filters set to a 2Sigma limit.

Latency:
The Latency test after fine editing showed exactly the same value as after minimum editing --0.30s.

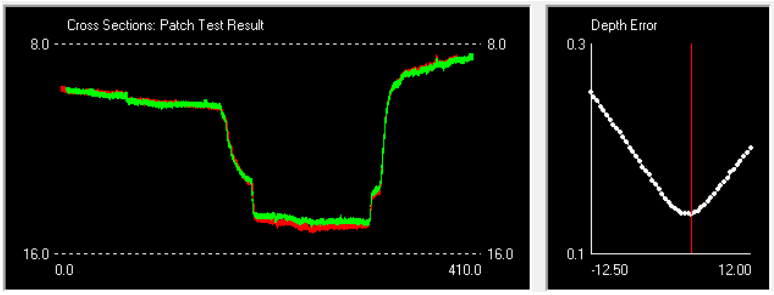
FIGURE 10. *Fig. 10Latency Test result after fine editing*



Pitch:

The average value for the Pitch after fine editing was 3.0^0, i.e. exactly the same as with the minimum editing session.

FIGURE 11. *Pitch Test results after fine editing*



Roll:
As in all previous tests, the Roll error curve has very nice V-shape in all three runs. The average value is 2.90^0, which is the same as with minimum editing and a bit higher than with unedited data (2.85^0).

Yaw:
As in the previous test, the Yaw value is 0.00.

IN CONCLUSION

- It is clear that the minimum editing is necessary to receive reliable results in the Patch Test.
- Only the Roll adjustment can be received even with unedited data.
- It is not necessary to do fine editing to get valuable results of the Patch Test.