Marcus G. Langseth
Patch Test – MGL1214

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Multibeam Advisory Committee
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MGL1214 Patch Test Survey Plan
### MGL1214 Patch Test Survey Plan

<table>
<thead>
<tr>
<th></th>
<th>Start Lon</th>
<th>Start Lat</th>
<th>End Lon</th>
<th>End Lat</th>
<th>Distance (nm)</th>
<th>Speed (Knots)</th>
<th>Estimated Time (Hours)</th>
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<tbody>
<tr>
<td>Transit From Astoria</td>
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<td>4.17</td>
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<td>Latency1</td>
<td>-125.12530</td>
<td>45.90944</td>
<td>-125.19576</td>
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<td>0.76</td>
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<td>Transit To Astoria</td>
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<td><strong>TOTAL:</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td><strong>13.06</strong></td>
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MGL1214 Patch Test Survey Overview
1.1 MGL1214 Latency Test Procedure

- Conduct XBT and enter using SVP Editor
- Same line, same direction, 2 speeds
- Prior to first line:
  - Max angle changed from 65 to 30 for both sides (puts more points over center of swath)
  - Disable FM
- Run Line 1 at typical survey speed (e.g. 8 kts)
- Run Line 2 at half speed of line 1 (e.g. 4 kts)
- Log lines in separate files and turns in separate files.

<table>
<thead>
<tr>
<th>Time</th>
<th>Longitude</th>
<th>Latitude</th>
<th>Speed</th>
</tr>
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<tbody>
<tr>
<td>XBT Launch</td>
<td>125.12530W</td>
<td>45.90944N</td>
<td>8kts</td>
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<tr>
<td>End</td>
<td>125.19576W</td>
<td>45.87495N</td>
<td></td>
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<tr>
<td>SOL1</td>
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<td>45.90944N</td>
<td>8kts</td>
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<tr>
<td>EOL1</td>
<td>125.19576W</td>
<td>45.87495N</td>
<td></td>
</tr>
<tr>
<td>SOL2</td>
<td>125.12530W</td>
<td>45.90944N</td>
<td>4kts</td>
</tr>
<tr>
<td>EOL2</td>
<td>125.19576W</td>
<td>45.87495N</td>
<td></td>
</tr>
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</table>
1.2. MGL1214 Latency Test – Results

- Use SIS to select along-track corridor at Nadir:
  - Lines plot pretty much on top of each other
  - Latency on MGL1214 appears to be fine.

*This is expected - modern systems shouldn't have latency issues, but it is important to run this test as an initial part of the patch test procedure.
2. MGL1214 Pitch & Roll Test Procedure

• Conduct XBT and enter using SVP Editor
• Run same line 2x in opposite directions, same speed (e.g. 8 knots)
• Change Sonar Settings
  – Changed max angles from 30 to 60 for both Port/Stbd

XBT @ 2012-08-01 05:26  Finish at 2012-08-01 05:31
SOL1 @ 2012-08-01 06:18 (file 17)  125.19576W, 45.87495N  8kts
EOL1 @ 2012-08-01 06:35  125.07624W, 45.93324N
SOL2 @ 2012-08-01 06:46 (file 19)  125.07624W, 45.93324N  8kts
EOL2 @ 2012-08-01 07:05  125.19549W, 45.87468N
### 2.1. MGL1214 Roll Bias Results ★

- Use SIS to select across track corridors (at least 3):
  - First corridor: -0.065
  - Second corridor: -0.065
  - Third corridor: -0.065

*Apply this offset at the end of the line (stop logging to apply offsets)*

| SOL1 @ 2012-08-01 06:18 (file 17) | 125.19576W, 45.87495N | 8kts |
| SOL2 @ 2012-08-01 06:46 (file 19) | 125.07624W, 45.93324N | 8kts |
Corrected Roll Bias
2.2. MGL1214 Pitch Bias Results ✔

- Use SIS to select along track corridor at nadir, from top of ridge to flat area
- Pitch Looks OK - no change needed!

<table>
<thead>
<tr>
<th>SOL1</th>
<th>2012-08-01 05:53 (file 16)</th>
<th>125.19576W, 45.87495N</th>
<th>8kts</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOL2</td>
<td>2012-08-01 07:05 (file 20)</td>
<td>125.07624W, 45.93324N</td>
<td>8kts</td>
</tr>
</tbody>
</table>
2.3. MGL1214 Apply Roll Offsets

- At conclusion of line
- Saved offsets into text file
  - PU_params_2012-0801.txt
- Current + New offsets:
  - Roll: -0.51 + -0.065 ==> -0.575
    (NOTE SIS only took it to -0.57)
- Stop logging to apply new offsets
- Resume logging @ 2012-08-01 07:35 (file 0022)
3. MGL1214 Heading Test Procedure

- Run 2 parallel lines offset 2x water depth at same speed and in same direction
  - Line 1:
    - Change starboard side to 15 degrees, leave port at 60
      - forces beams to Port side (2012-08-01 07:38 )
  - Line 2:
    - Change port side to 15 degrees, starboard to 60 deg

-SOL1  2012-08-01 07:43 (files 0023, 0024)  125.18560W, 45.86399N  8kts
-EOL1
-SOL2 @ 2012-08-01 08:46 (file 0026)  125.20111W, 45.88658N  8kts
-EOL2 @ 2012-08-01 09:11  125.13373W, 45.92014N
3. MGL1214 Heading Test Results ★

• Using SIS, select along-swath corridor (where two swaths overlap)
  – Best heading offset appears to be -0.2
  – Prior to patch test, no heading offset was entered

@2012-08-01 09:18 - changed heading offset to -0.2
New Heading Bias
5. MGL1214 Conclude Patch Test

- Resume Logging
  - Update Runtime parameters
    - set swath back to 65 degrees both Port/Stbd,
    - Unclick FM disable
  - Resume logging again @2012-08-01 09:21
MGL1214 Final Sensor Offsets

<table>
<thead>
<tr>
<th>Offset angles (deg.)</th>
<th>Roll</th>
<th>Pitch</th>
<th>Heading</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX Transducer:</td>
<td>0.1603</td>
<td>-0.0772</td>
<td>359.99</td>
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<tr>
<td>RX Transducer:</td>
<td>0.1603</td>
<td>-0.0772</td>
<td>0.00</td>
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<tr>
<td>Attitude 1, COM2:</td>
<td>-0.57</td>
<td>-0.23</td>
<td>0.43</td>
</tr>
<tr>
<td>Attitude 2, COM3:</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Stand-alone Heading:</td>
<td></td>
<td></td>
<td>-0.20</td>
</tr>
</tbody>
</table>
MGL1214 Patch Test Summary

• Latency Test ✔
  – *No change needed*

• Roll Test ★
  – Applied additional offset of -0.065
  – Resulting Roll Offset: -0.575

• Pitch Test ✔
  – *No change needed*

• Heading Test ★
  – Applied offset of -0.2
  – Resulting Heading Offset: -0.2
Patch Test Protocol Summary

- Latency (30 deg both sides)
  - Same line, same direction, 2 speeds (1 & 0.5 x survey speed)
  - S/S: Use along-track corridor at Nadir
- Roll (full 60 deg both sides)
  - Same line, opposite direction, same speed
  - S/S: Use across-track corridor
- Pitch (full 60 deg both sides)
  - Same line, opposite direction, same speed
  - S/S: Use along-track corridor at Nadir
- Heading (15 deg & 60 deg then switch)
  - 2 parallel lines offset 2x water depth
  - Same speed, same direction
  - Focus beams to side of overlap before running line
  - S/S: Along-track corridor at area of overlap
MGL1214 MAC Recommendations

• Continue to use SVP Profile Editor
• Conduct a patch test when
  – A component instrument is changed (e.g. POSMV, etc)
  – Prior to a dedicated mapping cruise
• Please email us with future patch test results
Questions? Feedback? Suggestions?

• Please visit the MAC website:
  http://mac.unols.org

• MAC Help Desk:
  mac-help@unols.org