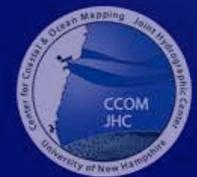# Patch Test

MULTIBEAM CALIBRATION

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What is a patch test?

- ▶ Even with the best marine survey of the components of a multibeam echosounder system, there will almost always be some misalignment between the motion sensor and the sonar arrays.

- ▶ In order to determine the residual angular offsets between the sonar array and the motion sensor a patch test is conducted

- ▶ Angular values for pitch, heading, and roll are determined , as well as a determination of any timing issues (latency)

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NSF

When to do a patch test

- A newly installed system

- Movement of ancillary systems (MRU/IMU replacement)

- Prior to any survey when multibeam data is the primary objective

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Where to do a patch test

- Depths appropriate for the frequency of the system(s) being tested.

- Ideally depths should be as deep as possible, but prior to the point where the swath width no longer increases as a function of depth

- Requires sloping seafloors for the pitch, heading, and latency testing

- Requires flat seafloor for roll bias determination

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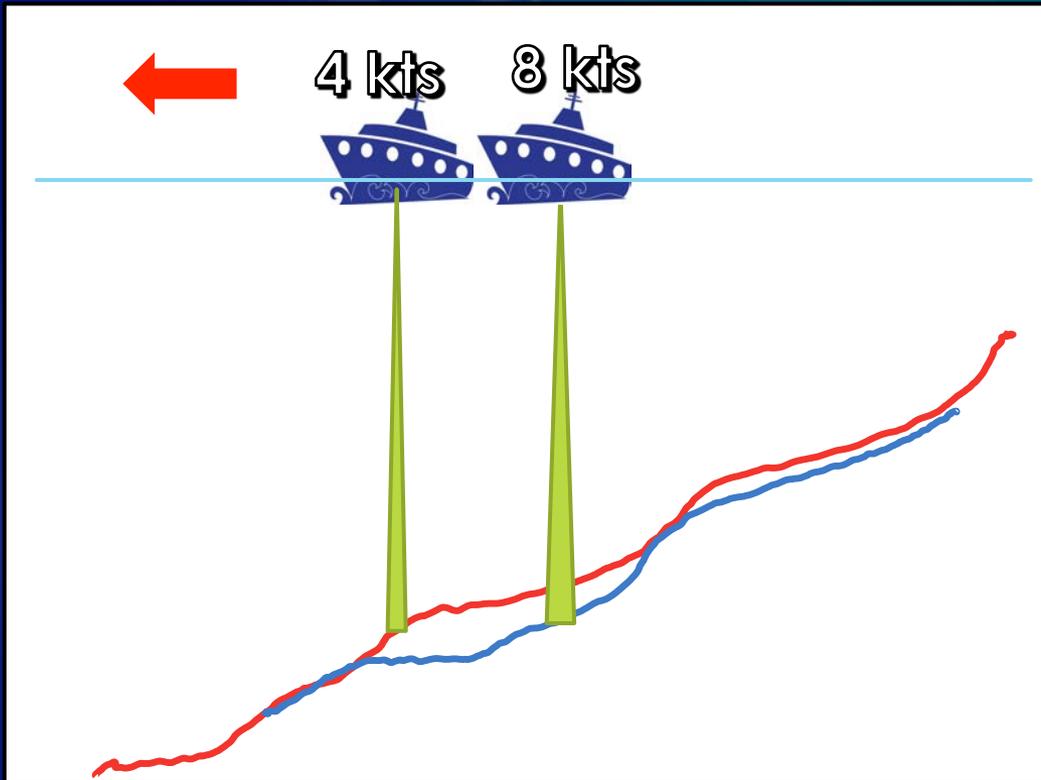COLUMBIA UNIVERSITY | EARTH INSTITUTE
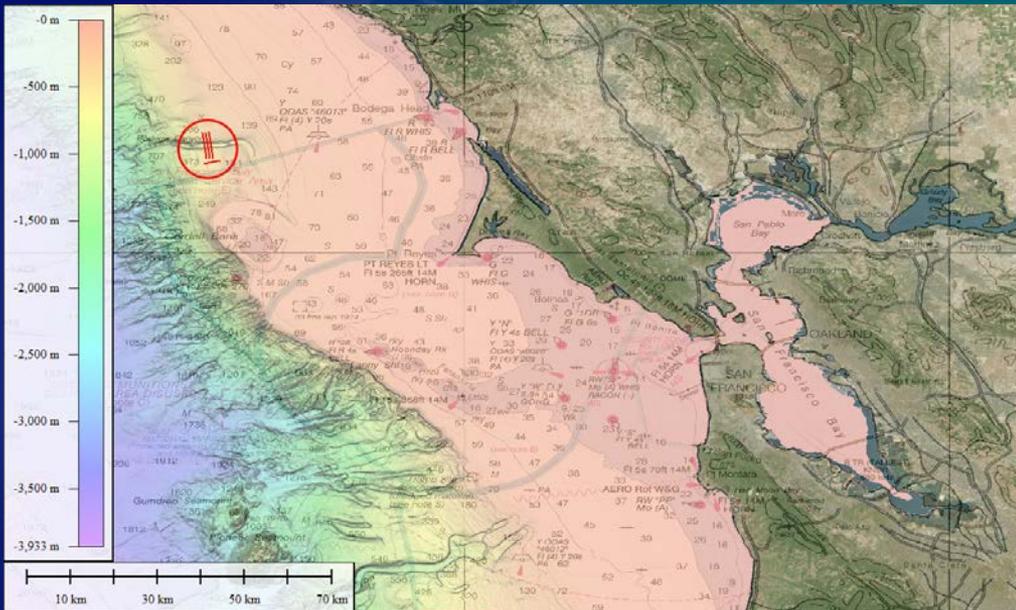
Layout of a patch test
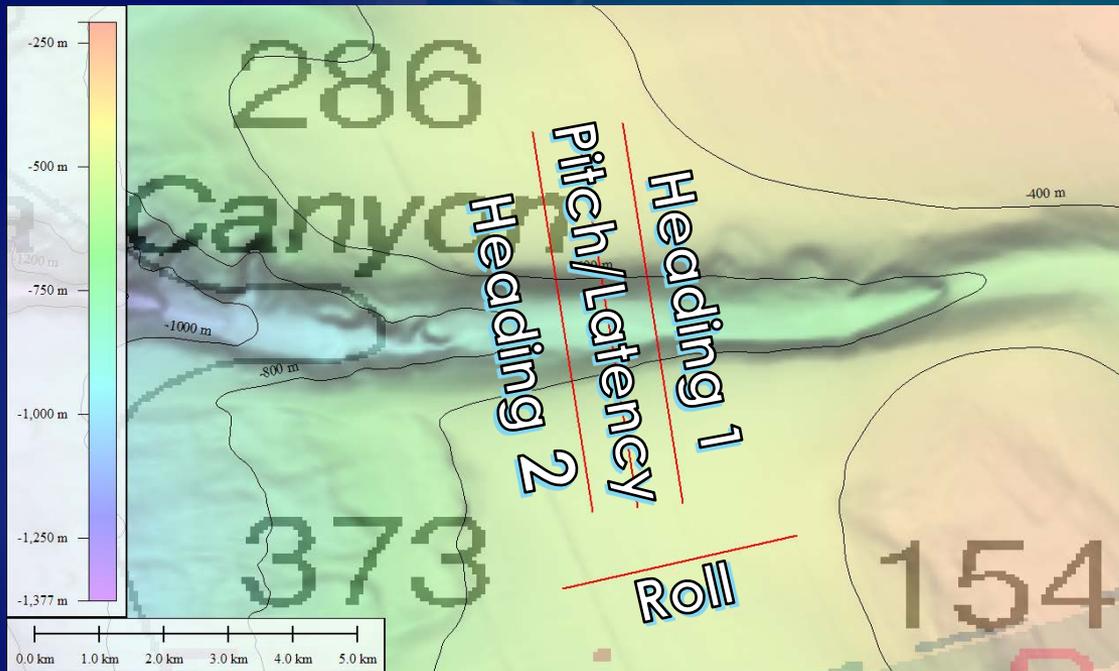
- ▶ Often difficult to find ideal site, most often will have to work with a site close to a port with limited time.

- ▶ Good to keep all lines in close proximity to not waste time transiting

- ▶ Save enough time to do the patch test and then do it again for validation
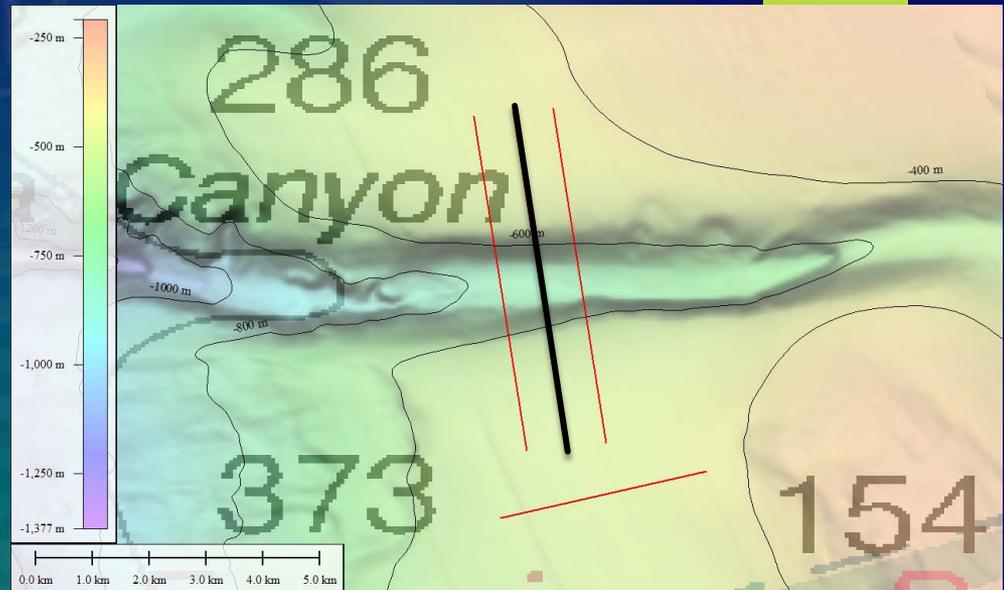
Latency

- Latency (Timing issues) work best with steep slopes

- 2 lines are run in the same direction, at different speeds (ideally one run at half the speed of the other)
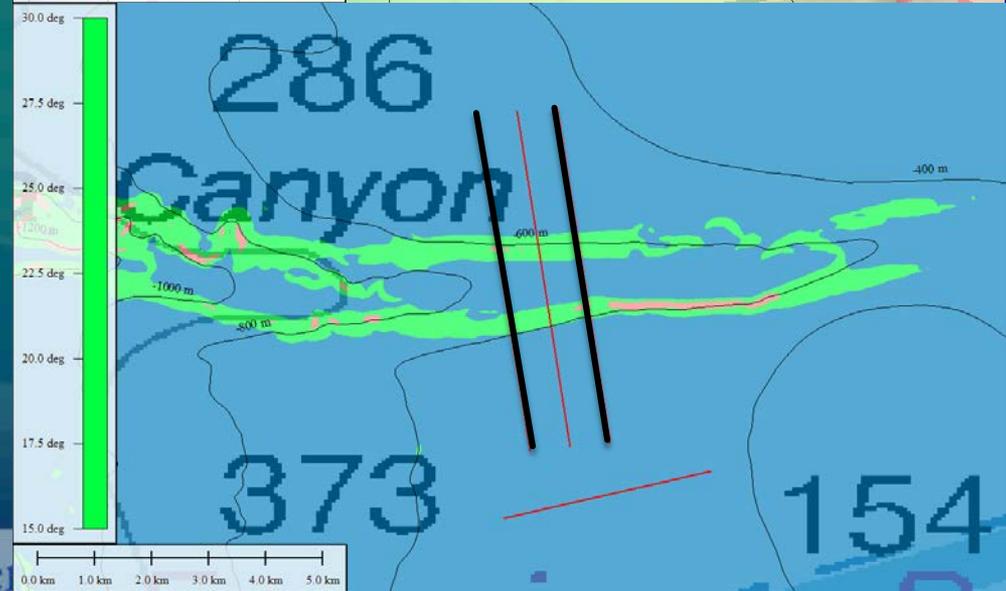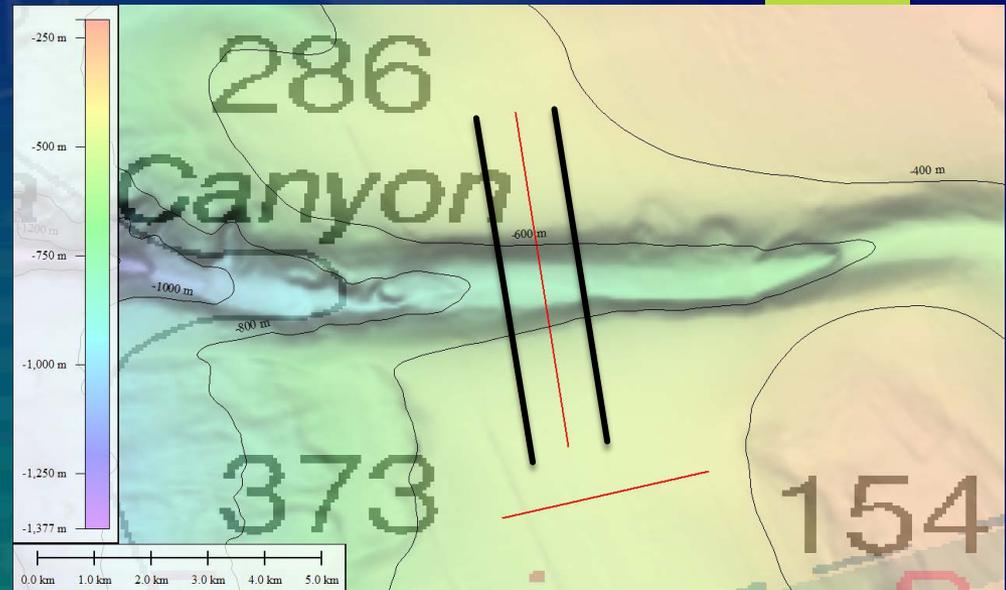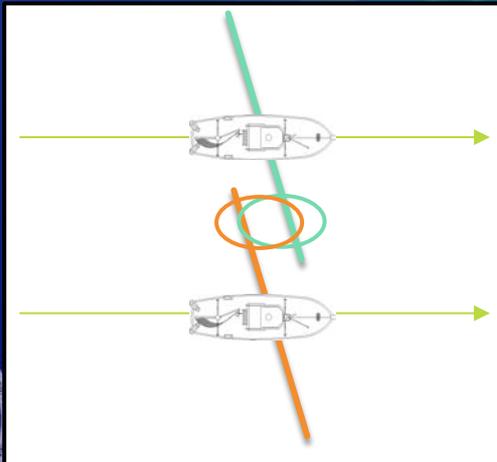
- Nadir profiles between the two lines are compared

4 kts   8 kts

286
Canyon
373   154
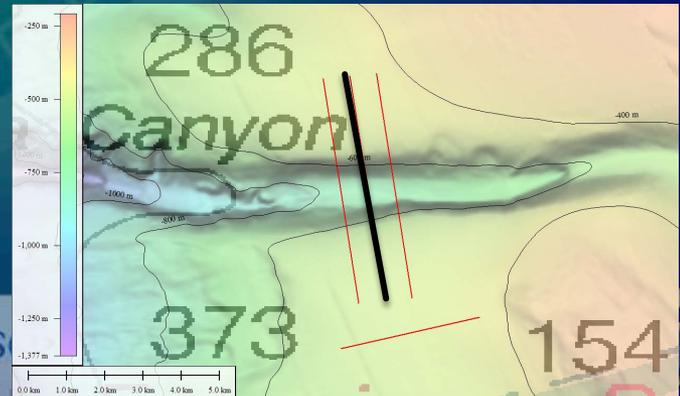
Pitch

- 1 Line – Run in Opposite Directions

- Slopes should be steep
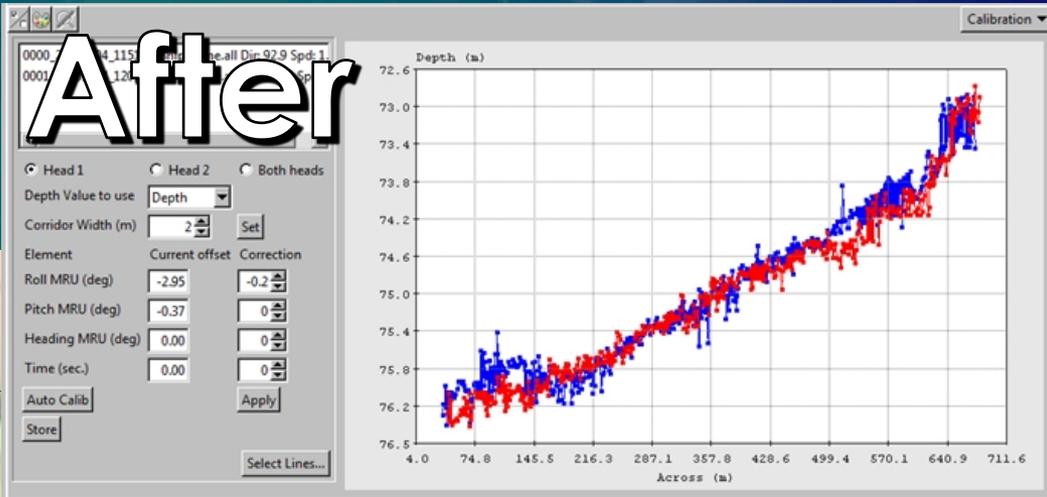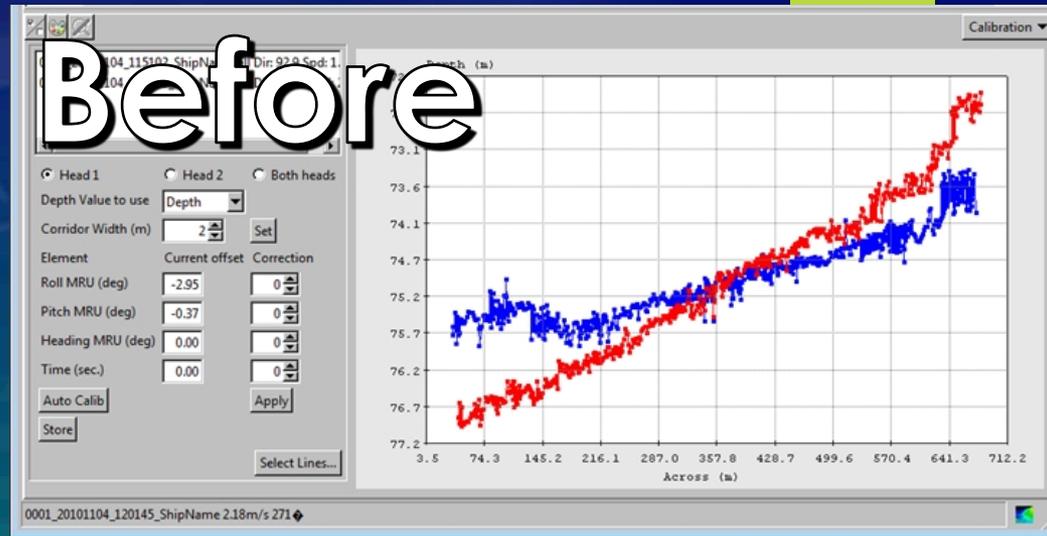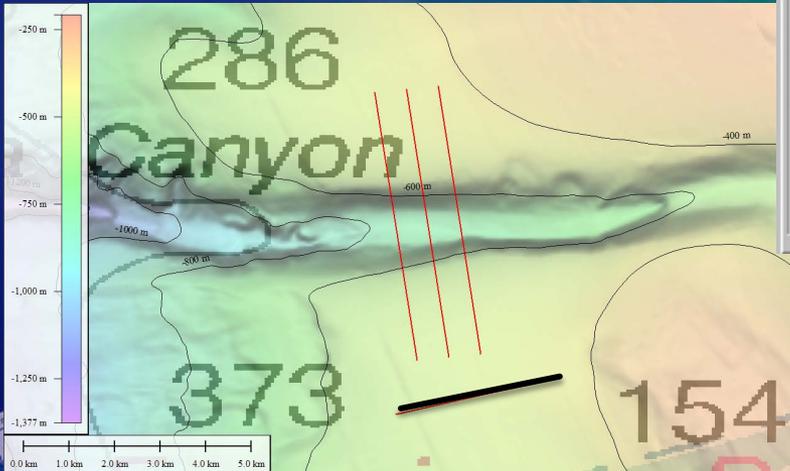
- Nadir profiles between the two lines are compared

Heading

- Steep slope or well defined object required

- 2 Lines, each run in the same direction

- Along track profiles mid-way between the two lines are compared

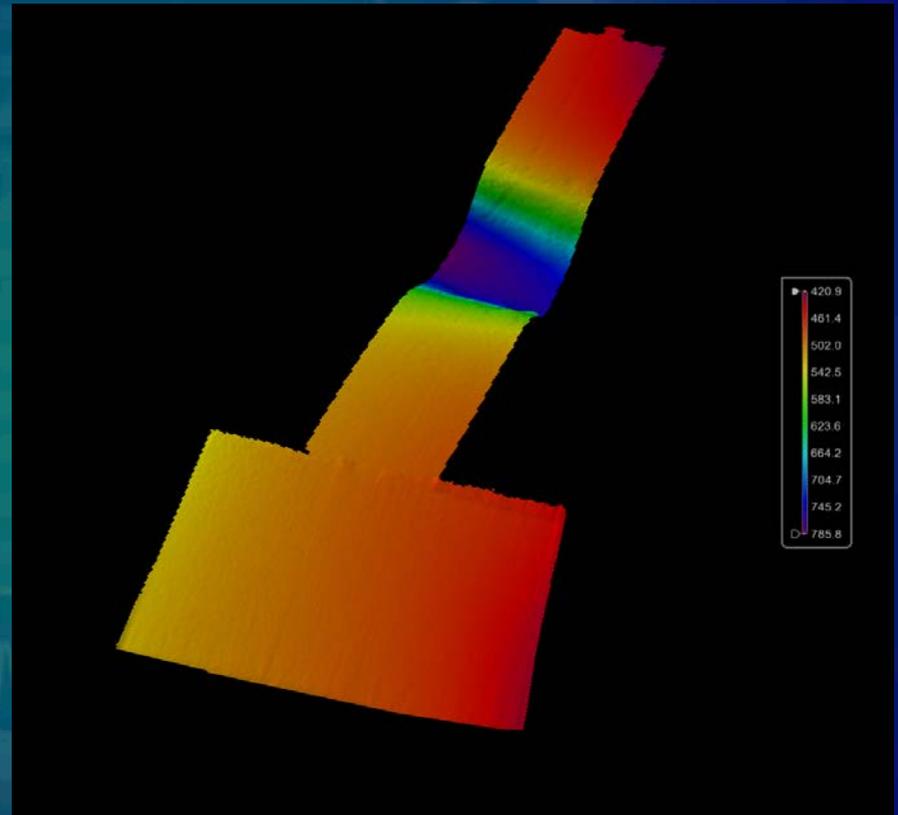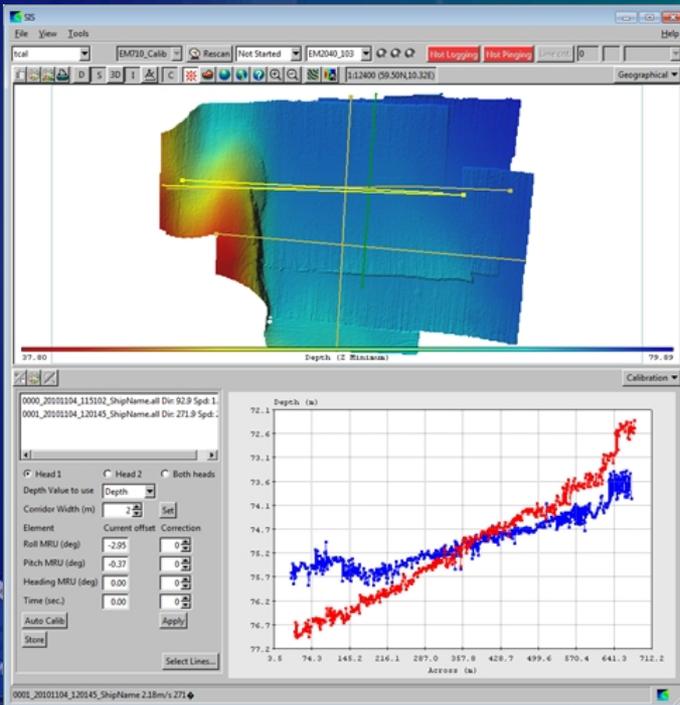# Roll

▶ Requires "flat" (boring) seafloor

▶ 1 Line, Run in reciprocal directions

▶ Across Track Profiles are compared

# How to process

▶ SIS Calibration Tool

▶ Caris HIPS

▶ MB-System

Remote Patch Test - R/V Langseth

- Selection of site based on ship track and availability of global bathymetric data (GMRT) along the track

- Points are transmitted to ship for patch test

- Ship runs the lines

- Python script is used to strip all but the necessary components out of the raw files

- Stripped raw files are sent to shore

- Angular offset values are determined (Caris)

- Offset values are sent back to the ship

Patch Test

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google earth
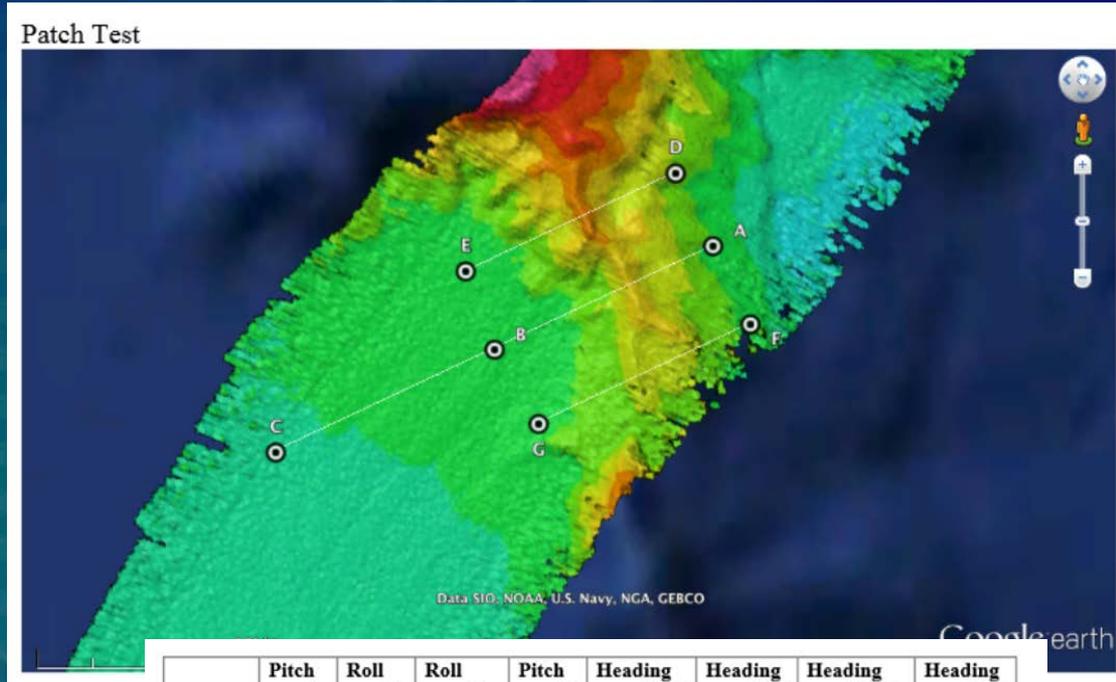
	Pitch pass 1	Roll pass 1	Roll pass 2	Pitch pass 2	Heading pass 1SW	Heading pass 1NE	Heading pass 2SW	Heading pass 2NE
Start Point	A	B	C	B	D	E	F	G
End Point	B	C	B	A	E	D	G	F
Distance (NM)	5	5	5	5	5	5	5	5
Speed (kts)	6	6	6	6	6	6	6	6
Time (min)	50	50	50	50	50	50	50	50

Line running time (hours): 6.7
****Does not include time for turns****
Does not matter the order that lines are run in.

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MAC Patch Test Cookbook

▶ Coming soon to the mac website

▶ http://mac.unols.org

▶ Will contain both a both a cookbook and sample datasets