



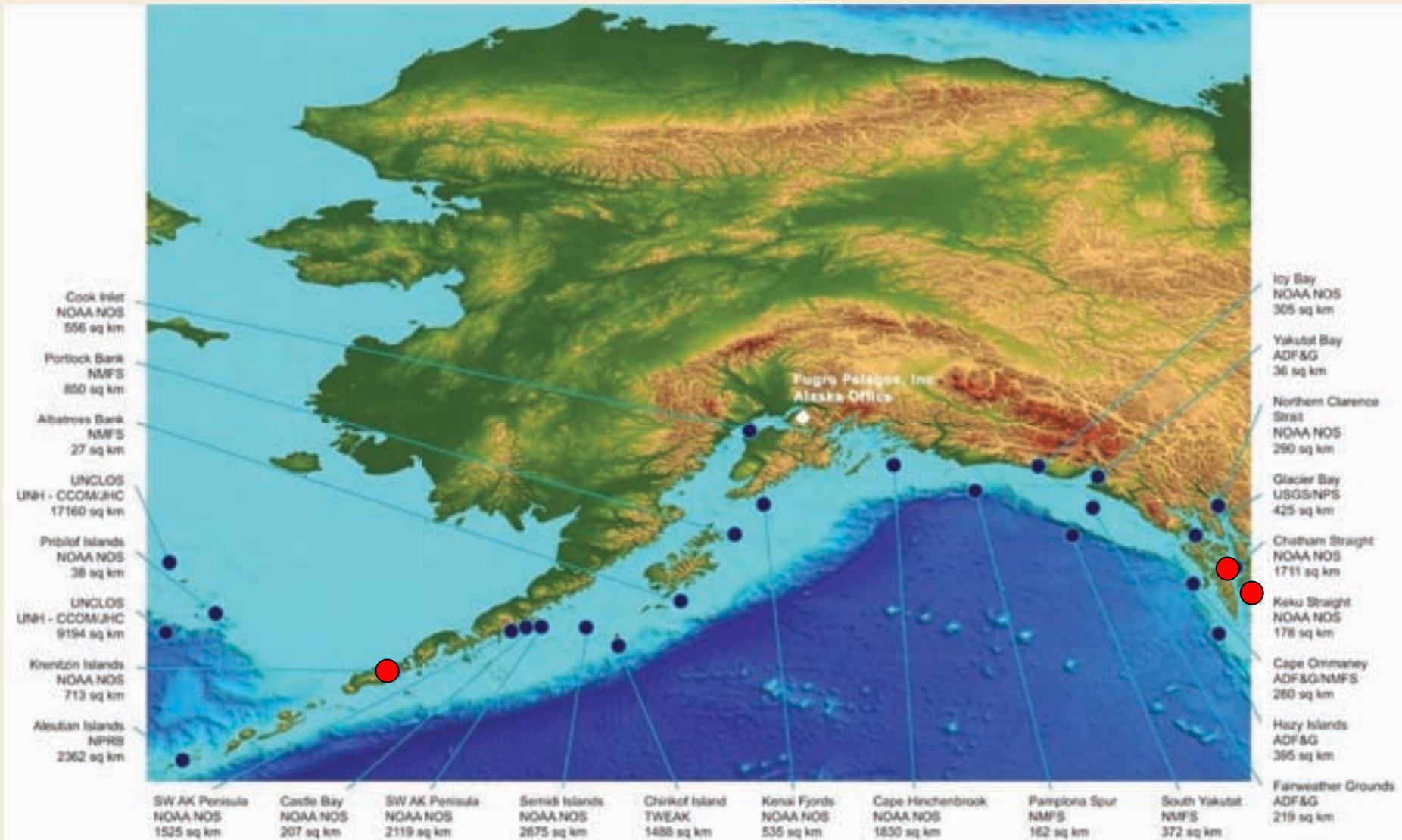
Facing Challenges with New Techniques: Southeast Alaska to the Aleutian Islands

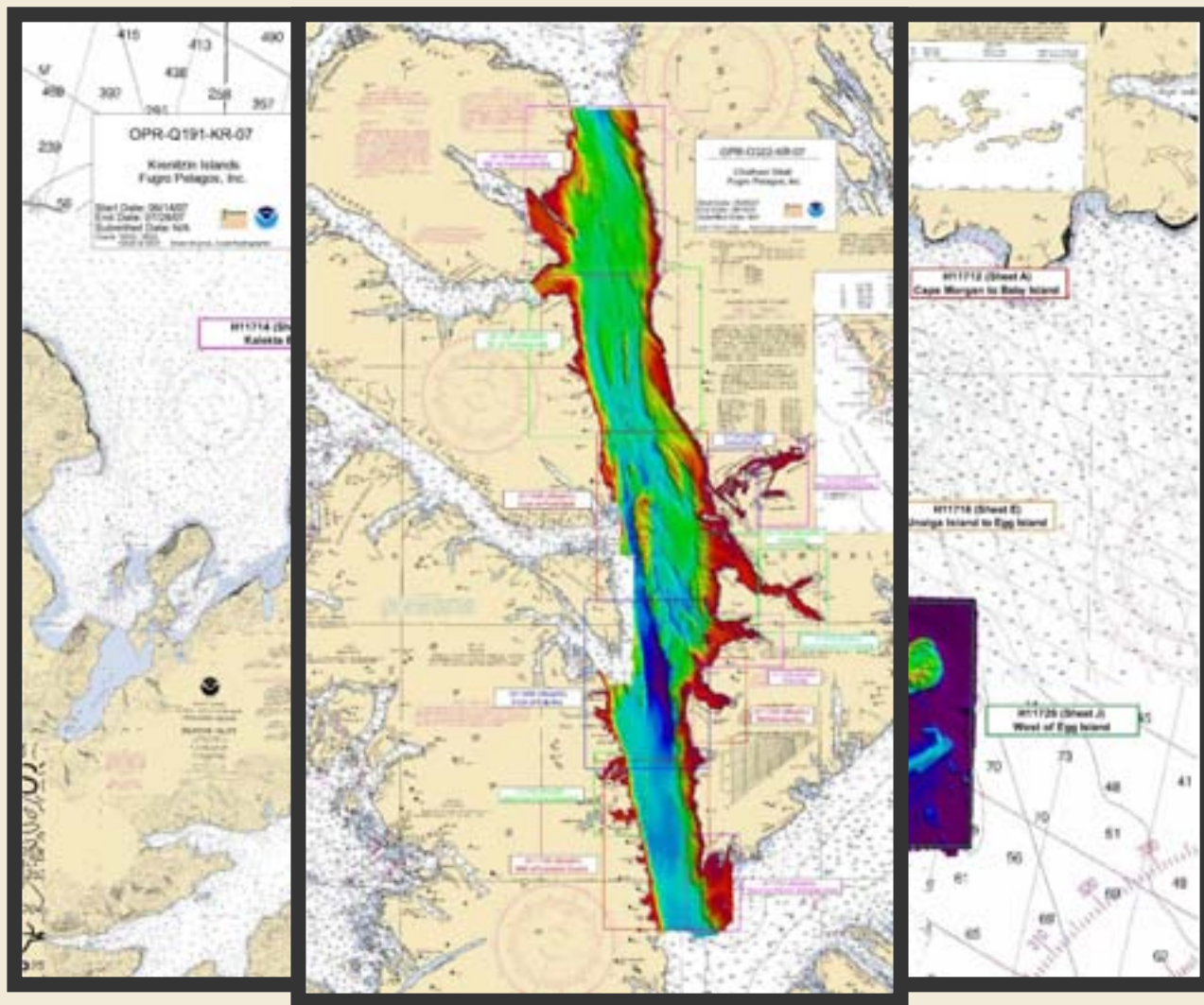
Bob Richards, Andy Orthmann, Dean Moyles and
Carol Lockhart Project thanks to JOA and Assoc.

Fugro Pelagos, Inc. San Diego, CA



Past Alaska Surveys





R2/D2

- Reson 8101
- Bottom Samples
- Capable of Shoreline Verification

Davidson

- Davidson
 - Mother Ship
 - Reson 8111
 - Bottom Samples



R2



D2





- Due to the magnitude of the project and the areas to be surveyed, we thought this could be the right environment for a tilted head.
 - Survey Plan and Breakdown (Chatham Strait and Krenitzin Islands):
 - Total of 22 Survey Sheets.
 - Approx. 700 Sq NM area to survey.
 - Approx. 350 NM of coastline to survey and verify.
- Fugro Pelagos, Inc. (FPI) has been conducting surveys with a rotated MB head since 1999.
 - Normally used for :
 - Breakwater Surveys - where data is require to the water line.
 - Reservoir Surveys - volume computations.
 - Navy Surveys (vertical profile of berthing walls).
 - Survey Technique.
 - Conventional method we use is to always stay on our data in near shore areas.



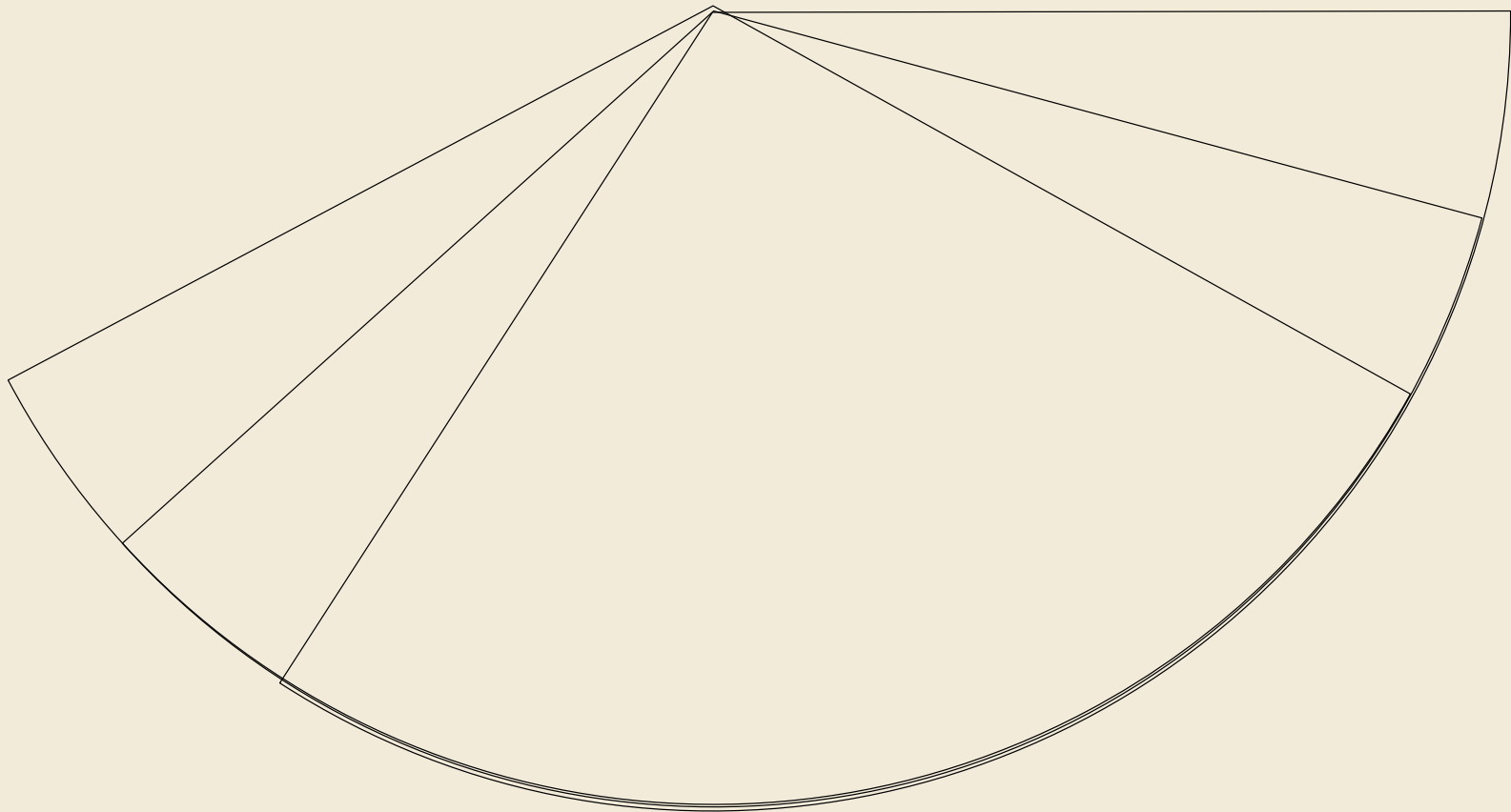
Shoreline Skiff (a.k.a. Lil' Dude)

- Reson 8125 (rotated ~30 degrees to starboard)
- 4m survey work
- Shoreline Verification
- Transit @ 25-30 knots (with pole up)



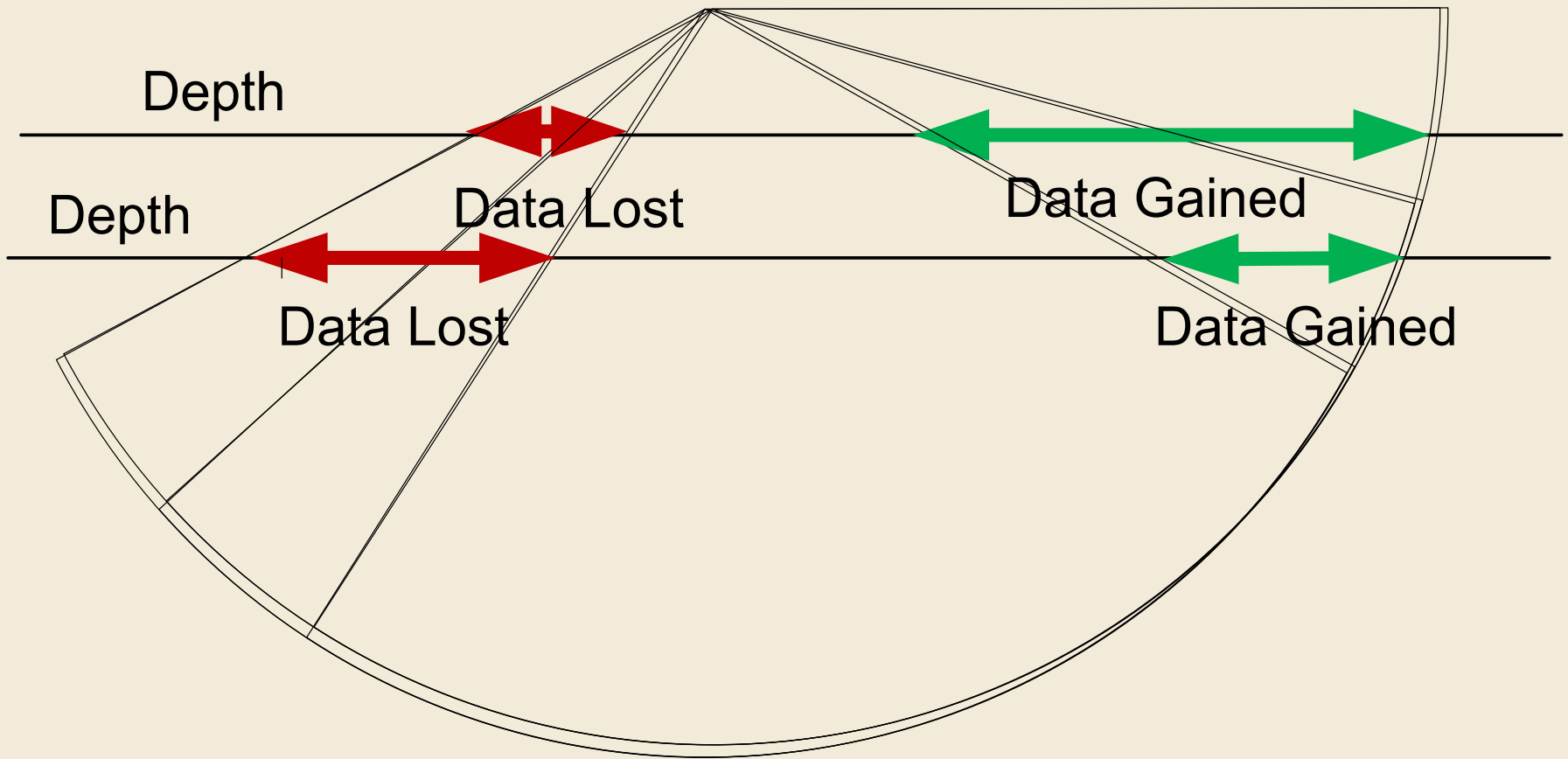


~~NO~~ ROLL ANGLE





As depth increases, more data is lost than gained





Survey Operations

- Triton ISIS for data acquisition
- Bathy Pro for Real-time display
- WinFrog (Navigation Software)





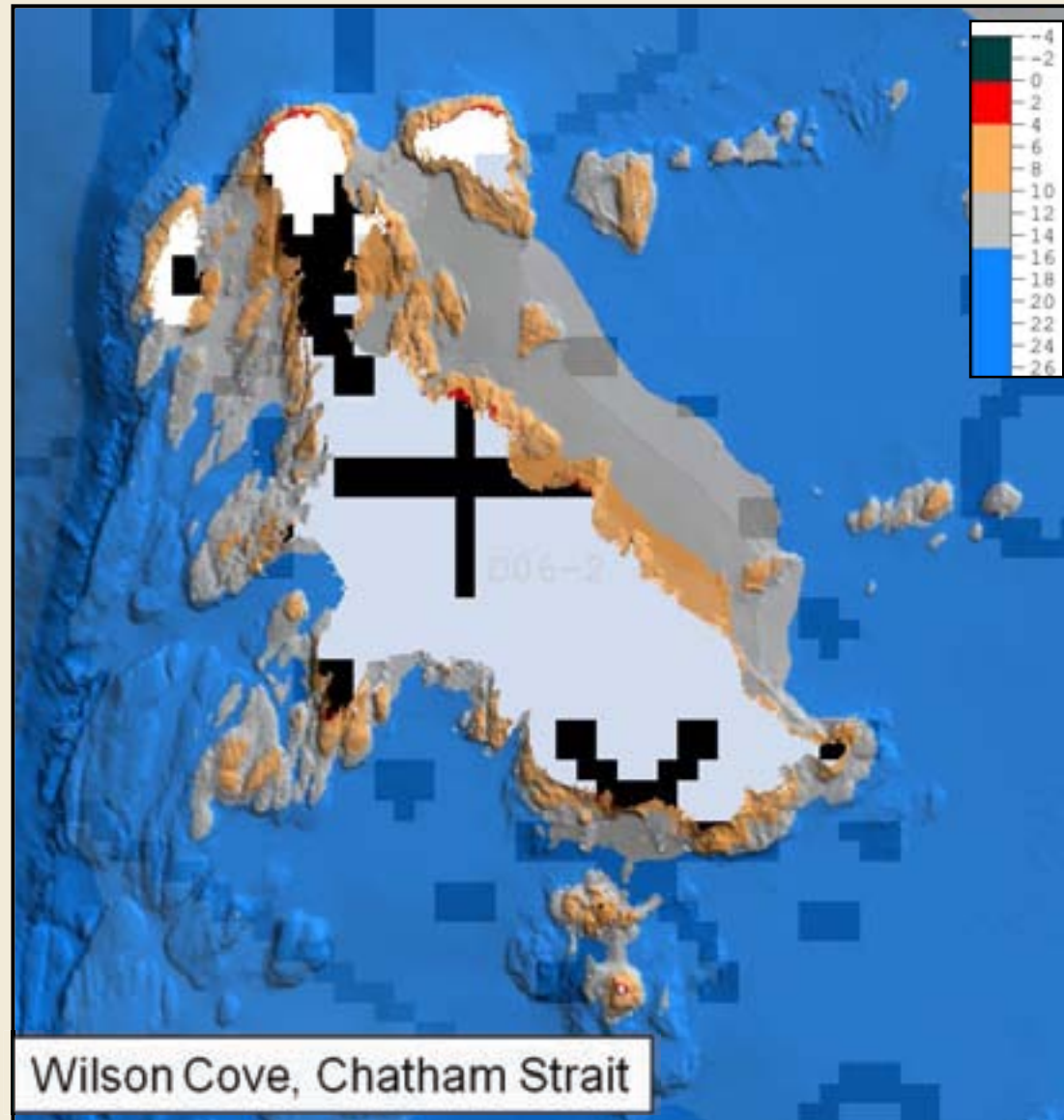
Survey Operations

- Color coded DTM's and NOAA charts were displayed as background layers in either ISIS (Bathy Pro) or WinFrog.

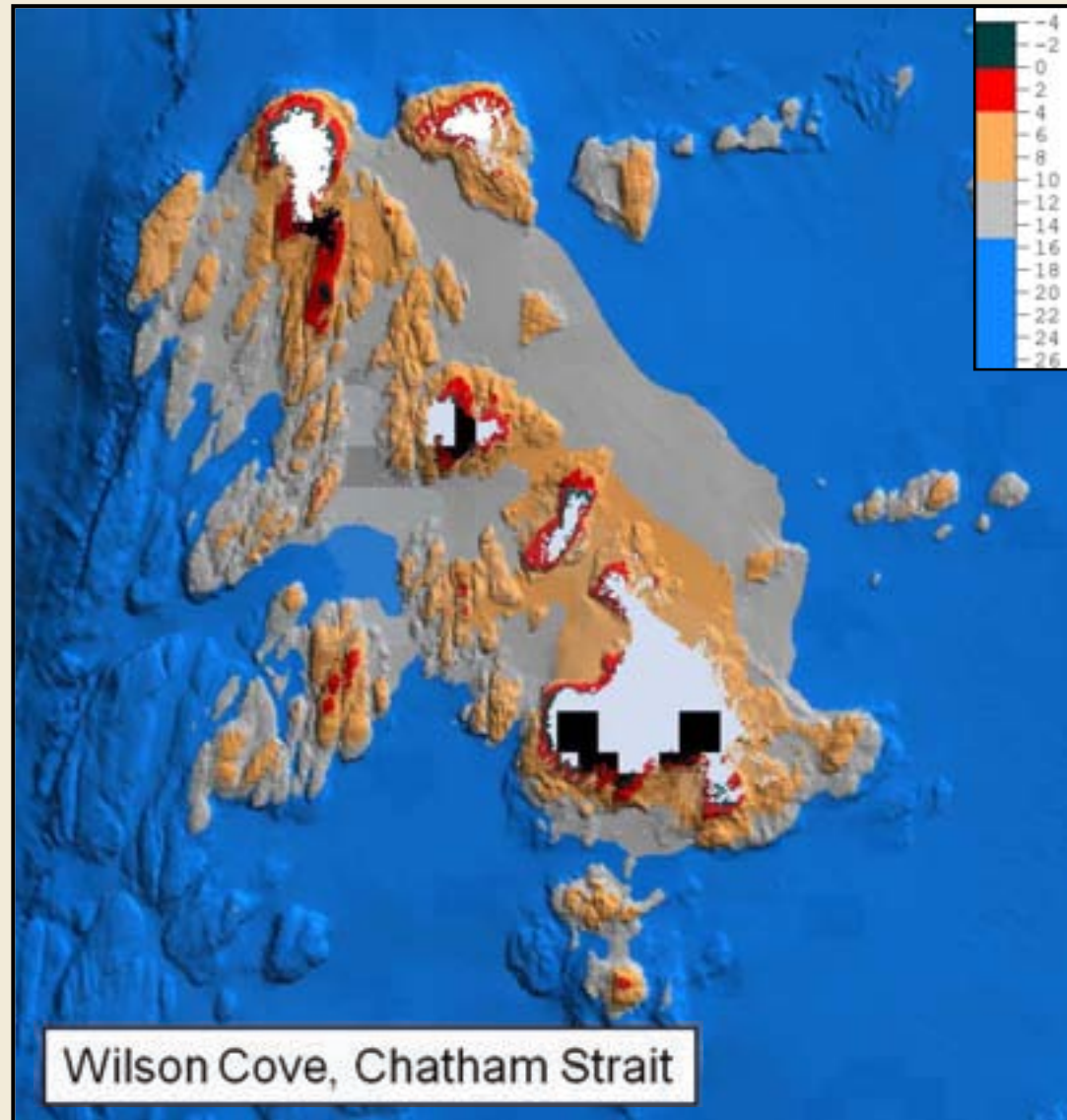


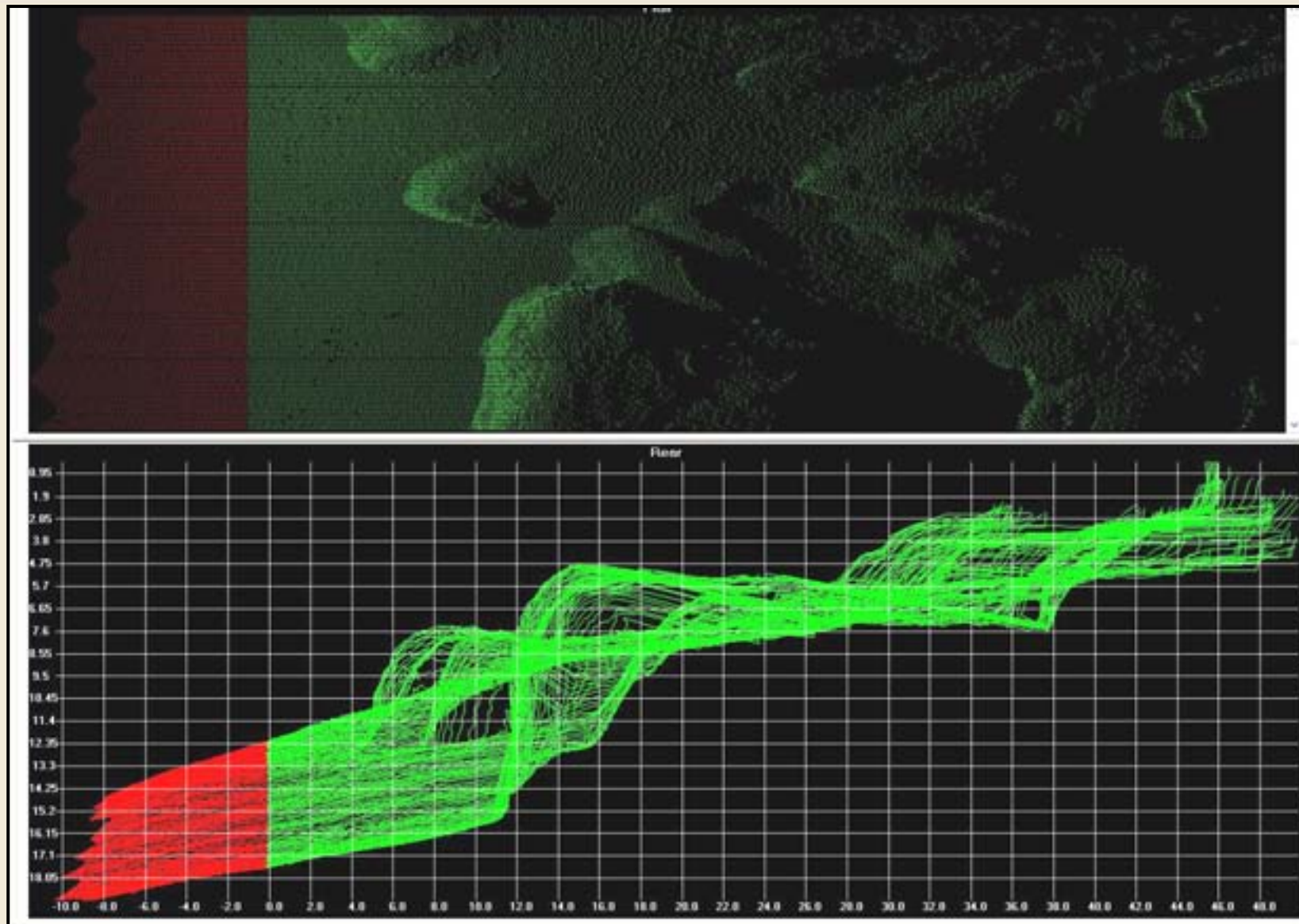
- Instead of having to run multiple lines to achieve the 4m contour, it usually took just one.

- 8101 data from R2 (No Tilt).



- Combined Data Set (8101 from R2 and Rotated 8125)





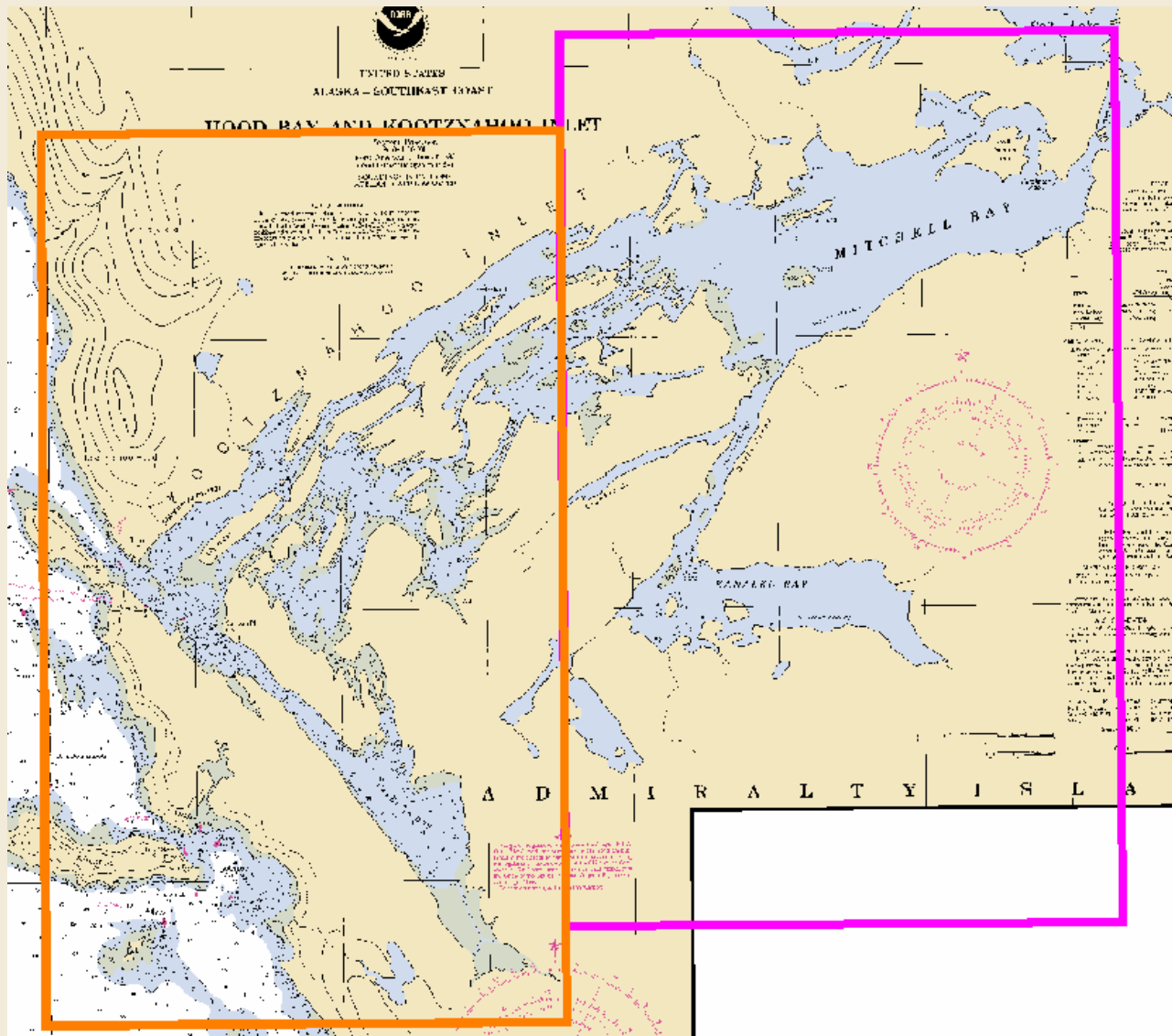


- Pros:
 - The SAFETY factor.
 - Increased productivity on achieving the 4m contour.
 - Increased productivity for shoreline verification.
- Cons:
 - Could only run lines in one direction when conducting the nearshore work.



Need for LIDAR Recon Data

- 100% multibeam coverage w/
shoreline verification
required



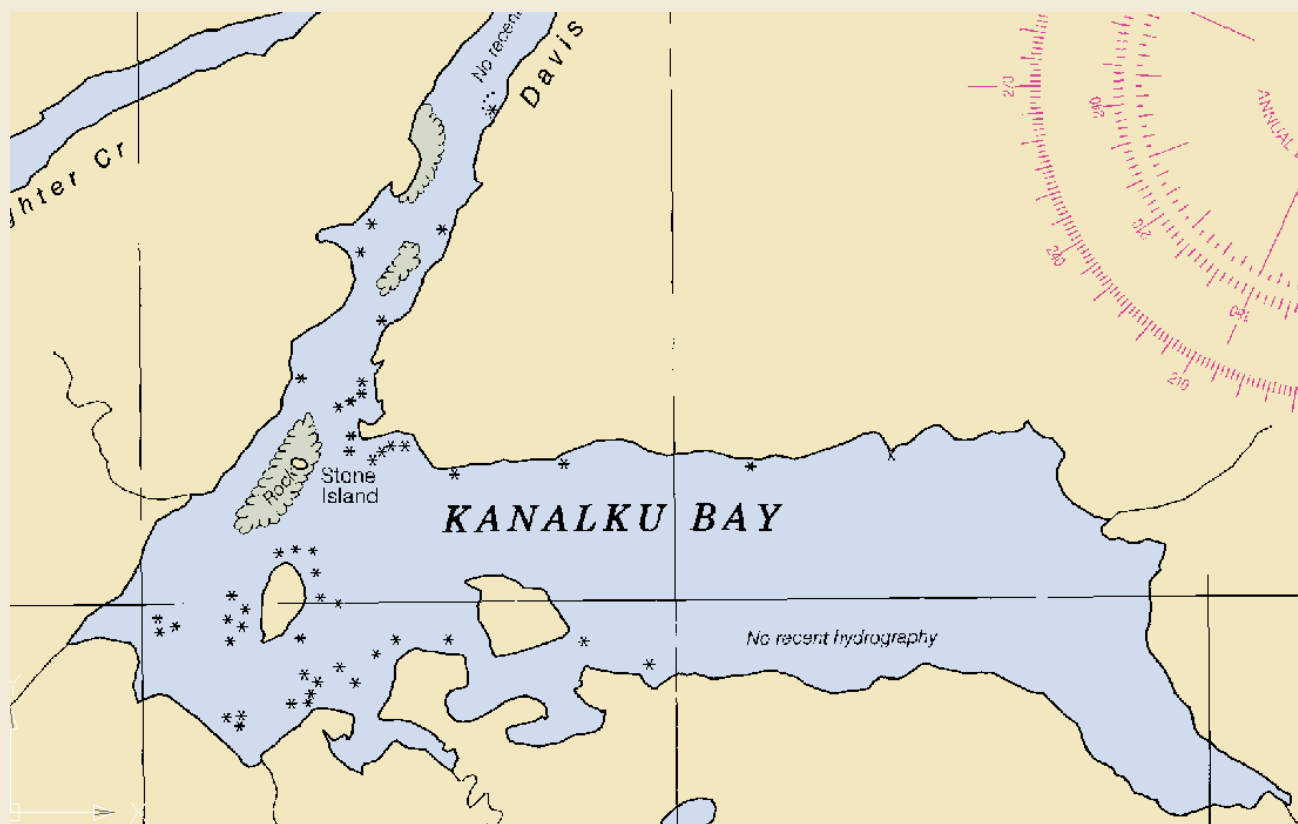


Need for LIDAR Recon Data

- 100% multibeam coverage w/ shoreline verification required
- Existing chart data sparse



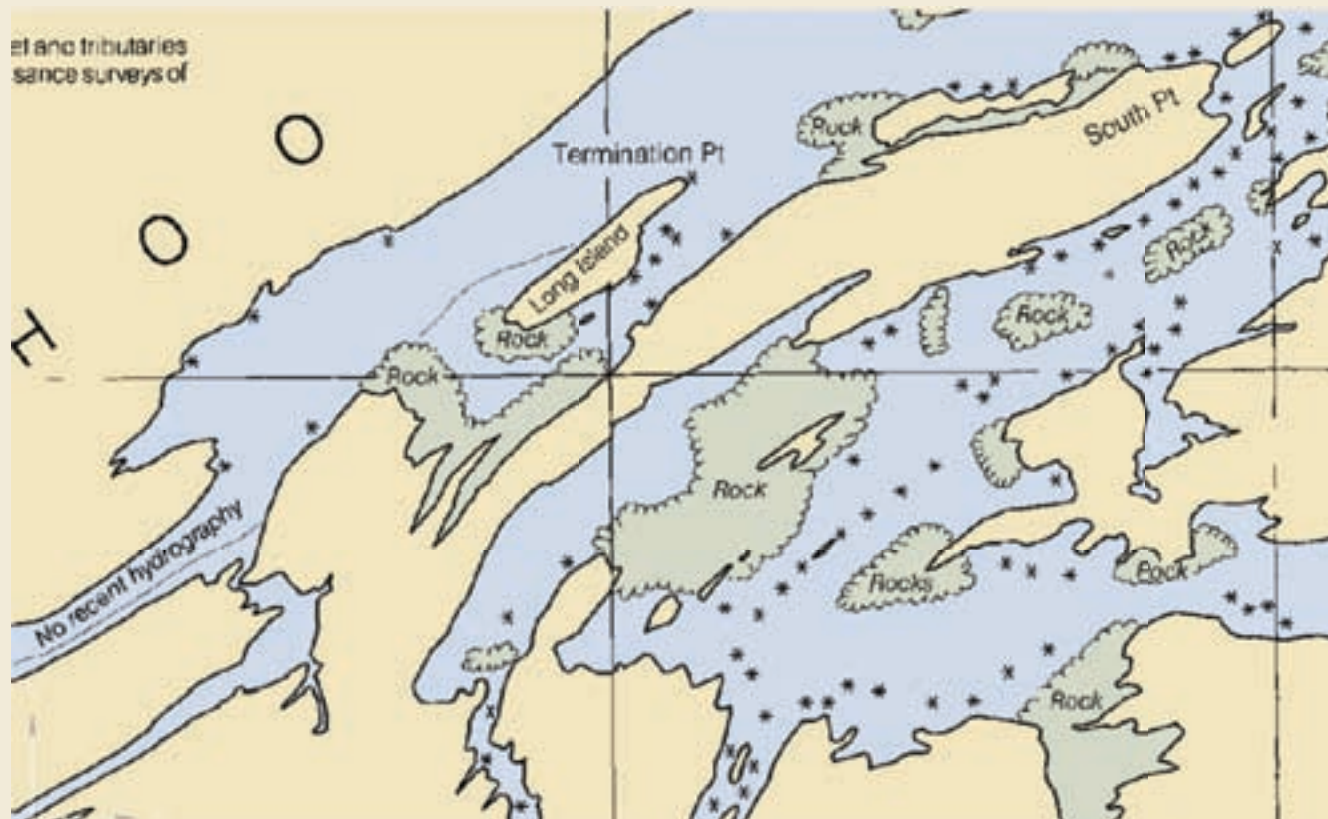
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Need for LIDAR Recon Data

- 100% multibeam coverage w/ shoreline verification required
- Existing chart data sparse
- Complex ledges and rocks





Need for LIDAR Recon Data

- 100% multibeam coverage w/ shoreline verification required
- Existing chart data sparse
- Complex ledges and rocks
- Extreme tidal currents to 15 kts or more in narrow constrictions





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LiDAR Survey of Mitchell Bay

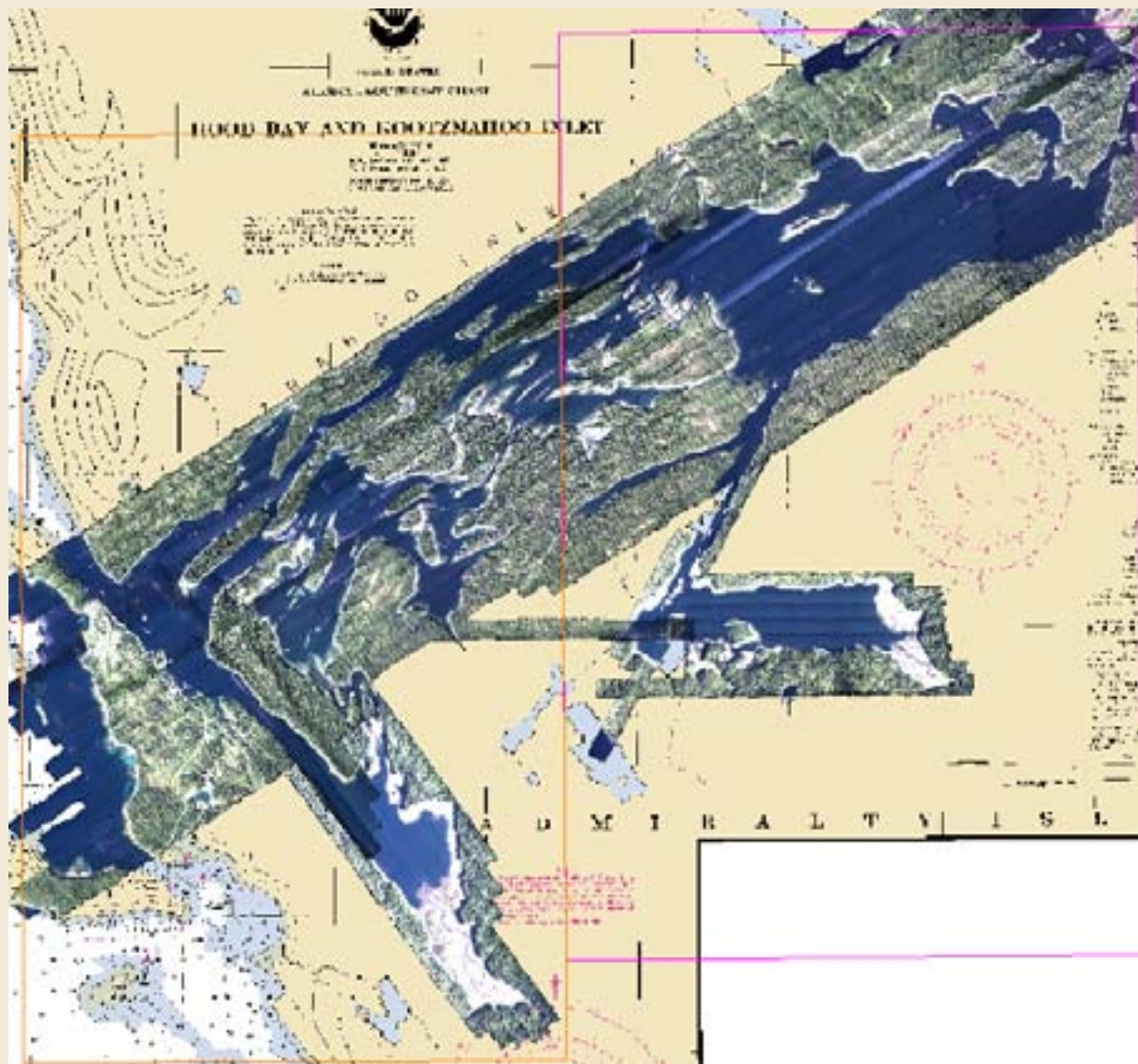




SHOALS 3000-T LIDAR System



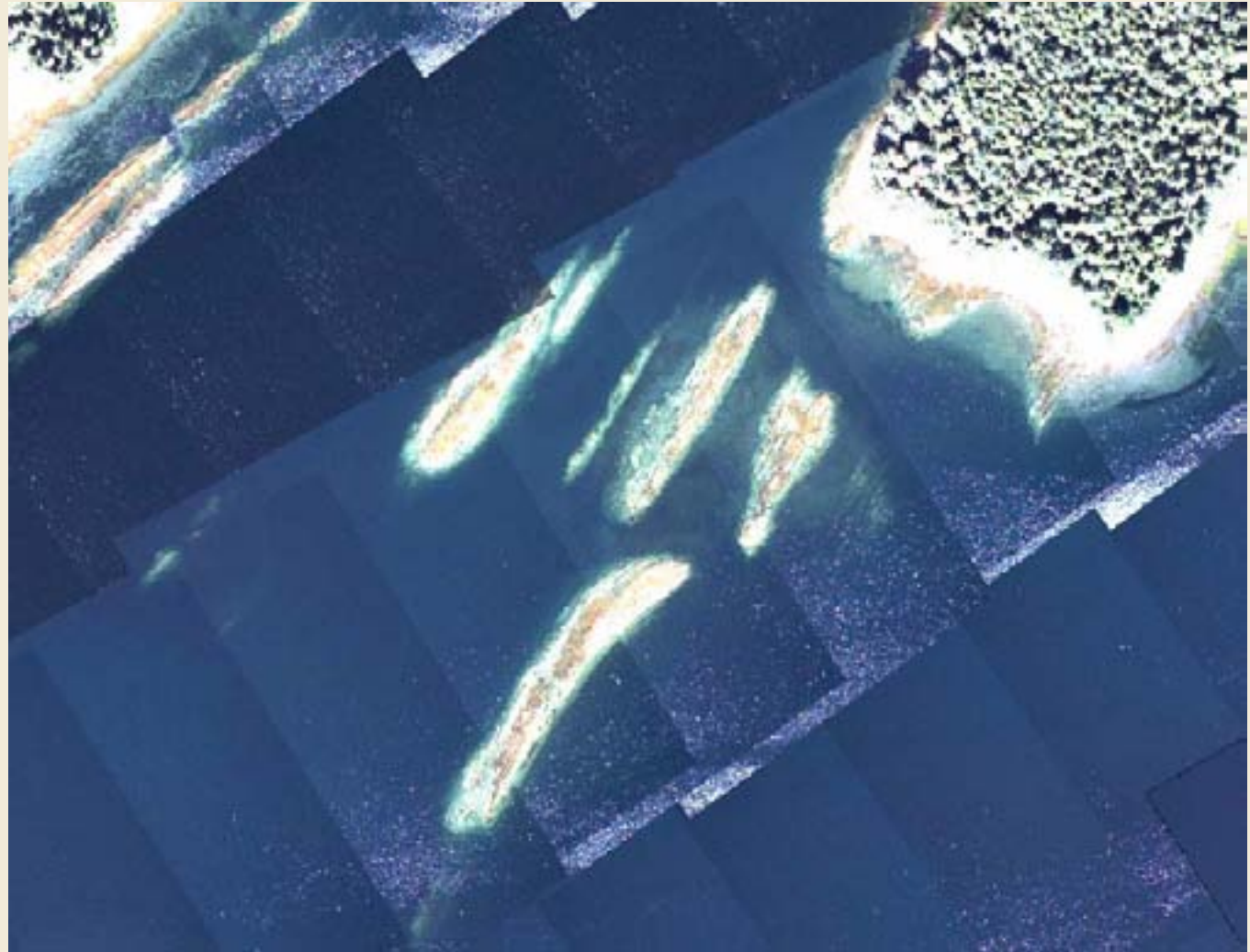
- Geo-referenced photomosaics





Use of LIDAR Recon Data

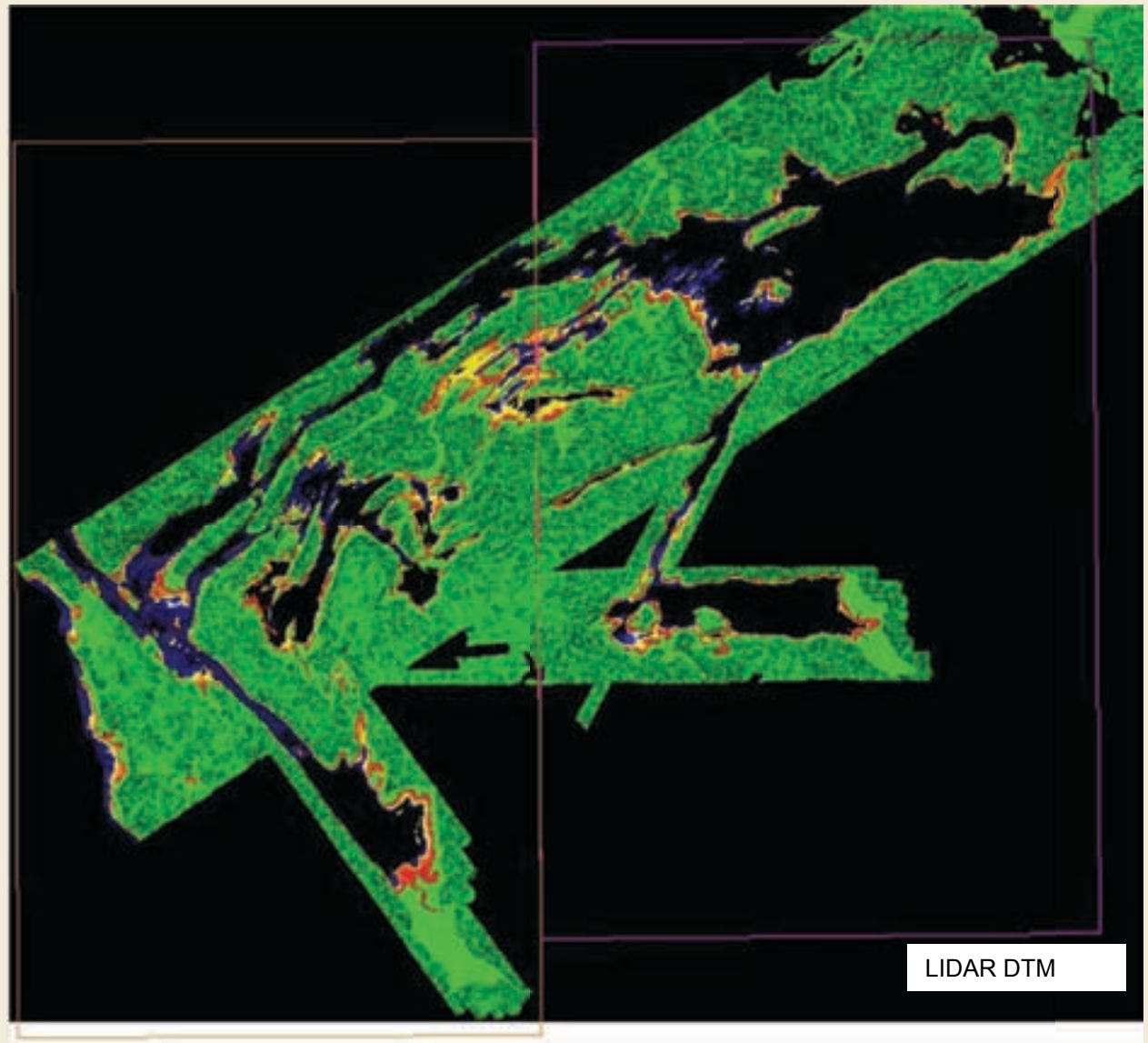
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Use of LIDAR Recon Data

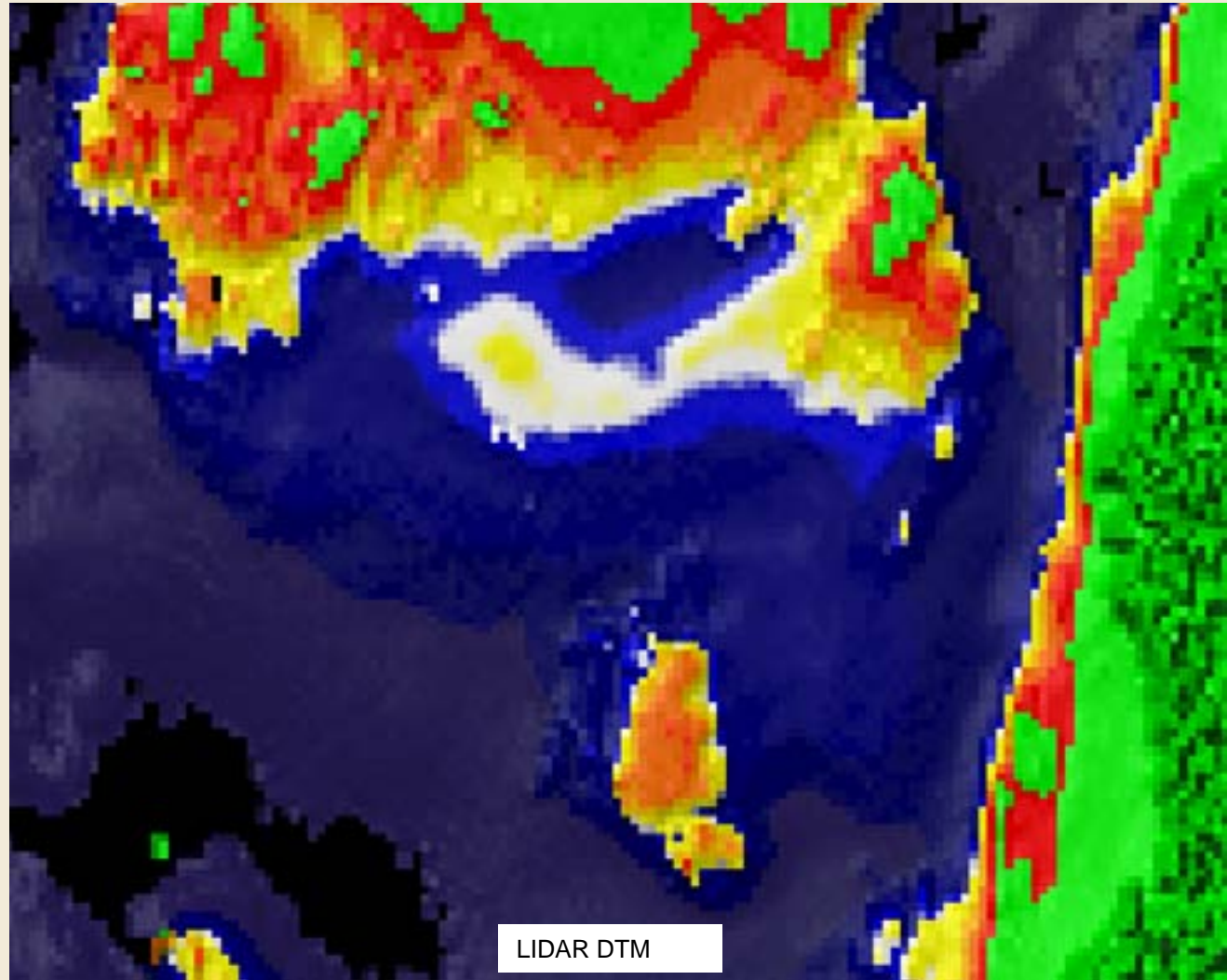
- Geo-referenced photomosaics
- XYZ of LIDAR soundings used to create a DTM



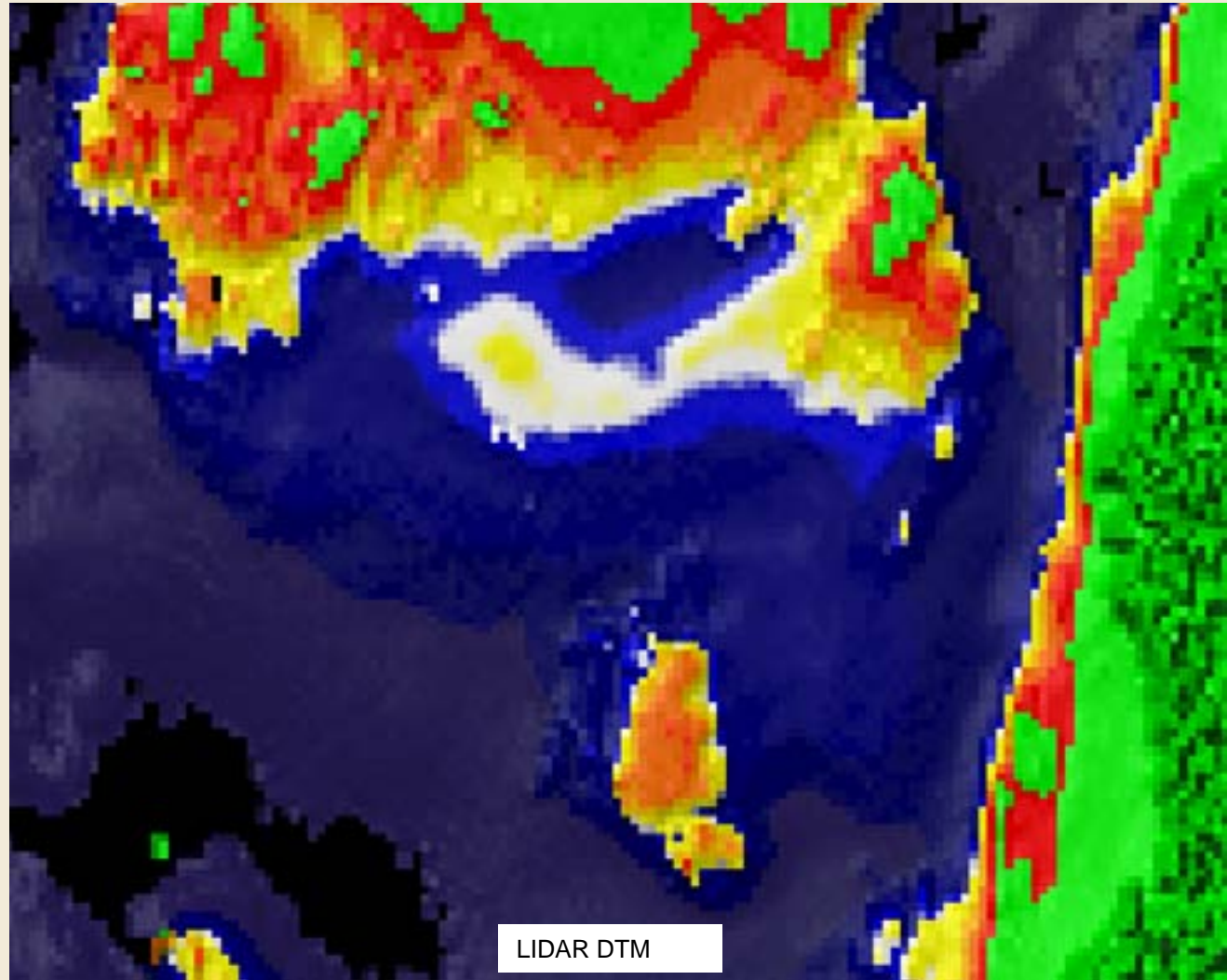


Use of LIDAR Recon Data

- Geo-referenced photomosaics
- XYZ of LIDAR soundings used to create a DTM
- DTM color coded to differentiate between shallow and deeper areas



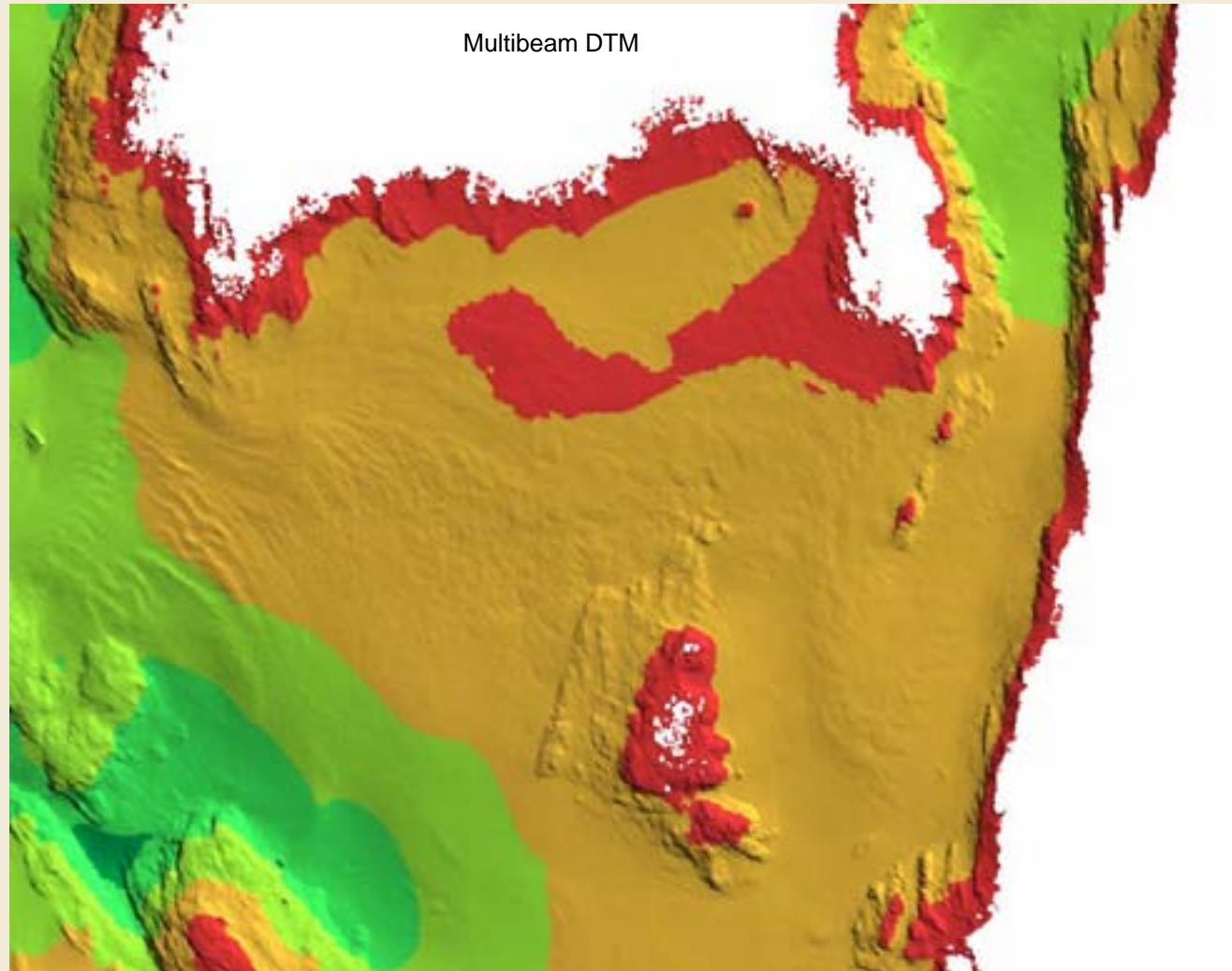
- Geo-referenced photomosaics
- XYZ of LIDAR soundings used to create a DTM
- DTM color coded to differentiate between shallow and deeper areas
- Survey crew used DTM to navigate in real-time, surveying from 4m out utilizing the rotated 8125



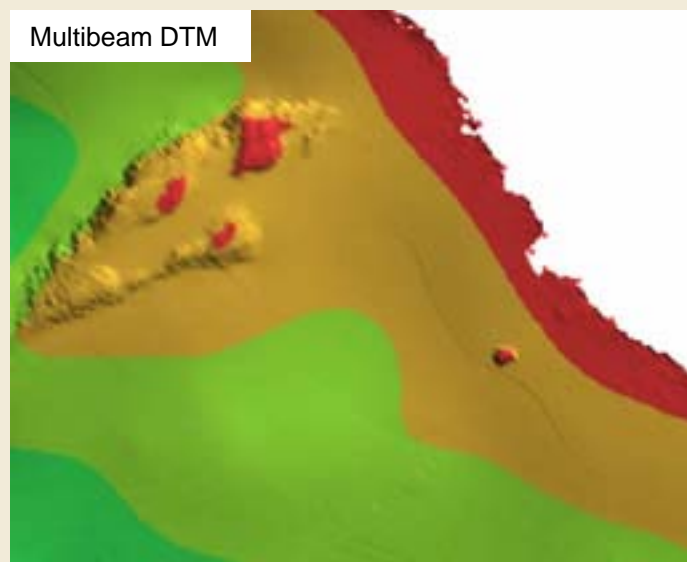
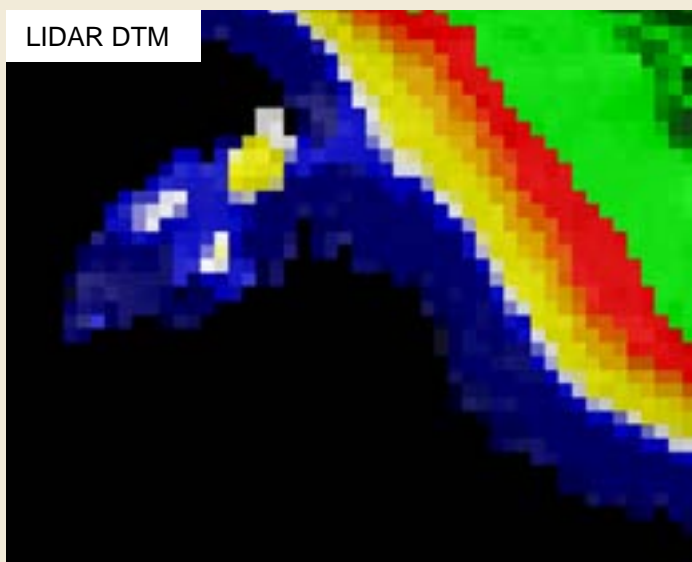


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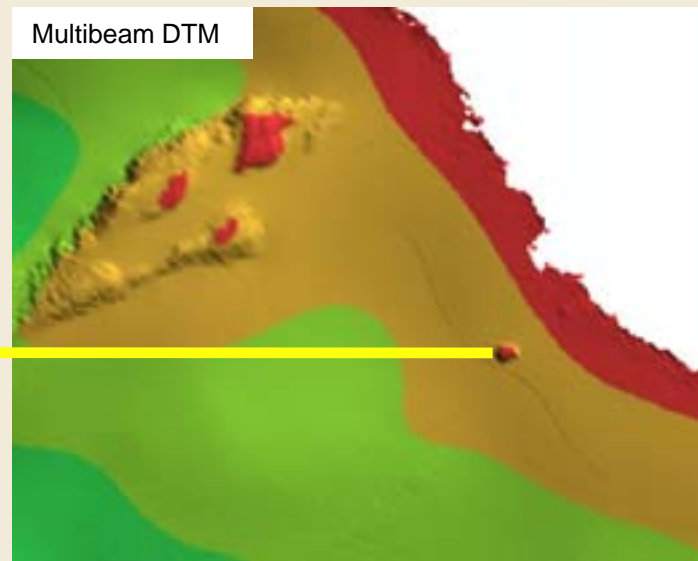
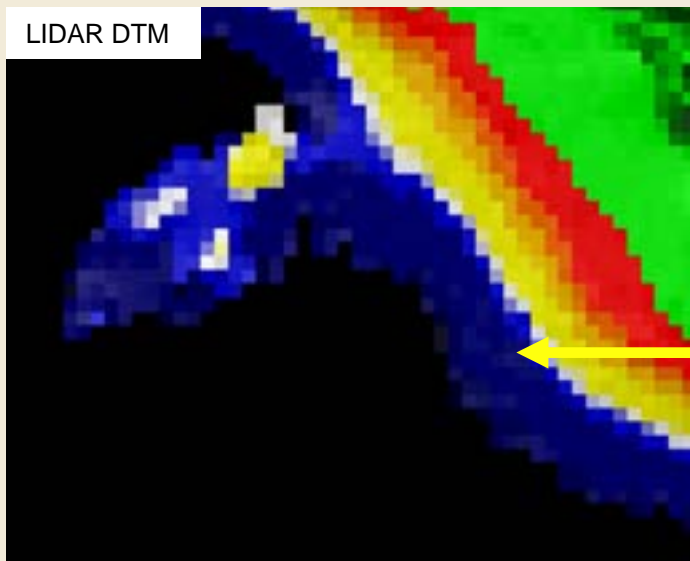
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- LIDAR DTM at 5m resolution gave indication of shoals so they could be avoided



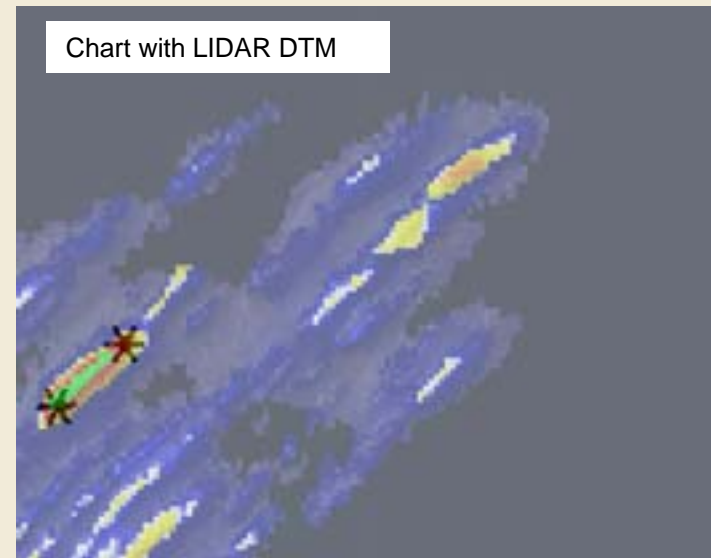
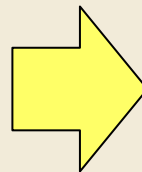
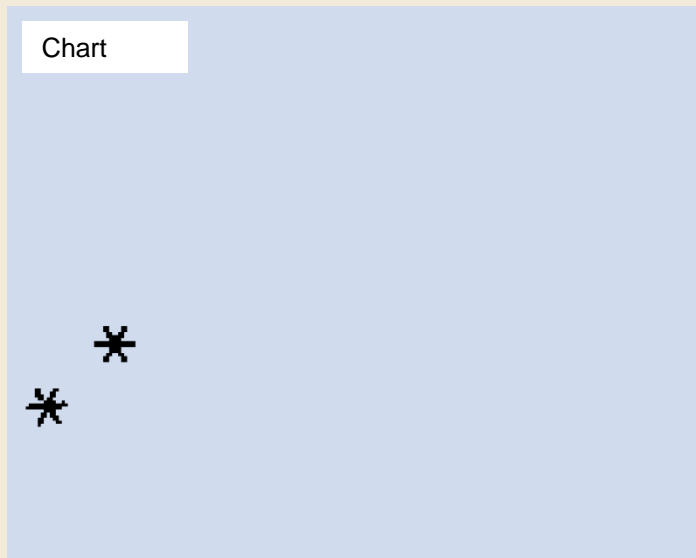
- LIDAR DTM at 5m resolution gave indication of shoals so they could be avoided
- Pinnacle-like features were not as obvious in LIDAR DTM





Benefits of LIDAR Recon Data

- Safety: We could avoid dangerous, uncharted features





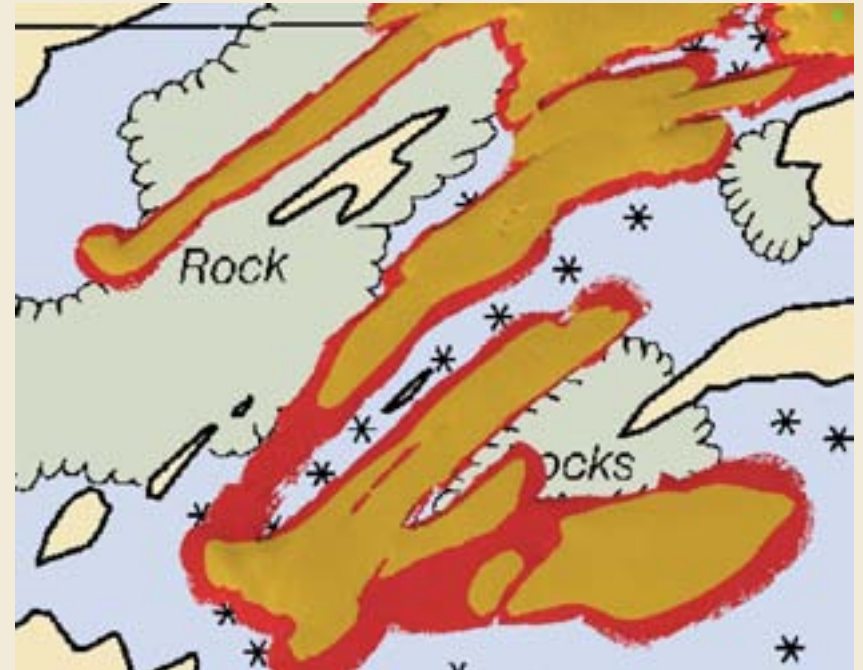
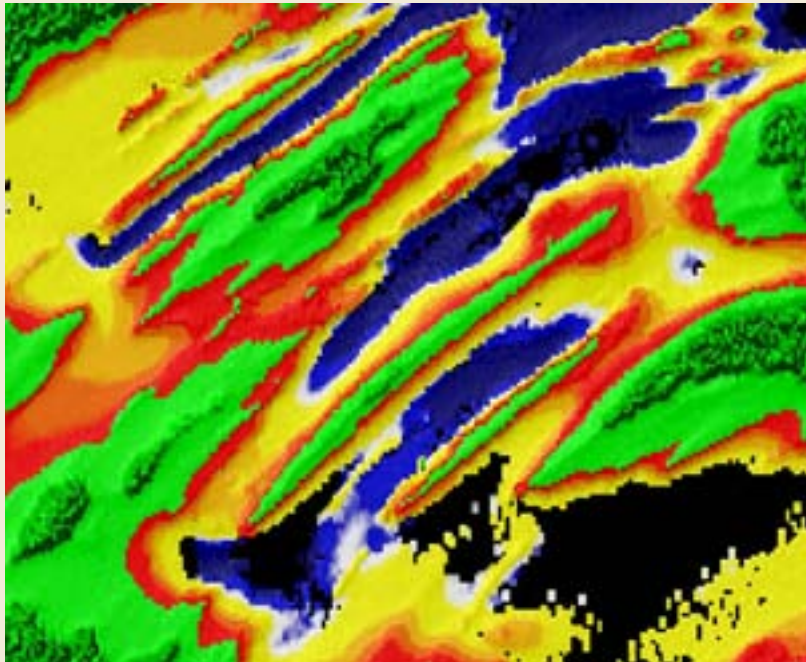
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- Speed: We could increase our survey speed



Benefits of LIDAR Recon Data

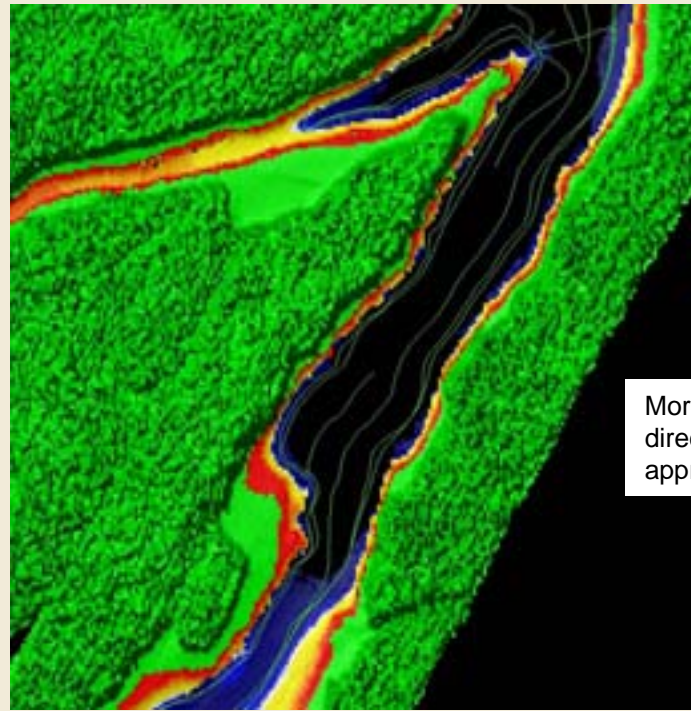
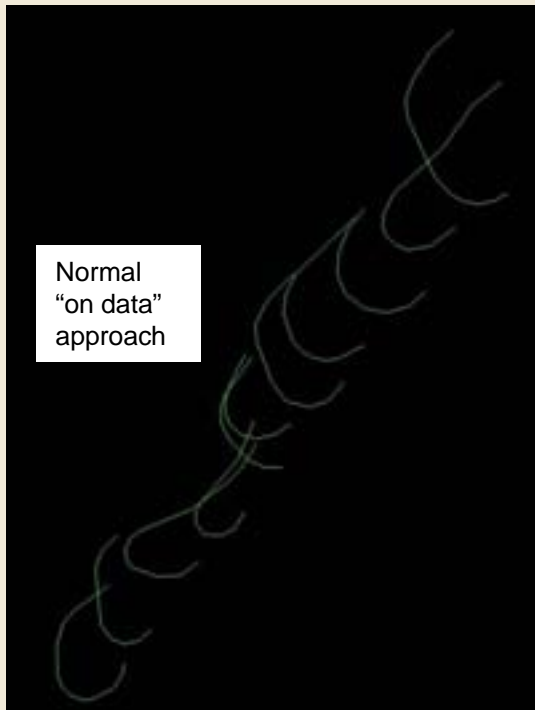
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- Able to access and multibeam areas we otherwise might not have attempted to reach

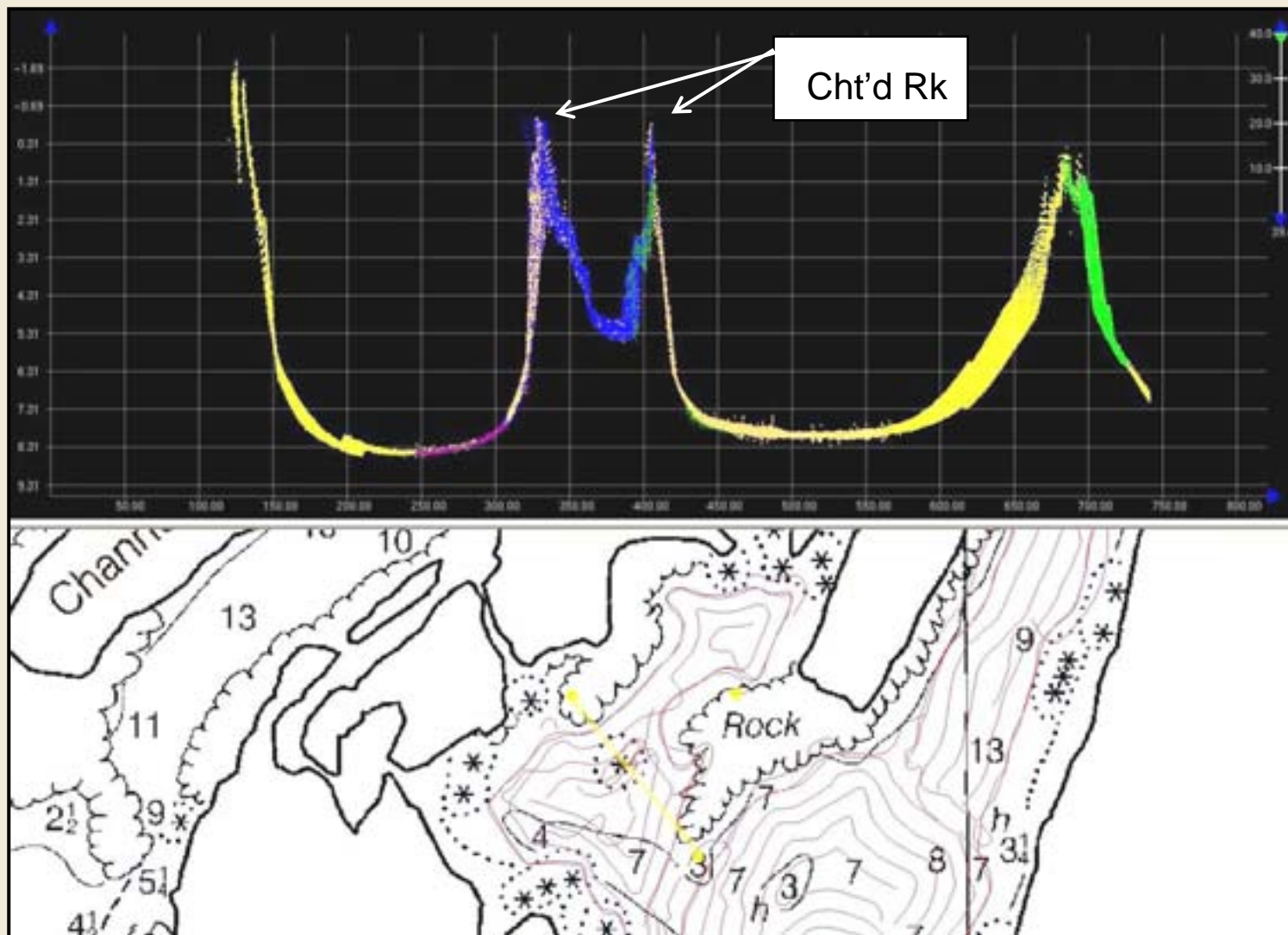




Benefits of LIDAR Recon Data

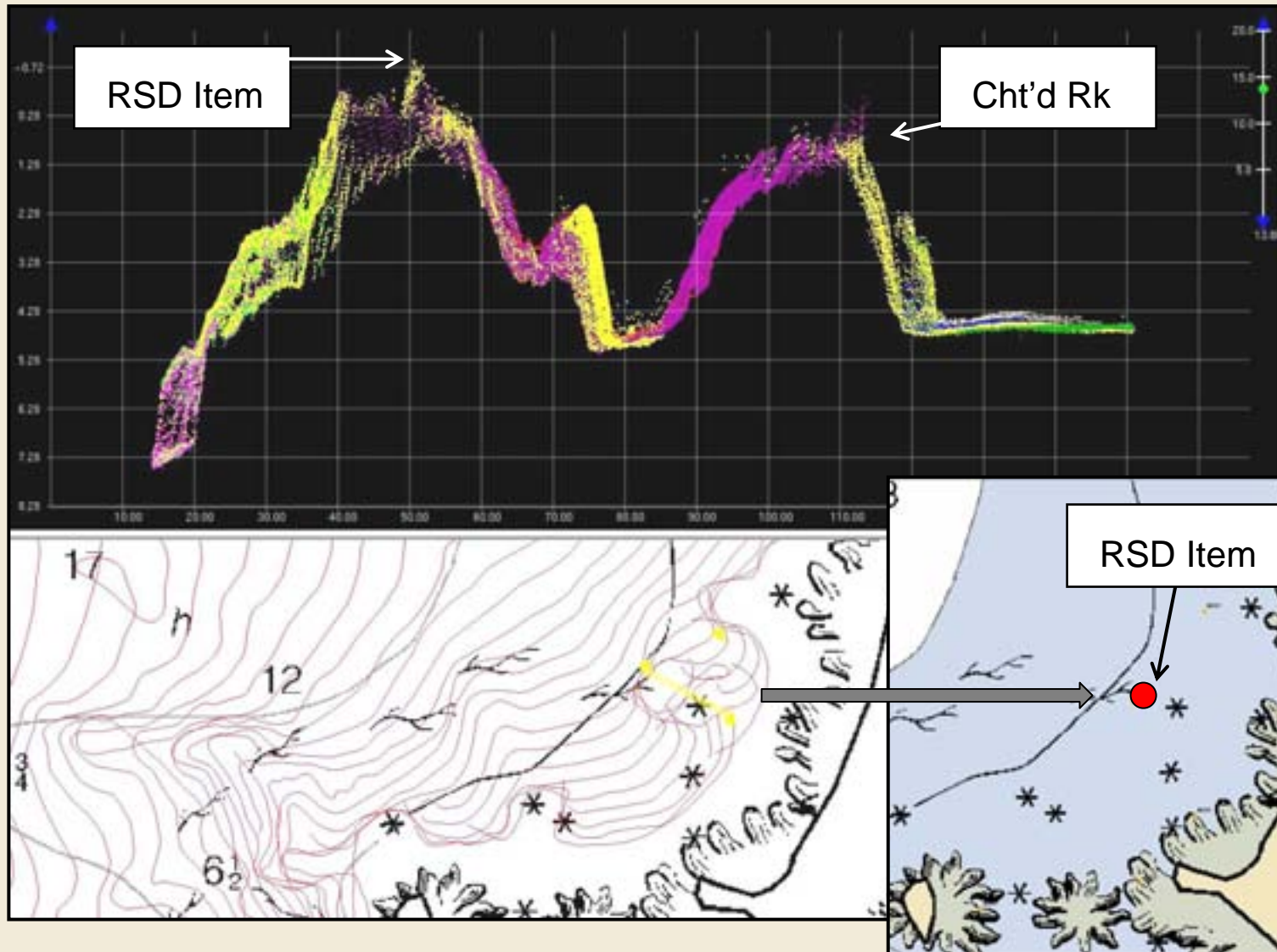
- Safety: We could avoid dangerous, uncharted features
- Speed: We could increase our survey speed
- Able to access and multibeam areas we otherwise might not have attempted to reach
- Increased efficiency: Could open up line spacing and run lines more directly





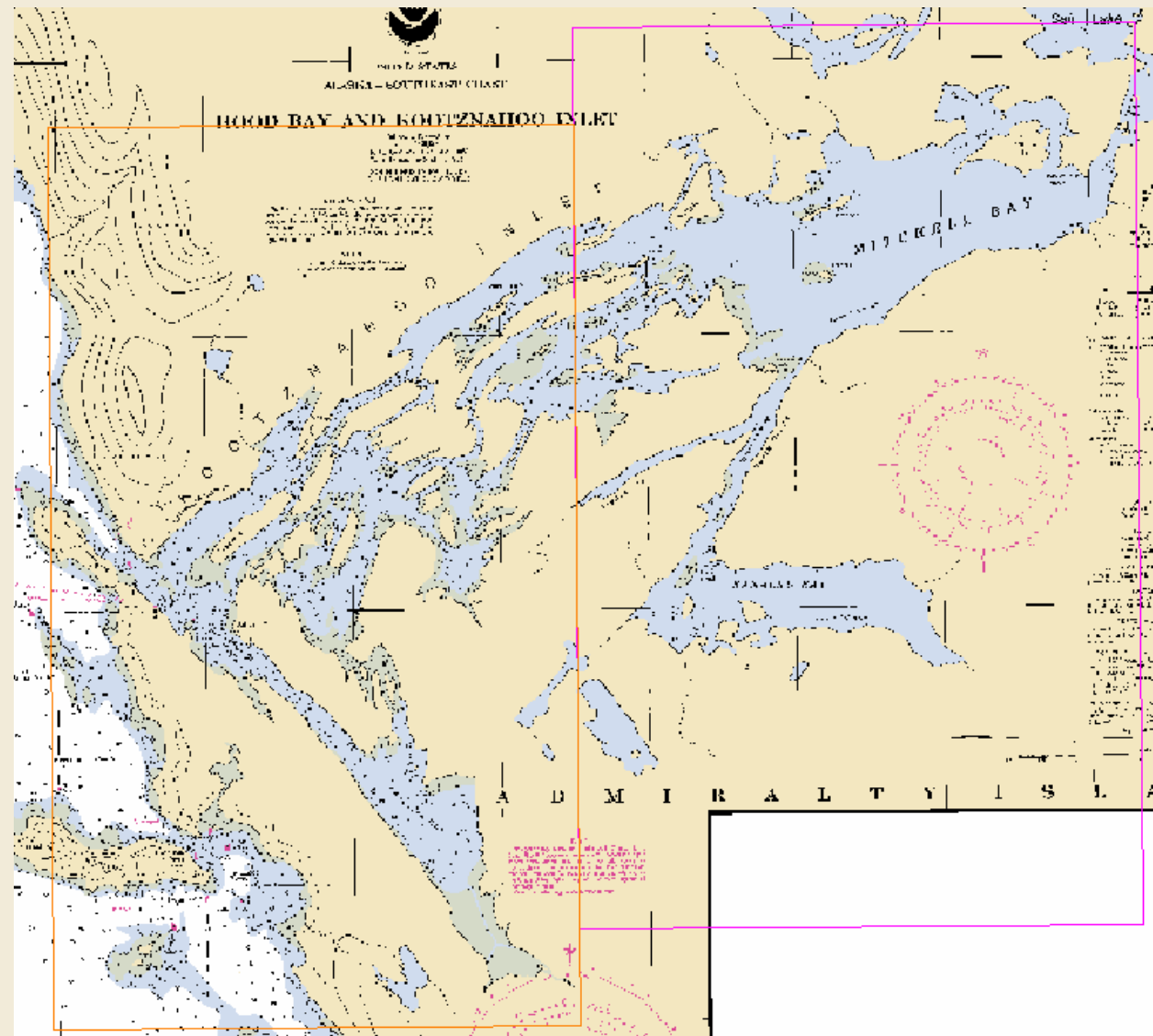


Aided with Shoreline Verification



Estimated: 36.4 days

Concerned if this was enough time because of the lack of data to plan on





Time Savings

Estimated: 36.4 days

Actual: 15.3 days
(cumulative)

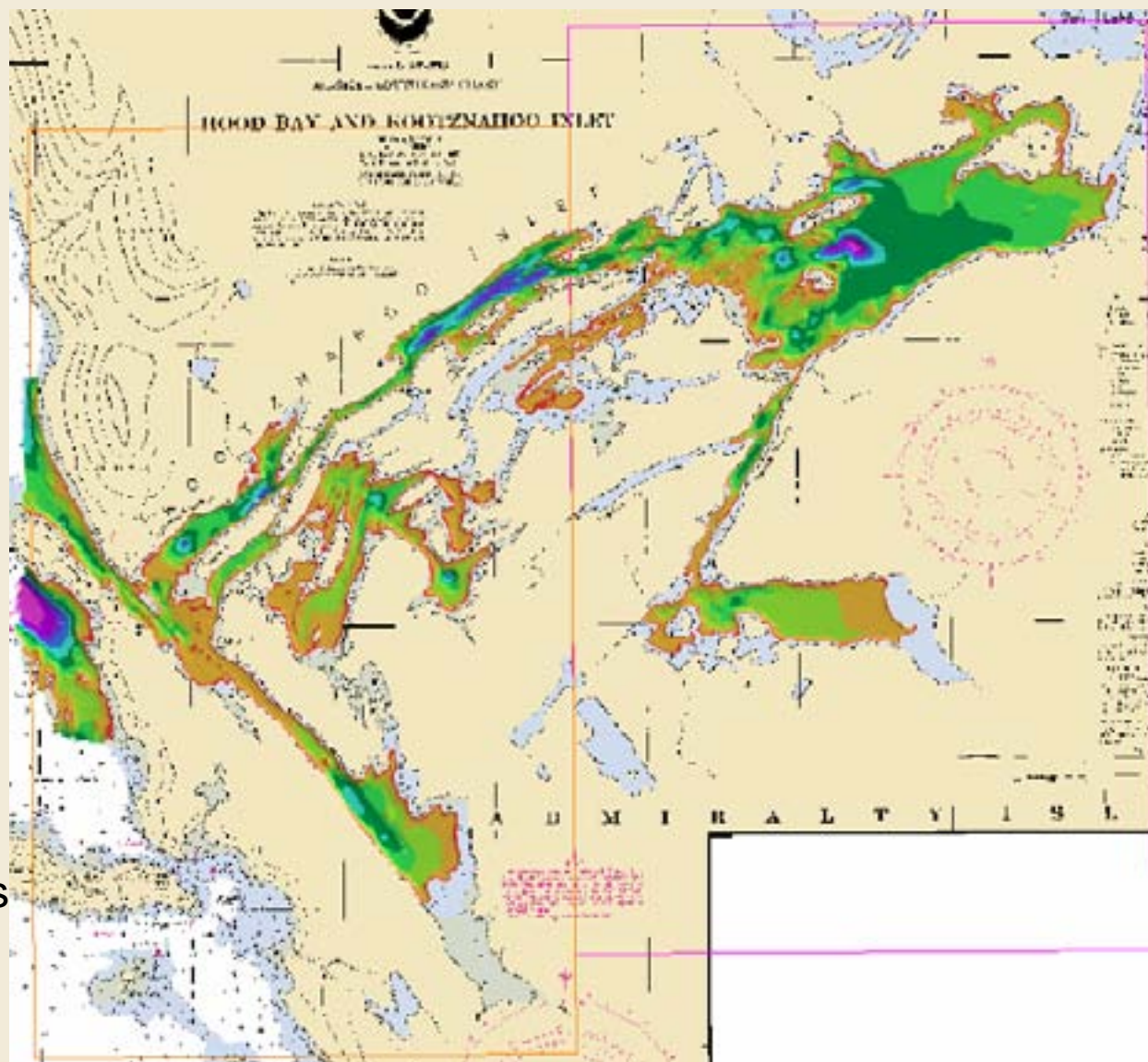
Time Savings: **21.1 days**

During Survey Ops for
Both areas:

Submitted 140 DTN's

Documented 5228 Dp's

Took 325 Bottom Samples





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