

Initial Report on Greenland Data

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Sigma Space

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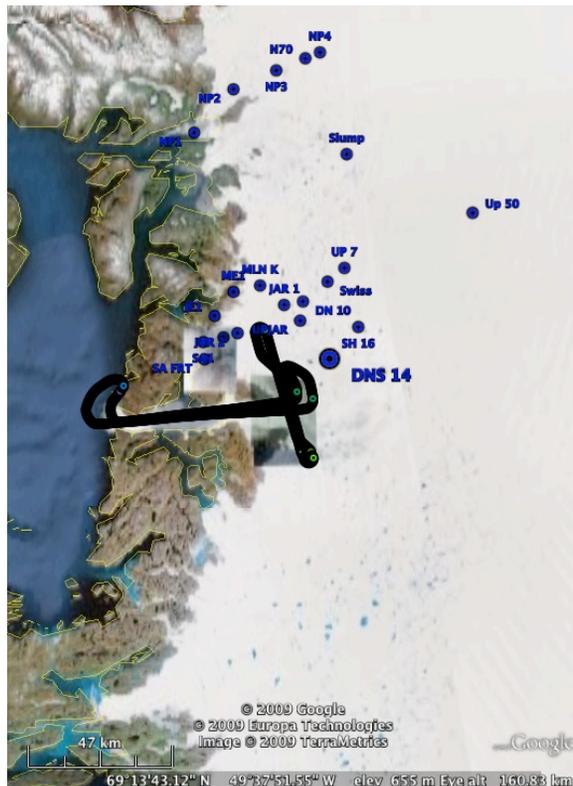
Flight Overview

There were three successful data collection flights over Greenland

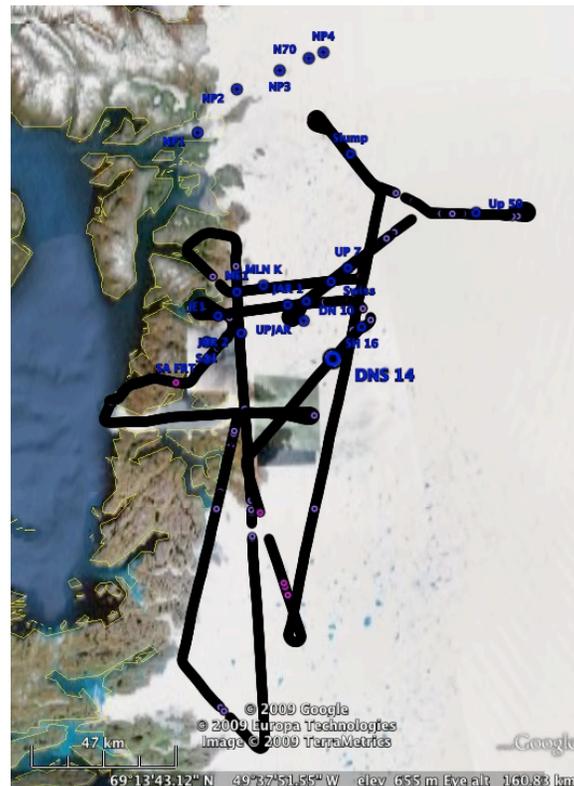
- Flight 6 about 160 mapping miles
- Flight 7 about 660 mapping miles
- Flight 8 about 320 linear miles+250 miles of grid flying over the glacier face
 - Range gate set for 10 to 14 us throughout the flights.

Flights 6, 7, and 8

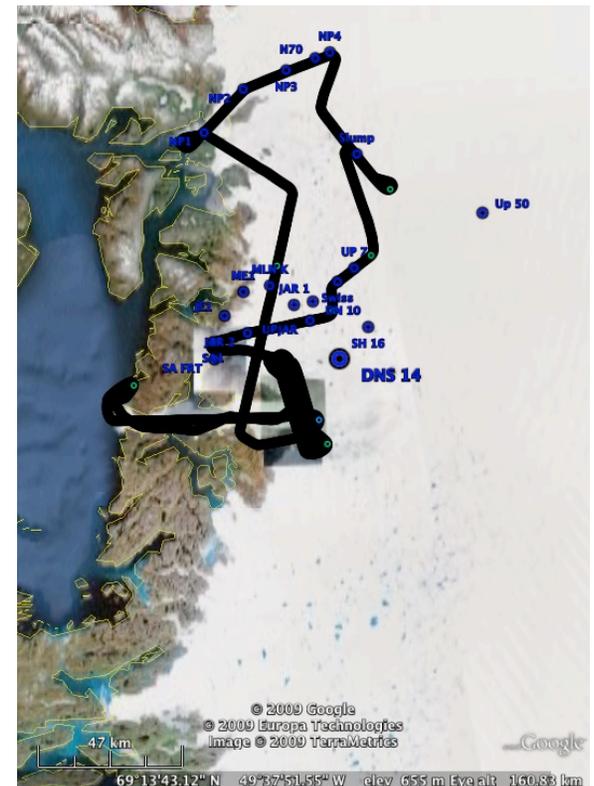
Flight 6



Flight 7

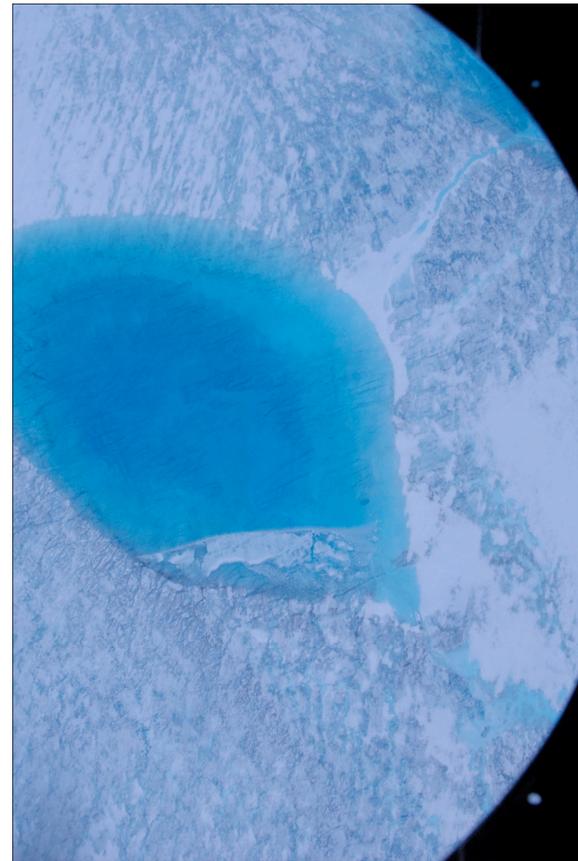


Flight 8



Water vs Ice returns issue: Images of Water Surface and Bottom

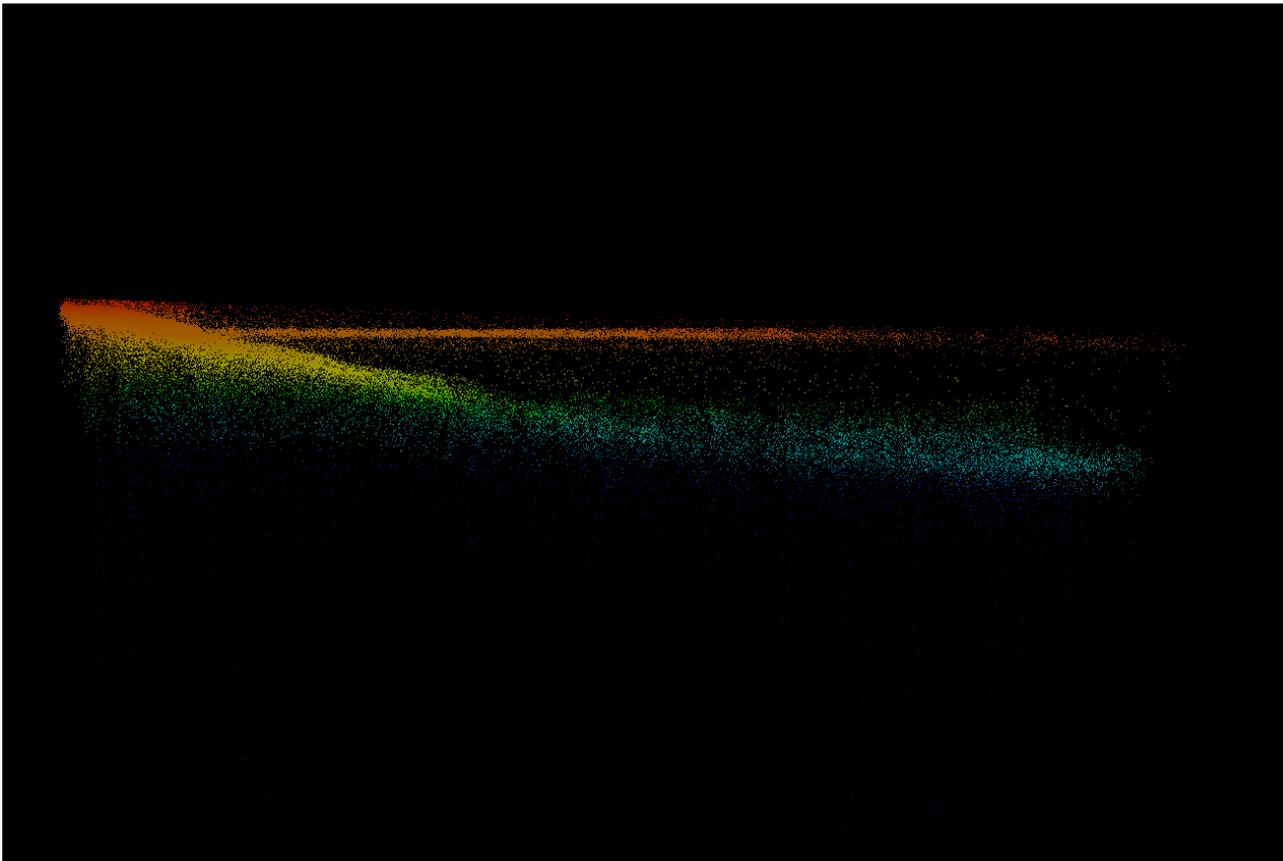
- Made two passes over this lake.
- View a cleaned image of the lake surface and bottom.
- Will provide raw set, level 1, and level 2 cleaned sets.



Front
of
plane

Lake Profile

Initial Cleaned Results



Surface return is reduced toward the right because the slant angle increases to ~13 degrees.

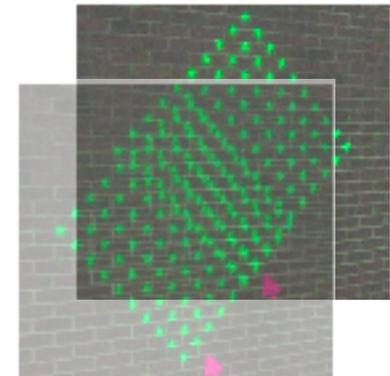
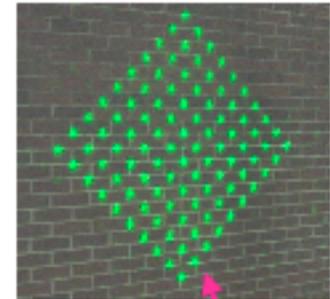
Other Major POI to Show

- Swiss Camp
 - Flight 7
 - 47125 GPS seconds
 - 47668 GPS seconds
 - 48057 GPS seconds
 - Flight 8
 - 71913 GPS seconds
- The Slump
 - 44655 (ground out of range)
 - 45187

Description of Data Products

Note that while the instrument spot is a nice grid, the x, y, z, points in the file are not in a grid.

- Because scanner moved 1/2 grid between shots
- Returns not limited to surface. Slant angle mixes x, y positions of points with various z values
- Left and right scans overlap at nadir.



Description of Data Products

Provide several data products for each site.

- Binary data. (*.bin).
 - 1024 ASCII file header.
 - Includes Easting & Northing origin in UTM system.
 - Processing parameters such as bias, tadpole, range cutting, etc.
 - Block zero filled.
 - X, Y, Z single precision floats
 - Can be read by Matlab, QT Modeler and others.
- QT Modeler format (*.qtc)
 - Can be loaded by QT Modeler Reader
 - <http://AppliedImagery.com/download.php>

Description of Data Products

- For several data sets provided
 - Raw data
 - Level 1 cleaned data. Done on the data before shot and channel number is lost.
 - Level 2 cleaned data to isolate surface

To keep in mind:

- Instrument is a prototype SBIR unit developed for different purpose.
 - No in-flight adjustments.
 - No in-flight controls.
 - New operational software and interface under development.

These were engineering flights, (severely hampered by aircraft power issues)

- 1) Range gate set at flight start 10-14 us.
 - Attempted to fly 5,000 to 7,000 ft AGL.
 - Limited feedback.
 - **Ground sometimes out of range**

- 2) PMT gain/discriminator threshold not optimal.
 - Gain a bit low and threshold a bit high.
 - Initial efforts in Greenland to gather data to optimize hampered by aircraft integration issues.
 - **Surface returns $\sim 1 / \text{m}^2$ rather than $\sim 10 / \text{m}^2$ (if right settings would have been used)**

Instrument and Data Issues

- Minor electronic issues
 - Creates string of dots in air (tad poles).
 - Due to electronic issues to be resolved with new TOF electronics (under fabrication).
 - Easy to clean during initial data processing
 - Creates second surface displaced ~ 0.5 meters.
 - Likely ringing in line between PMT and TOF electronics (new PMT and AMP boards under design with matched impedances).