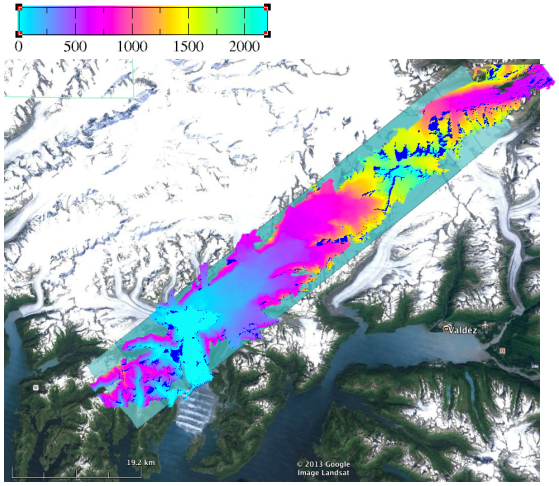
The Airborne Glacier and Land Ice Surface Topography Interferometer (GLISTIN-A)

PI: Delwyn Moller, Remote Sensing Solutions (RSS)

Objective

- Provide an ice surface topography, swath mapping sensor capable of operationally supporting NASA cryospheric science campaigns including potential IceBridge participation and ICESat-II augmentation - especially in coastal regions.
- Transition the Ka-band interferometer capability developed under the NASA International Polar Year (IPY) to a permanently available Ka-band UAVSAR configuration.
- Improve IPY configuration to provide enhanced performance and swath-mapping capability.
- Enable compact "plug and play" reconfiguration between L-band UAVSAR and Ka-band.



- Height map mosaic over Columbia Glacier (collected 4/24/2013)
- Data were processed to a 3mx3m horizontal resolution
- Height precisions are <2m on the ice

Accomplishments

- Integrated state-of-the-art solid-state power amplifiers combined to achieve 80W peak transmit power.
- Designed, built, and integrated a new Ka-band solid-state front-end enabling >50% increase in swath coverage (often in excess of 10 km).
- Implemented a high-fidelity calibration loop with an isolation that exceeds 80dB.
- Successfully redesigned the antenna mount to minimize multipath interaction (isolation >80dB).
- Completed the thermal design and testing of the Ka-band front-end and demonstrated excellent thermal stability in-flight over a large range of conditions. Telemetry indicated temperature variability of ±3°C that varied slowly over multiple hours.
- Integrated with the UAVSAR infrastructure, including hardware, planning, and in-flight operations.
- Conducted several engineering test flights to validate instrument hardware upgrades.
- Conducted a science flight over snow and ice targets demonstrating a capability to make sea-ice freeboard measurements.

Co-Is/Partners: James Carswell, RSS; Scott Hensley, Gregory Sadowy, Yunling Lou, and Charles Fisher, JPL