

*Science Data Systems for Satellite and Airborne LiDAR Data*

Summary of Accomplishments (2000 characters):

- Finalized definitions and units for the GLANL derived variables and produced a corrected, complete, and unambiguous 'Master GLANL Data File Specification Document' - a spreadsheet document detailing every element in each of the 5 GLANL output data files.
- Several important modifications made to GLANL generation code and RAMADDA code to: handle records that have no geolocation information (laser fired but there was no usable return pulse); search RAMADDA based on reliability flag values; search RAMADDA based on track number(s).
- Completed processing of the GLANL short subset product.
- OpenTopography now offers GLAS data download in comprehensive CSV format (lat,lon.alt and LAS format files were already supported).
- Finalized wording on data disclaimer and added disclaimer to OpenTopography discovery interface.

Current Progress Description (2000 characters):

Work this quarter emphasized finalization of the GLAS formats (GLANL) and related updates to the RAMADDA system to support these data. GLANL data are now accessible via the OpenTopography beta interface, and support bounding box and track-based queries. Additional updates and improvements were also made to the LVIS RAMADDA system at UNAVCO and the OpenTopography interface to access those data. Progress on the new LVIS data format is staled as we await interaction with the LVIS science team. In the interim, we are working to gain access to additional LVIS data in the standard format to ingest and distribute via NLAS.

NSIDC Highlights:

NLAS project at NSIDC accomplished the following in the Jan-Mar 2012 timeframe:

1. Finalized definitions and units for the GLANL derived variables
2. Created a corrected, complete, and unambiguous 'Master GLANL Data File Specification Document' - a spreadsheet document detailing every element in each of the 5 GLANL output data files.
3. Create automated Master Document processing routines that inputs the csv files from

- the Master Doc and creates: - IDL data structure definition routines (record-based) (5 IDL routines) - IDL data structure definition routines (for the flattened output GLANL format) (5 IDL routines) - IDL routines to perform scale conversion for the "Subset" elements - IDL routines to perform creation of all required Data Dictionary files
4. Updated FTP data fetching routines to use platform independent system calls
  5. Made modifications to GLANL generation code and RAMADDA code to handle records that have no geolocation information (laser fired but there was no usable return pulse)
  6. Enabled RAMADDA searching based on reliability flag values
  7. Enabled RAMADDA searching based on track number(s)
  8. Finalized wording on data disclaimer
  9. Got the NSIDC web template to behave properly with the RAMADDA interface. Conflicts were causing offsets in the spatial selection boxes. Other cleanups improved the appearance.
  10. Completed processing of the GLANL product for all campaigns. This is for the short subset only. The GLANL product for the long subset, xmt and rcv waveforms and the IPA products, which had to be written separately to keep daily file sizes under 6 GB, were produced for one campaign.

#### SDSC Highlights:

1. Team participated in monthly NLAS project calls and email exchanges where various project issues and tasks have been discussed, including:
  - a. OT/RAMADDA system interoperability, data discovery, and data exchange.
  - b. NLAS API definitions, metadata elements, and architecture.
2. Continued refinement to OpenTopography's remote data discovery and processing capabilities (in collaboration w/ UNAVCO team) to search the NLAS RAMADDA system for LVIS datasets and allow users to not only download the data but also utilize OpenTopography's processing algorithms on the selected datasets. This system also carries over the advantages and capabilities of OpenTopography such as job statistics and monitoring, as well as personalized job workspace and access to other lidar data sources. Full functionality is available for testing via the OpenTopography beta portal: <http://opentopography.org/beta>
3. Ongoing refinement of the OT-based interface to display GLAS reference tracks on Google Earth (driven by Google Fusion Tables). The interface allows display of GLAS tracks based on different attributes. Query of the NSIDC RAMADDA to retrieve GLANL data is possible via rectangular bounding box and/or track queries. Extensive troubleshooting and interaction with NSIDC team related to optimizing query performance.

4. Added support for GLAS data download in comprehensive CSV format (lat,lon,alt and LAS format files were already supported).
5. Updated OpenTopography derived products service to correctly calculate slope and hillshade products for datasets in geographic coordinates (lat/long). Update fixes products generated from LVIS topography.
6. Familiarized and followed conversation related to development of the PulseWaves format (pulsewaves.org) for full waveform lidar data.

#### UNAVCO Highlights:

The primary areas of work this quarter been in the area of improving RAMADDA's support for operational data delivery, including:

1. Added functionality for web services queries for the number of points within a request area and for job information for a currently running request.
2. Implemented a number of small bug fixes related to the items in #1 and in the web services query for the lat/lon bounds of individual datasets.
3. Optimization of the dataset tiling algorithm which creates input for various data segmenting/delivery operations.
4. Extensive work to improve metadata functionality within RAMADDA.

#### Work Plan for Next Reporting Period (2000 characters):

- Migrate GLANL data processing to the university's (CU) supercomputer, which will also alleviate storage problems.
- Adapt GLANL code for Release 33 and begin processing to adapt RAMADDA waveform viewing for GLANL rcv waveform files
- A metrics plan will be submitted to NASA beginning of Q2.
- Continued efforts to obtain and ingest more of the LVIS data catalog into NLAS.
- Development of a sustainability plan for NLAS systems beyond the end of the current funding.

Schedule Status (2000 characters):

We are late in finalizing the NLAS metrics plan (see below), but plan to submit the plan to NASA early in Q2.

Delays/Problems Experienced (2000 characters):

We continue to experienced delays in getting the final LVIS data formats from the LVIS science team. Efforts are ongoing to gain access to the full LVIS archive and to get those data ingested into the LVIS RAMADDA system.

Corrective Actions/Recovery Plan (2000 characters):

N/A

Technology Readiness Level Assessment (2000 characters):

N/A

Comments (2000 characters):

We continue to refine the final version of the metrics plan and expect to submit it the beginning of the coming quarter. Through OpenTopography we have been gathering usage metrics for a small selection of LVIS data since December 2010. The experience we have gained with tracking usage of the NLAS prototype datasets will guide our understanding of the metrics requirements for the production NLAS data systems. Support for these requirements has been added into the NLAS API and data systems.