NSF OpenTopography Advisory Committee Report

January 31, 2018

January 23rd, 2018 meeting:

Representing OpenTopography:
Ramon Arrowsmith (ASU), Christopher Crosby (UNAVCO), Vishu Nandigam (SDSC), Chelsea Scott (ASU)

Representing Advisory Committee:
Stephen DeLong (USGS), Doug Yule (CSUN), Howard Butler (Hobu, Inc), Robert Sare (Stanford - Graduate Student Representative), Nancy Glenn (Boise State University).

Report from OT: OT was not recommended for funding prioritization via NSF NGEO mechanism. OT PI team plans to submit a 5-year funding proposal to NSF Instrumentation and Facilities in Spring 2018.

OT advisory committee members note the following accomplishments by OT since the last advisory meeting:

1. OT has continued to expand data holdings, and user interactions.
2. OT has expanded partnerships with non-NSF entities (e.g. State of Indiana, USGS, etc.).
3. OT has demonstrated consistent commitment to, and improvement of, community engagement activities, especially short courses. We particularly commend OT for making tutorial material available online.
4. OT has demonstrated responsiveness to changing data environments (e.g. anticipating and facilitating use of SRTM, structure-from-motion and terrestrial lidar data).
5. OT continues to improve web interface and user-facing tools.
6. OT has demonstrated attention to higher-end needs via API, bulk downloads, advanced data processing capability.
7. OT enjoys success because of consistent staffing and community responsiveness (thanks to the core team of Vishu, Chris, and Ramon!)

The OT advisory committee has the following recommendations:

1. Continue to increase data holdings from NSF and non-NSF supported data. USGS and NOAA will likely continue to only focus on their own data, so OT can be opportunistic about data that benefits the scientific community and provides revenue from data owners in need of hosting and value-added tools.
2. Evaluate the implementation of topographic change detection tools. Identify best way forward and implement these in next generation of OT. Include formal error propagation and assessment workflow.
3. Continue to evaluate and improve the facilitation of structure-from-motion data access, and provide community leadership in “best practices” for collection and processing of these data.
4. Continue to evaluate improving interaction with the ecological community, including NSF-NEON.
5. Develop specific tools: add flexibility to gridding algorithms including access to more lidar point classes, and gridding algorithms. Implement attribute-based classification and filtering (RGB, multispectral, etc) or integrate user-defined filters. OT should add features to allow users to invoke their own user-defined PDAL filters across large swaths of data. OT can handle fan-out of processing over large collections easily, and tools such as PDAL’s filters allow users to compose operations that OT would not have to be responsible for constructing.
6. Allow increased access to OT tools via APIs and “back-doors” for user-supplied data.
7. As functionality expands, continue to provide intuitive user interfaces suitable for users with a range of technical abilities. Continue testing options for web-based rendering and manipulation of point clouds and derivative products using open source tools such as the Potree WebGL interface and Greyhound framework for streaming point cloud data.
8. Continue to evaluate, adapt, and act on opportunities in HPC and cloud computing. Engage with open-source development community, be mindful of technological advances relevant to OT. Encourage OT to explore opportunities for cost-efficient data management and increased access to high performance computing, leveraging SDSC infrastructure, NSF XSEDE, and the commercial cloud (e.g., AWS and Google Cloud). OT should explore partnerships with industrial cloud computing providers for in-kind access to compute and storage resources. The cloud providers have incentive to get educated on these data types because they are so large and have the potential to drive a lot of computing demand.
9. Evaluate implementation of Jupyter (or other python-based) notebooks for common and reproducible workflows, and other methods for implementation of external workflows etc.
10. Continue to develop meaningful collaborations and coordination. Examples include NCALM, NSF Earthcube (CDF, RCNs), UNAVCO, NSF NEON, NSF CZOs, NSF PGC, USGS researchers and 3DEP, NSF XSEDE.
11. Clearly articulate OT’s positioning within NSF’s 10 Big Ideas for Future NSF Investments.

12. Develop a sustainability model and consider prioritizing development of a more diversified business model, including revenue streams from private partnerships, government partnerships, and providing direct services such as short courses to interested parties. This should include international opportunities.
13. We recommend a larger advisory committee meeting later in 2018 with additional participants.