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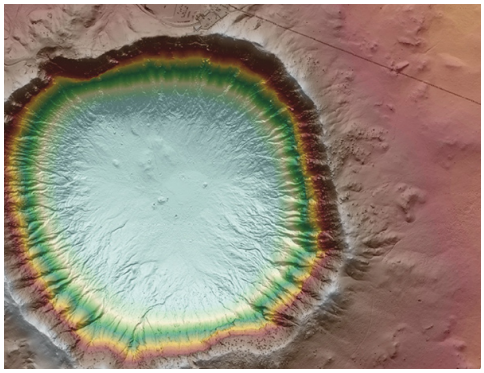
NSF Renews Funding for National OpenTopography Project

Internet-based High-Resolution Topographic Data Facility Led by SDSC and ASU



ved image of Meteor Crater, AZ. Color bands show 'evations from 1541 meters at the bottom of the maximum of 1835 meters on the crater rim. Image f Barrett Salisbury (ASU), with data collected for ucis (UC Berkeley) by the NSF-funded National Center e Laser Mapping.

The National Science Foundation (NSF) has renewed funding for OpenTopography, an Internet-based project that provides open and free access to high-resolution topographic data collected by technologies such as LiDAR (Light Detection and Ranging).

OpenTopography is managed by the San Diego Supercomputer Center (SDSC) at the University of California, San Diego, and Arizona State University's (ASU) School of Earth and Space Exploration. The three-year renewal under the National Science Foundation's Geoinformatics and Earth Sciences: Instrumentation and Facilities (EAR-IF) program follows an initial three-year award from EAR-IF and the Office of Cyberinfrastructure, announced in late 2009.

OpenTopography was initially developed as a proof-of-concept cyberinfrastructure project for the earth sciences as part of the NSF Information and Technology Research (ITR) program-funded Geosciences Network (GEON) project, and continues to emphasize innovative cyberinfrastructure approaches to the online storage, access, and processing of large topographic datasets.

OpenTopography's primary emphasis has been on earth science-related, high-resolution topography collected with LiDAR technology, providing datasets to a large and varied user community to further research in areas ranging from earthquake geology to ecology and hydrology. OpenTopography has demonstrated success in efficiently managing, archiving, distributing, and processing terabytes of community geospatial data in a manner that democratizes access for researchers, educators, and commercial sector users.

"OpenTopography began as a project to host EarthScope LiDAR data for the San Andreas fault with the ability to generate custom digital elevation models from the data, and has since grown to host a variety of topographic datasets from a range of sources covering an expanse of more than 85,000 square kilometers," said Chaitan Baru, an SDSC Distinguished Scientist, SDSC's Associate Director for Data Initiatives, and principal investigator for the project. "In this next phase, called OpenTopography 2 or OT2, we will continue to accept new datasets as before, to be served to the community at large. In addition, however, OT2 will also develop a *pluggable services infrastructure* to enable scientsts to contribute state-of-the-art LiDAR processing tools and algorithms operating on OT data, for use by the larger community."

The growth of OpenTopography has been spurred by the increasing demand for data collected with LiDAR technology. As one of the most powerful tools available to study the earth's surface, overlying vegetation and man-made structures, high-resolution LiDAR data sets are regarded as revolutionary for earth science, environmental, and engineering applications, as well as natural hazard studies.

"These data provide an unprecedented fine-scale view of earth surface features such as fault scarps, glacial moraines, lava flows, meteor craters, and numerous surface-sculpting processes," said Ramon Arrowsmith, co-investigator for the project and an associate geology professor in ASU's School of Earth and Space Exploration. "In addition, data from the bare earth surface and the vegetative canopy enable valuable earth science and ecological studies in heavily vegetated terrain."

During the first three years of operations, the OpenTopography user community has grown to several thousand registered and guest users and a catalog of half a trillion LiDAR points. OpenTopography has also developed successful data hosting relationships with NSF-funded projects such as the National Center for Airborne Laser Mapping (NCALM), as well as other federal, state, and local agencies that are collecting LiDAR data.

“OpenTopography has been very successful during our first round of funding in building strong partnerships and collaborations with groups that want to make these data more easily accessible, but who lack the infrastructure and technology to do so themselves,” said Christopher Crosby, a co-investigator of OpenTopography who also heads the Geodetic Imaging (Terrestrial Laser Scanning (TLS) and Synthetic Aperture Rader (SAR) activities at UNAVCO based in Boulder, Colorado. “The great power of OpenTopography is that it allows a wide spectrum of users to access the datasets, and thus dramatically increase the impact of those datasets.”

Other SDSC researchers contributing to OpenTopography include Viswanath Nandigam, a project co-investigator who has been the technical lead on the project since its inception; Minh Phan, a software developer/programmer analyst; Emily Kleber, a geospatial data specialist; and Choonhan Youn, a research programmer.
