EMERGING LIDAR TECHNOLOGY FEDERAL ROUNDTABLE

Co-Sponsored by
The 3D Elevation Program Executive Forum
The Civil Applications Committee
And
The White House Office of Science and Technology Policy

September 16, 2014, 9:30 AM - 12:30 PM
White House Conference Center, Truman Room
726 Jackson Place NW, Washington, D.C.

EXECUTIVE SUMMARY

The 3D Elevation Executive Forum, the Civil Applications Committee, and the White House Office of Science and Technology Policy co-sponsored a Federal roundtable meeting on September 16, 2014 to explore the status and potential of emerging lidar technologies from the Defense community and NASA. These systems can collect high-resolution data from aircraft flying higher and faster, potentially reducing the cost of nationwide lidar coverage (ifsar in Alaska), a major objective for the 3D Elevation Program (3DEP). 3DEP is designed to address the requirements of 34 Federal agencies, 50 states and local, tribal, and private organizations. Future commercialization of more efficient technology has the potential to produce new benefits and increase the return on investment for future generations of 3DEP. The meeting goals were to share Federal status and plans for emerging technologies, discuss potential next steps to advance the commercialization of emerging lidar technologies for future use in 3DEP, and to improve coordination for further technology advancements.

The Office of Science and Technology Policy presented Administration perspectives and priorities related to earth observing systems. The national Earth Observation Plan that assessed the impact of observing systems on distinct societal benefit areas, ranked lidar number six among the more than 200 systems evaluated. The plan highlights the need to have a standardized national program, robust standards, and acquisition coordinated with other types of systems. The Administration supports the current portfolio and expanded research and development toward an integrated approach to the coordination of 3D measurements.

The USGS discussed the importance of lidar to nationally significant applications including the identification of faults and landslides, flood risk management, sea level rise and subsidence, wildland fire management, and alternative energy development. The USGS provided an overview of the requirements of 3DEP. 3DEP is operational: the lidar technology and best practices are in place to achieve the more than $690M of documented annual benefits that 3DEP will provide if fully funded. At the same time, it is important to reflect that lidar technology first emerged in the 1960s, and it has taken around 50 years to mature enough to support a national, operational mapping program that serves the broad needs of government and leverages the private sector for data acquisition. The lesson learned is that we need to
continue to push new frontiers in technology. The USGS provided an overview of photon counting, Geiger mode, waveform, flash array, and linear mode lidar systems. The best use of these new methods for 3DEP may be in integration, not substitution. In order to understand whether and how the new instruments can be used for 3DEP, data must be collected over well characterized test ranges and the results analyzed against 3DEP requirements and specifications. A defined technology maturity level schema must be applied to determine readiness. Because this will take several years to complete, the process should be initiated in the near term.

The Army Geospatial Center (AGC) shared information about their photon counting Buckeye and Buckeye II systems, and Geiger mode HALOE system, used by the US military in Iraq and Afghanistan. NASA described research programs that use both waveform and photon counting lidar systems, including the Land, Vegetation and Ice Sensor (LVIS), the space-based Global Ecosystem Dynamics Investigation (GEDI) program, and three of NASA’s photon counting systems. The National Geospatial-Intelligence Agency (NGA) presented information on the Geiger mode ALIRT (Airborne Laser Imaging Research Testbed) system that operated in Afghanistan from 2010 to 2014. NGA is seeking partners to maintain the system and aircraft. Alternatively, ownership can be transferred to another agency.

A facilitated discussion explored system capabilities, processing issues, costs, and access to data and software for Federal agencies. Accuracies of the systems are approaching 3DEP requirements, but work needs to be done to demonstrate capabilities over well characterized test ranges. Processing is a critical component as photon counting and Geiger mode sensors are more sensitive, so data tend to be noisier. Data volume is also a consideration for processing and storage. Data and processing software for these systems is generally government owned and can be shared with Federal partners for testing, though licensing is required.

Meeting participants decided to establish a working group to identify steps to test the systems and to evaluate their ability to address 3DEP requirements. The working group may be a subset or otherwise related to the Lidar Community of Practice and Lidar Interoperability Work Group led by NGA. The focus and membership of the group is important as well as the need to meet in an unclassified venue.