National Geospatial Advisory Committee

Public-Private Partnership Use Case:

3D ELEVATION PROGRAM

Piloting Public-Private Partnerships: Cooperative Geospatial Data Collection and Maintenance

Background

The 3D Elevation Program (3DEP) is managed by the U.S. Geological Survey (USGS) on behalf of the community of Federal, State, Tribal, local and other partners and users. The goal of 3DEP is to complete acquisition of nationwide lidar (IfSAR in Alaska) by 2023 to provide the first-ever national baseline of consistent high-resolution elevation data – both bare earth and 3D point clouds – collected in a timeframe of less than a decade.

High quality elevation data are critical to flood risk management, infrastructure construction, resource management, conservation, energy development, agriculture, and a host of other nationally significant applications. The National Enhanced Elevation Assessment (https://www.dewberry.com/services/geospatial/national-enhanced-elevation-assessment) documented more than 600 business uses of elevation data across 34 Federal agencies, all 50 States, selected local government and tribal offices, and private and nonprofit organizations. 3DEP is designed based on the NEEA to provide a 5:1 return on investment and to conservatively provide new benefits of $690 million/year with the potential to generate $13 billion/year in new benefits through applications that span the economy.

3DEP presents a unique opportunity for collaboration among all levels of government, to leverage the services and expertise of private sector mapping firms that acquire the data, and to create jobs now and in the future. The NEEA further estimated the cost to acquire and deliver the required elevation data for the Nation at $1 Billion in total over 8 years. As a result, 3DEP was designed from the onset to be built upon collaborative partnerships and leverage the expertise and capacity of the private sector.

Case Study: 3DEP Lidar Acquisition Partnerships

3DEP solicits proposals annually to acquire high-quality lidar data from Federal agencies, State, local, and Tribal governments, academia, non-profit organizations, and the private sector through a Broad Agency Announcement (BAA). The 3DEP BAA is a fair and equitable process that allows prospective partners to propose data acquisition projects. The cost of data acquisition for approved BAA proposals is shared between the applicant, USGS, and other Federal agencies with interests in the project area. All digital elevation models (DEMs) and lidar point clouds from projects that include Federal funding are published on The National Map and are available to the public free of charge, without use restrictions.

Private companies can initiate and submit BAA applications to receive funding to augment the project. The recent Arizona Maricopa-Pinal 2020 lidar project is an example of a private company investing in 3DEP data acquisition. For this project, a geospatial solutions provider, VeriDaaS, organized and submitted a BAA application that included an in-kind contribution for a portion of their work to complete the survey, which they valued at 20% of the full project cost. The financial partners on this project are the Natural Resources Conservation Service (NRCS), the Federal Emergency Management Agency (FEMA), and four State and county government organizations. This project will result in 5,033 square miles of new Quality Level 1 (QL1) lidar data collected in the fall of 2020. The data will support the FEMA Risk

Mapping Analysis and Planning program (Risk MAP), natural resource management, agriculture, infrastructure, and many other applications. VeriDaaS is assuming some risk by acquiring data at a higher density than 3DEP requires, and plans to deliver to USGS reduced density data that meets 3DEP specifications for unrestricted public use. VeriDaaS will retain the high density lidar data for their own use, for derivative analytics, and for reselling value-added products to other customers.

3DEP was also the recipient of an opportunistic Public-Private Partnership (P3) in Alaska. The Alaska Mapping Executive Committee - a governance body focused on improving foundational geospatial data in Alaska comprising several Federal, State, and local governments - prioritized the funding and acquisition of a statewide elevation dataset. USGS managed the multi-year acquisition of the data, with clear plans for contracting statewide collection. The vendors acquiring the data for USGS often were able to extend planned flights to collect additional data speculatively, and with no obligation from USGS to purchase the data. However, USGS was eventually able to purchase interferometric synthetic aperture radar (IfSAR) data at a later date from contractors who initially acquired the data speculatively. Alaska was mapped using IfSAR rather than lidar due to the remoteness of most areas and persistent cloud cover. This P3 is nontraditional because contractors acquired data to meet 3DEP requirements speculatively in areas that lacked data coverage but were adjacent to areas USGS was already funding. To minimize costs, Fugro, Intermap, and Dewberry acquired data on speculation, valued at nearly $17M, maximizing the efficiency of each flight-plan, which resulted in lower overall program costs.

How It Works

3DEP, by design, is a cooperative program that meets the needs of a broad range of stakeholders and depends on significant data investments and contributions through partnerships. Federal coordination for the program is managed through the 3DEP Executive Forum and the operational 3DEP Working Group, and data acquisition is managed through the BAA process and Federal data partnerships. Strides have been made to move beyond an ad hoc process that had long primarily emphasized information sharing about agency acquisition plans, to one that more fully integrates acquisition investments across levels of government. As a result, 3DEP-quality data is available or in progress for over 77% of the Nation at the end of FY20. In spite of this success, developing partnerships and funding for data acquisition in the western U.S. remains a challenge to meeting the 8-year goal of nationwide data completion by 2023. The difficulty in obtaining control points over large tracts of roadless area, a reduced State tax base due to lower population, and significant Federal land ownership from agencies with little available funding require us to take innovative approaches with partnerships in western states. Continued Federal, State, local, Tribal, and private partnerships are critical to the successful campaign to produce nationwide coverage of modern, 3D elevation data.

Why It Works

USGS has outlined several best practices to aid the 3DEP community in reaching a higher level of coordinated implementation and maximizing data investments. Acquiring data through a unified approach significantly benefits partners and the Nation's taxpayers in multiple ways:

- Reduced unit costs by pooling funding with other partners;
- Reduced unit costs through the economy of scale achieved through larger project sizes;
- Access to qualified and experienced mapping firms under contract to acquire and process data;
- USGS programmatic infrastructure that issues and manages data acquisition contracts, and inspects, accepts, and distributes point cloud and derived data products;
- Reduced costs for not replicating the same infrastructure in multiple agencies;
- More consistent data from standardized acquisition and larger project areas;
- Increased State, local, Tribal and other data acquisition partnerships through advanced planning and earlier notification of opportunities enabled by a defined, stable Federal acquisition budget;
- The opportunity to "buy up" higher-quality data for specialized applications;

- The opportunity to receive 3DEP cost-share funding to acquire lidar data and data made publicly available to support countless other uses.

Lessons Learned

Because 3DEP relies heavily on partnerships, the program has learned to be creative with developing funding collaborations. For example, the BAA process has the flexibility to acquire data via a USGS acquisition project using the Geospatial Products and Services Contracts (GPSC) or partners may request 3DEP funds toward a lidar data acquisition where the requesting partner is the acquiring authority. Another example is the 3DEP partnership with the National States Geographic Information Council (NSGIC) to work directly with states to develop state lidar acquisition plans that consider the unique requirements, geography, and funding partners in each State. USGS has also leveraged key applications for lidar such as critical minerals and hurricane and wildfire disaster recovery to secure new funding for data acquisition. As the lead for 3DEP, USGS also transparently communicates on the status of the program, expenditures, and budget requirements through the 3DEP Working Group and Executive Forum, and the 3DEP webpage. To date, over 260 organizations have partnered with 3DEP, however many other potential partnerships remain.

Conclusions

These case studies provide varied examples of how private companies can partner with USGS to acquire high quality elevation data. Because the resulting data are available to the public, these partnerships benefit not only the USGS and funding partners, but also the entire elevation data user community. While not a textbook P3 yet, the BAA process does allow the government a mechanism to bring in multiple partners in concert with the private sector to 'map once, use many times.'