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A Newsletter from the Federal Highway Administration (FHWA)

<https://www.gis.fhwa.dot.gov>



Our guest writers this month are from the Tennessee Department of Finance and Administration and the Tennessee Department of Transportation. GIS practitioners span professional fields, departments, and agencies, but these colleagues' dual perspectives on the Tennessee LiDAR Program demonstrate that working across boundaries reduced duplicated efforts and increased the value of their data collection.

Tennessee LiDAR Program

Article by Dennis Pedersen, Director, GIS Services, Tennessee Department of Finance and Administration

Background

The United States Geological Survey (USGS) collects 3D elevation data in the form of light detection and ranging (LiDAR) across the U.S. through a data collection program. The 3D Elevation Program (3DEP) effort responds to growing needs for high-quality topographic data through a collaborative effort primarily among Federal, State, and local governments. The 3DEP initiative is based on the results of the [National Enhanced Elevation Assessment](#), which documented more than 600 uses of elevation data across Federal agencies, all 50 States, selected local governments, Tribal offices, and private and nonprofit organizations. A fully funded and implemented 3DEP would provide more than \$690 million annually in new benefits to government entities, the private sector, and citizens.

Tennessee's Project

Working directly with USGS, Tennessee used this opportunity to advance its goal of statewide collection of LiDAR. Through the efforts of the Department of Finance and Administration's GIS Services group, led by State GIS Coordinator Dennis Pedersen, Tennessee is four years into a five-year plan to collect LiDAR statewide. The original impetus for this robust data collection was severe flooding across the State in 2010 and 2011. Flood risk management is now identified as one of the primary beneficiaries of the 3DEP program. However, Pedersen quickly realized that there was significant interest from and benefits to be gained by other levels of State government collaborating on data collection.

Tennessee identified a core group of agencies as potential funding sources to support statewide LiDAR collection through stakeholder workshops and interviews. Partners included the Department of Agriculture, Natural Resources Conservation Service (NRCS), the Tennessee Valley Authority (TVA), the U.S. Forest Service, the Tennessee State Department of Environment and Conservation, the Tennessee Department of Transportation (TDOT), and many local governments across the State. With these funding partners, Pedersen submitted five project proposals to USGS between 2015 and 2019. On average, the Tennessee proposals identified 70 percent of the funding, while the remaining 30 percent was funded through the

USGS 3DEP program. The projects range between collecting data for 12 to 27 counties per year, with the final 2019 project collecting LiDAR data for 16 counties in west Tennessee. Pedersen noted, "With everybody using the same data, we eliminate duplication of effort, reduce costs, and save time and effort on program management." Pedersen also identified TDOT as a primary funding source and indicated that it would have been very difficult to complete the statewide effort without TDOT's participation.

TDOT's Story: Collaborating on the 3DEP Initiative

Article by Kim McDonough, Senior IT Manager, GIS Information Technology, Tennessee Department of Transportation

The Tennessee Department of Transportation (TDOT) depends on accurate terrain data for engineering analysis and design. This data is used from the very beginning of a project to the final design and construction stages, through operations after construction. TDOT is responsible for the safe operation of railway crossings as well as numerous regional and general aviation airports across the State. With better elevation data, TDOT generates better analyses and designs of these assets. Absent an up-to-date and accurate terrain model, TDOT cannot produce accurate aerial imagery in a timely matter.

In the past, TDOT had to conduct low-altitude photogrammetry and field surveys for any preliminary engineering work or analysis. In addition, TDOT also collected 10-inch resolution, color orthoimagery for a quarter of the State's land area every year. TDOT, other State agencies, and almost every county used this data as a common base map. While costly and time consuming, they produced a very good terrain model. Hydrologic analysis for bridges was limited by time and personnel resources. The type of data produced for this effort, while very accurate, was also limited in its geographic scope and resolution, which then limited the extent of hydrologic analysis.

The proposal for a statewide 3DEP program provided substantial benefits to TDOT. Since funding was the main challenge to the project, a multi-agency cooperative would be needed to make such a program palatable to TDOT's leadership. Dennis Pedersen, the State GIS Lead, put a great deal of effort into creating a collaboration, after which TDOT leadership was more comfortable investing in since multiple agencies "had skin in the game." TDOT would only need to contribute a third of the cost for each phase of data collection.

This investment is now beginning to show great returns. The TDOT Hydraulics Division is able to perform accurate analysis over a larger area, and in less time than they could have before the completion of the 3DEP project. This benefit alone comprises almost a complete return on TDOT's investment. The TDOT Aerial Surveys Office now relies on the 3DEP data for their photogrammetry work and has improved the accuracy of their imagery while reducing the effort to produce their product. As other divisions in the agency explore this data, they also capitalize on its capabilities. Soon, accurate LiDAR data will permeate every part of our design process, proving the initial investment a very wise decision.

Other News

Newly Available

Mobile Apps Case Study

A new case study report highlighting four State DOTs and how they have incorporated GIS-related mobile applications is now available on FHWA's website. To read this, visit: [https://www.gis.fhwa.dot.gov/case_studies/Mobile Applications for GIS Case Studies.aspx](https://www.gis.fhwa.dot.gov/case_studies/Mobile_Applications_for_GIS_Case_Studies.aspx).

Updated GIS in Transportation Website

The new FHWA GIS in Transportation Program website is now live—including a streamlined, easier-to-use set of program materials and general resources for GIS practitioners. Check it out at <https://www.gis.fhwa.dot.gov>.

Past Events

GIS-T Conference, April 2019

In April, FHWA's GIS in Transportation program attended and presented at the annual GIS-T Conference hosted in Champions Gate, Florida. An updated annual survey of participants will help inform topics for upcoming webinars, peer exchanges, and newsletters in this program.

Peer Exchange on Data Governance

In September, Arkansas DOT hosted a Peer Exchange organized by FHWA's GIS in Transportation Program. The exchange focused on ways to integrate data and put in place effective data governance policies, procedures, and infrastructure. A summary of this peer exchange will be made available on this page: <https://www.gis.fhwa.dot.gov/reports.aspx>.

Coming Soon

Peer Exchange on Enterprise Data Systems

In November of 2018, Washington DOT hosted a joint Peer Exchange organized by FHWA's offices of Transportation Safety and GIS in Transportation Program. The exchange focused on ways to effectively transition an agency from legacy systems to an enterprise-level GIS infrastructure and data use. A summary of this peer exchange will be made available on this page: <https://www.gis.fhwa.dot.gov/reports.aspx>.

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