Is Your City a Dinosaur in Disguise?

When it comes to asset management, spectacular achievement is preceded by unspectacular preparation.

By Ron Mattox

In June 2016, Ohio’s capital city beat 77 other municipalities for the U.S. DOT’s inaugural Smart City Challenge. Columbus is adding a $50 million grant to $90 million already raised to integrate self-driving cars, connected vehicles, and smart sensors.

Its goal is one virtually every city shares: to give more people, especially those in disadvantaged areas, access to jobs and health care.

Whether they know it or not, many cities have the same technology Columbus used to get a holistic and actionable view of streets, roads, bridges, routes, and facilities.

By housing information about all assets in a single database, cities empower multiple departments to collaborate on managing critical infrastructure.

“Asset management creates efficiencies by facilitating continuous planning, design, construction, and maintenance improvement,” says City of Columbus Division Administrator of Infrastructure Management Frank D. Williams. “It keeps everyone working at the most efficient level possible and eliminates conflict and redundancies.”

The process of gathering asset location and condition information into a single repository accessible to multiple departments used to be time-consuming and error-prone. Today, thanks to software that leverages highly precise mobile-collection technologies, data is easier and faster to gather and share and much more reliable.

Like Columbus, other municipalities can also plan for and finance a better future.

Data-driven Decisions for Today and Tomorrow

Indiana’s capital city also applied for the Smart City Challenge. Like Columbus, Indianapolis’s mission statement stresses the benefits of open data platforms and broader data-driven management decisions: “Connecting our systems of transportation, communications, emergency services, and data will enable the city to maximize resources, make smarter investments, and attract talent.”

Connectivity starts by assembling a database of pavement, utility poles and lines, guardrails, traffic signals and signs, sidewalks and federally compliant ramps, hydrants, manholes, curbs, gutters, parking meters, railroad tracks, trees, vegetation, buildings – anything publicly owned that contributes to the community’s quality of life.

Deputy Program Manager Randy Bowman says the Smart Columbus program will demonstrate connected vehicles along select corridors in the city.
“They must have an adequate amount of assets inventoried and a process to manage changes to the inventory during the demonstration deployment,” he says. “The processes to be developed will help ensure the success and sustainability of the demonstration through deployment and beyond.”

In 2013, retained Woolpert to conduct a pavement, sign, and sidewalk inventory and gather the data into a single database. At 400 square miles and 129,949 signs, it was the largest municipal asset inventory in the U.S. at that time.

We used lidar and digital photographs to catalog color, text, type, position, orientation, and condition. Pavement and sidewalk condition ratings were also key project components.

Public Works used the results to support automated methods of evaluating street sign retro-reflectivity per FHWA Manual on Uniform Traffic Control Devices (MUTCD) specifications. The rules have changed since then; municipalities can apply a retro-reflectivity value to each sign or replace groups of signs based on condition rating.

The database helps the department internally, with decision-making, and externally by justifying requests to stakeholders.

“The information shows city council we’re woefully underfunded,” says Deputy Director of Transportation, Engineering, and Operations Larry Jones. “It helps explain what we’re obligated to do and what we should be investing in, and gets their attention that the problems we have are tied to funding. We’re not doing rehabs; we’re doing Band-Aids.”

Risk is often defined as the probability of failure multiplied by the consequence of failure. Feeding condition data into an asset management program enables public works to prioritize where to spend limited rehabilitation funds.

Alexandria, Va., did this in 2013 with pavement quality and location. The resulting rankings were used to develop the most effective and efficient capital spending plan possible for street repair.

“When you have everything from a highway with alligator cracking to a back road with potholes, condition scores help identify what’s most important and when it can be repaired,” says Woolpert Program Director Steve Schwabe. “This way, you can achieve the level of service that your community expects of you.”

Emergency Response, Preparedness

Municipal asset information is also used to improve regional emergency response and recovery.

After Hurricane Sandy hit the East Coast in October 2012, Woolpert used lidar to gather topographic elevation data for the entire affected area: more than 250 square miles of coastline in Maryland, New York, and Virginia.

The U.S. Army Corps of Engineers (USACE) used the digital elevation models we created to visually evaluate, denote, and quantify damage areas, change detection, and remediation. The U.S. Geological Survey (USGS) had us collect similar information for several areas in New Jersey as well to determine erosion.

In October 2015, a 1,000-year rain event hit South Carolina. Within two days, Woolpert collected topographical data via aerial imagery and uploaded it to a publicly accessible website created and hosted at firm headquarters in Dayton, Ohio.

Maj. Bryan B. Tolar of the South Carolina Army National Guard says the website helped local governments respond to road and dam failures, brief officials, and give residents valuable information. In addition to addressing the immediate needs of those affected by the disaster, the collection documented the event, the topography, and assets for future study.

Opportunity Grows from Preparation
With asset data getting cheaper and easier to collect and coordinate, municipalities are gathering information that'll help them meet needs that don't yet exist.

As for Columbus, with its Smart City grant in hand, that data is the backbone of the U.S. DOT's plan to make it the first city to integrate self-driving cars, connected vehicles, and smart sensors into its transportation network.

"Effectively managing roadway assets is key to transportation innovation," Bowman says. "While the visual representation of assets will be GIS mapping, it will be supported by processes and procedures that ensure long-term sustainability."

"If there's good asset management and you have good people, you can plan and react so much better," says Williams, who oversees the city's infrastructure management. "But it takes coordination. Commitment to asset management gives you the best opportunity to be as efficient and as fiscally responsible as possible. In the long run, it does pay dividends."

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