GIS Technology Vehicle: “Superhero”

By day, the GIS Technology Vehicle supports asset mapping; by night, the vehicle serves as mobile command center for public safety operations in Monroe County, NY.

In 2008, a suspected drug dealer fled into one of Monroe County’s many wooded wetland areas. Winter snows covered the maze of frozen marshes and ponds, making pursuit dangerous for law enforcement personnel. The suspect’s body was found in the marsh the next spring. Officials in the county’s Department of Environmental Services (DES) believed the manhunt could have ended differently if their vast GIS and GNSS resources could have been put into the hands of public safety personnel onsite. The idea for a mobile GIS vehicle was born.

Monroe County, New York, is home to 750,000 residents living in 19 towns, 10 villages and the state’s third largest city, Rochester. More than a decade ago, the county launched an enterprise GIS based on the concept of two-way data sharing among the county and local governments. From the start, the county adopted Trimble GNSS technology to collect asset information to populate the GIS.

Today, the DES’ GIS Division (GISD) supports nearly every county office with mapping services. The department decided to improve access to data collection and GIS capabilities for the entire 1898 km² (733 mi²) county by taking the services on the road. Rochester’s Eastman Kodak Company made the concept a reality by donating a van.

Monroe County turned the van into a GIS Technology Vehicle by installing three workstations, ruggedized laptops, a 36-inch plotter, printers, a SmartBoard, big-screen monitor, radios and wireless communications equipment. The onboard computers use this communications link to access the enterprise GIS as well as the county’s GNSS base stations. During asset inventories, GIS feature layers can be updated from the field with data uploaded directly from the mobile GNSS receivers carried in the van. Data can also be broadcast to the county’s Emergency Operations Center (EOC).

The GISD rotates GNSS equipment from its main office to the vehicle, but it usually carries Trimble GPS Pathfinder® Pro XR receiver backpack systems and newer GPS Pathfinder ProXH™ receivers. These mapping receivers are used alongside Trimble GeoXT™ GNSS handhelds. The county has established three base stations including two Trimble R8 GNSS receivers. The survey rovers typically receive real-time corrections in the field through cell-phone connection, while data from the mapping receivers is post-processed in the vehicle with Trimble GPS Pathfinder Office software. In both cases, the GNSS data is differentially corrected before it reaches the enterprise GIS.

During the day, the vehicle works onsite at major engineering and construction projects, generating GIS maps of where utility assets and property boundaries are located. As construction progresses, crews capture as-built data with the GNSS receivers to instantly update the enterprise GIS. Accurate records of newly installed or relocated infrastructure are never more than a few hours out of date.

When not involved in a construction or repair project, the vehicle is dispatched throughout the county for asset mapping using the Trimble GeoXT GNSS handhelds. The vehicle was also used extensively during a county-wide project to extend fiber-optic cables to all towns and hamlets. The GIS shows the field crews precisely where parcel boundaries are so that trenching on private property can
be avoided whenever possible. And if field crews must enter a property, they can address the homeowner by name when making the request—thanks to the GIS database.

DES Senior Operations Manager Steve Schwartzmeier likens the vehicle to a "superhero" that has one identity by day and another on nights and weekends.

“It’s used day-to-day for just about any mapping service you can imagine [related to] county maintenance, operations and construction,” Schwartzmeier said. “Then at night, we serve a completely different audience, bringing a full complement of mapping capabilities to fire, police and Emergency Management folks.”

The vehicle is often requested by the Monroe County Director of Public Safety. These duties are typically divided into emergency and non-emergency assignments. The majority of the planned, non-emergency activities involve festivals and other public events that are likely to draw large crowds. The vehicle plays a critical role in coordinating public safety logistics in these situations.

At an annual air show, for example, the vehicle arrives in advance and its crew maps out the locations of vendor booths, power sources and staging areas, as well as public evacuation routes and emergency vehicle ingress/egress lanes. These points are added as layers to the GIS and maps are printed in the van for distribution to the public safety personnel who work the show.

At least once a month, the GIS Technology Vehicle is called to the scene of a rapidly evolving emergency. Recently, an escapee from a detention facility was eluding the state police. The van arrived just as the police lost their communications link to the EOC. They quickly moved to the GIS van for onsite command operations. GIS maps and color air photos of the area were printed onboard and circulated among the officers for use on foot and in the air. The result was an incident-free apprehension—a more positive outcome than the situation three years earlier that first inspired the van’s creation.

“The hard-copy maps we provided from our large-format plotter gave the officers a good feel for the surrounding terrain, and they made an apprehension within an hour or two,” said GISD Operations Manager Scott McCarty.

The GIS Technology Vehicle is a resounding success and is now in great demand county-wide. The van has saved thousands of personnel hours both in the field and in the office. Its greatest benefit is that it puts information—some of it potentially life-saving—into the hands of experts when and where they need it.

“We are able to get information out into the field,” said Schwartzmeier, “and good information supports better decision making.”