



WATER LOGGED

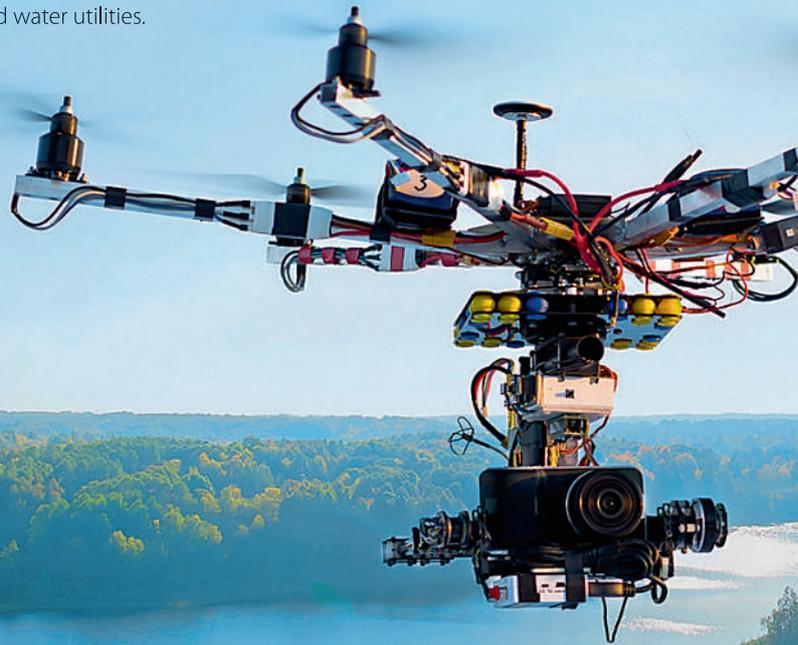
RACHEL RAYNER LOOKS AT HOW TWO SMALL US ORGANISATIONS HAVE USED UAVS TO HELP UNDERSTAND AND MANAGE THEIR WATER UTILITY ASSETS

Clean, fresh water is an essential most of us take for granted. Yet without constant work, it's one which we would not be able to enjoy. When staff turnover left one town unsure of the location of utility assets, they called in GEO Jobe UAV, a geospatial data provider based in Nashville, Tennessee. The firm provides high-resolution digital mapping products such as ortho-aerial maps, topographic data and models to public sector clients in local and county governments, as well as private sector clients in the utilities, engineering, construction and land surveying industries.

Jeff Lawrence, who heads UAV business development at GEO Jobe, says: "As a service provider in the UAV market, we're seeing a whirlwind of interest from communities interested in using aerial data for a wide variety of applications from improving

asset management to programming bus routes." Lawrence and the team were called to nearby Tiptonville to fill a vital gap in the town's knowledge. Like many towns that are too small for a public works department, Tiptonville relies on engineering consultants and UAVs to support the operations and maintenance of sewer and water utilities.

"The town realised they really didn't have a good idea of where all their water utility system assets were. They didn't know where some of their valves were, or where some of their manhole access points were." Looking ahead to opportunities to better understand, manage and upgrade their infrastructure, town leaders hired GEO Jobe to develop a high-resolution orthomap of the town's water utility infrastructure.



The team mapped the town in two days with a Sensefly eBEE Plus UAV and SODA camera, using checkpoints in Pix4Dmapper to validate the RTK GPS. Information was relayed back to the standalone base station via Bluetooth.

"We choose to set up a base station because we felt the local department of transportation's virtual reference system was not accurate: we weren't getting accurate readings or corrections. RTK opens

The team was able to develop the topo map of the town with 30cm contours in a couple hours, post-process the data within Pix4Dmapper and deliver the orthoimage within a week.

Lawrence concludes, "Mapping with UAV-based sensors and flexible, fast, post-processing tools is an affordable way to create basemaps and build a GIS for a fraction of what it used to cost. For small towns like Tiptonville, it doesn't make sense

"This is where we took the project further – we host the map on our servers, and the resort staff send us their stormwater data as they collect it, which we combine with their orthoimage. We spend a lot of time cleaning up their data, categorising it so they can show all their pipes that are of a certain material or a certain installation date," explained Lawrence. "Now, from their offices down in Florida, they can run a web-based app to review all the information. They're been using it for presentations to their board, and they use it to do their draining study and stormwater analysis."

Taking the technology even further, that same owner is looking to compile other layers of GIS data, such as local zoning ordinances, mosquito-spraying programmes and working on community-engagement applications. If there's a flash flood or a backed-up storm drain, a resident can simply tap into the community app to report the incident. Or the property maintenance team can push out information such as the beginning of a flood mitigation program or areas impacted by a recent rain event to alert residents and business owners.

Lawrence adds, "The basemap becomes a two-way source of conversation and connection between the community public works team and residents and businesses."

The utility of UAVs

More and more, UAVs are being seen as another tool in the toolbox for utility companies. They have proven their utility in supporting the people that support the infrastructure to work more quickly, more safely and more efficiently.

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up those areas without accurate reference systems, as you basically create your own base station and correct the output from that. It takes time to calibrate the base station, but the output is more reliable."

Lawrence believes the ability to quickly and affordably develop a micro-GIS is one of the greatest advantages of UAV technology for smaller municipalities. He adds, "Before UAVs and high quality microsensors, Tiptonville would have had to hire a plane to develop a topographic map – and they would have been lucky to get two-foot [60cm] contours, for a much higher cost and then it would have taken several months to produce."

to fly a plane. UAVs can do it faster, cheaper and more accurately." With the values and manhole access points mapped into the microGIS, the town can better manage its sewer and water utilities – and if something springs a leak, they'll know where to look.

Futureproofing below sea level

A resort community in Florida both defined by and threatened by the ocean which borders it. The 9km² property is essentially a small city with residential, commercial and recreational facilities such as golf courses along with almost a kilometre of beachfront.

"The resort is very flat and much of it is below sea level. Drainage and stormwater runoff is a major concern for them and they monitor it closely," says Lawrence. GEO Jobe's client wanted a high-resolution map to better assess potential stormwater issues. Before contracting the team, the resort staff had collected some key information with handheld GPS units, which GEO Jobe could process into an orthomap. The owner now has a comprehensive map of drains, manhole covers and the pipes used to manage the infrastructure and utilities assets.

