Take asset management to a new level with Microsoft Azure–powered mixed-reality solutions

When the Canadian company Meemim | vGIS began building the world’s first holographic GIS, they needed an affordable, scalable, and reliable back-end infrastructure. Whether supporting a local project or storing infrastructure information for a nationwide pipeline, vGIS must be capable of handling the workload. Additional complexity was introduced by the data storage requirements, as vGIS clients requested their data to be stored in specific regions.

vGIS is a visualization geographic information system platform that combines GIS data with information from multiple sources to create practical virtual-, augmented- and mixed-reality solutions. It literally lets you “see” underground pipes, cables, and other utility objects.

“A potent combination of two Microsoft technologies—Azure and Mixed Reality—allowed us take a futuristic idea and turn it into reality. Microsoft Azure played a critical part in creating a solution that can be scaled on demand to cope with clients’ requirements.”

– Alec Pestov, CEO, Meemim | vGIS
The range of data available—from information on human populations, to the layout of underground pipe and cable systems, to the geological composition of the land—means that geographic information systems (GIS) are used in every municipal department from education to planning, public works to utilities. GIS can also be integrated into a city government’s or utility company’s other computer systems to ensure that purchasing, asset management, planning, maintenance, budgeting, and crisis management are all better informed by detailed geographic and spatial data. This has significant and measurable effects on efficiency and helps avoid errors in decision making.

vGIS taps into the power of Windows Mixed Reality technology to deliver impressive visualization and productivity capabilities. Using live video feeds blended with spatial GIS information and 3D maps, it connects people within organizations, enabling powerful collaboration. Built on Microsoft’s technology with Azure, .NET, and Unity, vGIS is designed for the future.

Azure had enabled vGIS deployments to expand to five continents and sped up client onboarding. Because vGIS runs on Azure, no software needs to be installed, the solution can be scaled on demand, and clients can connect vGIS to the GIS back end in just minutes.

Most important technological trend in public works
Access to a GIS allows the user to capture, store, manipulate, analyze, manage, and present spatial or geographic data. In the past, managers, planners, and front-line municipal and utility workers had to consult vast numbers of paper maps or separate computer files containing different data sets. GIS technology allows these workers to apply and combine huge numbers of data sets, and overlay them on maps of any scale from an individual street to an entire municipality.

Employee-focused benefits
vGIS solutions are estimated to save 12–20 hours per person per month and prevent up to 50% of excavation-related accidents resulting from human error.

“Thanks to Azure, we are able to get new clients up and running in minutes almost anywhere around the world, providing better than 99.999 percent uptime.”

— Alec Pestov, CEO, Meemim | vGIS

“Meemim has pioneered vGIS technology, allowing organizations to literally ‘see’ underground utility locations in the field, via Microsoft HoloLens. Truly innovative, truly transformative.”

— Len Bundra, IT/GIS Director, Toms River MUA
Meemim vGIS in action

Municipalities and utility companies are tasked with the maintenance of vast networks of underground and above-ground infrastructure. This infrastructure is difficult to access - pipes, cables, valves, etc. are buried underground – and often complex, with multiple utility types positioned densely near each other. The combination of complexity and inaccessibility leads to high costs for any infrastructure-related initiative. Additionally, the inability of utility workers to directly see buried assets occasionally leads to excavation damages, estimated at $6B annually for North America alone. The traditional approach for locating utility assets relies on printed or digital maps in conjunction with specialized equipment such as electromagnetic locator or ground-penetrating radar. This process is inefficient and time-consuming, leaving room for human error.

Toronto Water is responsible for all aspects of the city’s water treatment, supply, and management. It oversees a large number of facilities and assets across Toronto, including treatment plants, pumping stations, water and sewer mains, laboratories, and yards.

Solution spotlight

The underground nature of public utilities infrastructure makes it difficult and costly to maintain. Excavation damage costs due to nonlocated assets are estimated at $3B–$5B annually in North America.

GIS data has a new purpose with greater productivity, improved data, a better connected workforce, and a far simpler deployment.

Workers in the field understand surrounding infrastructure up to 50% faster and reduce the number of field trips.

Improved data means validating newly captured asset location in real time and simplifying discrepancies.

Azure benefits

Scalability and manageable upfront investment made Microsoft Azure affordable for a startup without performance sacrifices.

Built on Microsoft technology, vGIS is designed for the future, and is able to support hardware that hasn’t been released or announced yet.

Azure accommodated the complexity of the needed infrastructure, including Cosmos DB, SQL Server, virtual machines, search and real-time networking engines, and geolocation of data.

“We see enormous potential for vGIS to improve field personnel’s productivity and safety. We look forward to the day when vGIS is in everyone’s hands.”
– Alec Pestov, CEO, Meemim | vGIS
Bill Shea, Director of Toronto Water, has a profound understanding of the need to innovate, and he recognized the value that mixed reality brings to the table. Bill connected with the Meemim vGIS Team, and after doing their necessary due diligence, TW initiated a pilot project.

The solution was vGIS Utilities – a mixed-reality holographic GIS application designed by Meemim Inc. While wearing the HoloLens, TW workers can see an unobstructed physical world in front of them as well as a holograph of the lines of wastewater pipes underground. The pipes are color coded and projected to scale, while remaining “world locked” in the same physical location.

vGIS Utilities provides companies with underground assets the ability to see through ground. This helps field technicians close service tickets more quickly by reducing the time required to locate assets by up to several hours on a single job. Additionally, vGIS Utilities helps avoid costly repairs and line breaks. A line break means that work comes to a halt until repairs are made and many breaks occur because the aboveground markings are inaccurate or incomplete. This can result in a simple mark up turning into a $23,000 repair.

Featuring stable and accurate holographic and augmented-reality projections, vGIS works on multiple devices—from phones and tablets to the Microsoft HoloLens. It features a patent-pending calibration process that allows high-precision locational and lateral accuracy to be established within seconds.

In addition to the time and cost saving benefits provided, TW sees vGIS Utilities as a tool for preserving knowledge as the workforce is bracing for a wave of retirements from the baby-boomer generation.

Meemim vGIS use cases

**Toronto Water**

Toronto Water will use Meemim vGIS for in-the-field holographic visualizations of serviceable objects—such as above-ground and underground pipes, cables, or valves—and their supporting information.

Toronto Water expects to increase the productivity and safety of its field workforce by equipping them with augmented reality tools to help manage underground infrastructure.

[Direct link >]

**Gas Technology Institute**

Meemim is partnering with Gas Technology Institute to bring mixed-reality GIS to the gas industry.

The new solution will be based on Meemim vGIS, which combines real-world environment, holographic projections, and cloud processing to deliver visualizations of above-ground and underground pipes, valves, cables, and other utility assets.

[Direct link >]

**OHM Advisors**

OHM Advisors is more than an architecture, engineering, and planning firm. They are a community advancement firm, designing award-winning work across the architecture, engineering, and planning spheres.

GIS is only as good as the data behind it. OHM can work with customers to optimize and enhance their GIS system to expand its capabilities and increase efficiency, saving both time and money.

[Direct link >]

© 2019 Microsoft Corporation. All rights reserved. This case study is for informational purposes only. MICROSOFT MAKES NO WARRANTIES, EXPRESS OR IMPLIED, IN THIS SUMMARY.