

How to leverage the power of GIS in capital program management



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When Global Positioning System (GPS) devices became widely accessible about 15 years ago, they combined with mobile networks to trigger a revolution in the construction industry. GPS technology in equipment like earthmovers, excavators, motor graders, and generators became commonplace, quickly becoming an efficient and low-cost means to guide and track heavy assets. They proved handy in executing daily tasks like surveys, field inspections, and progress reports. In the last few years, telemetry data has quickly enhanced the locational intelligence offered by GPS. This has enabled the minimization of asset downtime, reduced idle time, and changed business models. Mobile and GPS technologies have come together to create advanced Project Management Information Systems (PMIS). Today, these are being fused with Geographic Information Systems (GIS) to create powerful, cutting-edge PMIS.



GIS and its application in the construction industry

GIS tools provide a straightforward way for organizations like yours to capture, manage and analyze all types of digital data and overlay it on maps. They allow you to see spatial patterns and relationships between data sets in a broader geographical context. For example, you can observe and forecast traffic congestion as land use changes.

These insights can help set new priorities for infrastructure and facilities related to transport infrastructure in the public sector. GIS can impact the lifecycle of your infrastructure projects, starting with surveying, environmental analysis, and design, right up to construction, operations, and maintenance.

The COVID-19 pandemic has accelerated developments in the GIS space. With lockdowns and social distancing restrictions, the pandemic brought a halt to on-ground

data collection across industries. This forced several industries to tap into and integrate alternate data sources. The consequent developments set off in the GIS space promise to deliver a high impact on the construction industry.



The opportunity in GIS for the construction industry

A [recent study](#) on GIS in the construction industry found that the technology was being used by over 50% of designers for project planning and permitting, classifying land use, buildings, highway, and infrastructure. Over 40% of contractors were using it for site data collection and providing digital handovers of project information.

This data suggests that the true potential of GIS had not been tapped. Demographic and socioeconomic data, field data collection, monitoring the location and usage of materials and equipment to improve safety and security remain to be leveraged. This is despite the fact that more than 88% of GIS users reported improvements in project outcomes and other business benefits. What this indicates is simple—organizations need to build the expertise and resources required to leverage GIS effectively.



How should GIS and PMIS work together?

Today, construction management software is widely used to organize projects and capital improvement programs (CIPs). Simultaneously, geotagged data has become an important part of capital project lifecycle management. It, therefore, makes sense that PMIS be able to incorporate accurate, geotagged data into most activities. This data should also be easy for your users to access.

Here are some ways you can make GIS and PMIS work together:

- **Reports assigned to coordinates**

A good PMIS will have easy ways to digitally capture your field data, such as inspections, progress reports, digital images, and quantity tracking. All such data should be searchable by location so that, for example, all inspections performed on a particular bridge abutment can be recalled by searching within a defined geographic area.

When GIS is part of PMIS, there are several advantages for owners and managers of capital improvement organizations. For instance, they can not only verify that fieldwork was performed in the right location but can access detailed documentation and data for specific assets and events in a geographical context. This makes it easier to track project progress and hold staff accountable for their work.

- **Automatic coordinate capture**

Where information is being entered on GIS-enabled digital devices such as tablets or PDAs, coordinate and time information along with other land use, ownership, and documentation history should be captured automatically, without extra effort by end-users.

- **Useful reports**

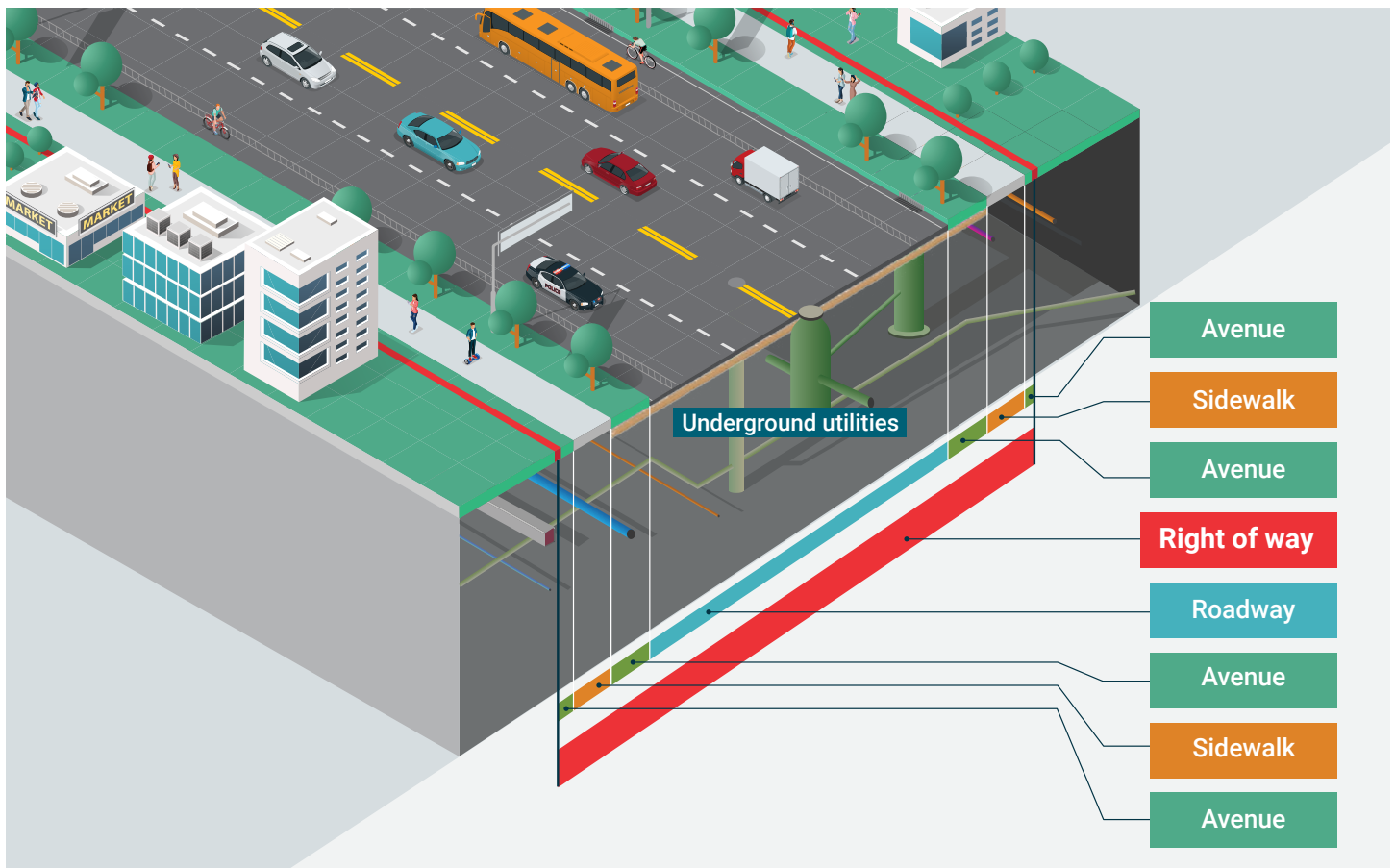
Geolocated digital information and images are not helpful to you unless they can be conveniently accessed. Besides searching by location, reports showing personnel location, tasks performed, equipment, and vehicles should be easy to generate.

- **Leverage existing investments**

Many organizations already have survey divisions, which represent major investments in equipment and skilled personnel. These resources become more valuable as GIS is used more widely within an enterprise. Likewise, large infrastructure organizations are likely to have invested in a GIS or are about to invest in a GIS. Having a comprehensive PMIS solution that incorporates coordinated information and asset data can enhance the investment in GIS software.



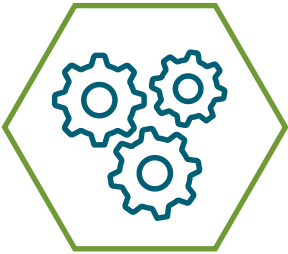
An example of GIS in Right of Way (ROW)



GIS has important implications for the Right of Way (ROW) management. ROW involves parts of project management, but it functions independently, outside the usual plan-design-bid-build-operate cycle. ROW can be as simple as procuring a single piece of land to build a parking lot on or involve a hundred properties on the side of a road if a local administration is widening it. In these cases, each property is almost like a mini-project with an assessment-valuation-offer-negotiation process that involves considerably complex paperwork. A good ROW management tool streamlines this and keeps everything in one place instead of having hundreds of folders in a shared directory on a shared folder containing all the individual documents.

Imagine your project managers or ROW agents having to check the status of hundreds of properties. It is easy for them to lose track of the paperwork and authorizations required. It is therefore handy for them to bring the data up on a map, so they

immediately know they are discussing a property, say, in the context of the corner by the big intersection or the property next to the school. Otherwise, the data is just a list of names and property IDs with no context. Managers have to jump to [ESRI](#) and manually match them.



ESRI integration

GIS can integrate with ROW, exposing ESRI layers to show the latest existing or planned land inventories, utility lines, water pipes, and other geophysical information. The advanced GIS features can be game-changing. They provide a contextual view of the entire project, daily events, assets, financial data, etc., through information overlaid on a geographical map, aiding in real-time decision making. This makes it easy for managers to plan and execute their ROW and land use plans. It is equally helpful for the project management or the construction phase.



Regulatory compliance stored in one place

It is advantageous to have a capital project management system that can store surveys and visual mapping of each parcel of land data using ESRI ArcGIS, which can be accessed in one place. This can aid your project team to have a clearly defined project boundary and obtain necessary approvals and guarantees so that a signoff is never lost.

The benefits of GIS are obvious, especially in enhancing operational performance. Admittedly, there are traditional challenges that obstruct the implementation of innovative technology—incompatible systems, systemic complexity, and culture being some of them. But they can be overcome. Data and technology are transforming every industry. Adjacent industries, most notably logistics, manufacturing, mining, and quarrying, have made considerable progress in using GIS to improve scheduling, cut costs, drive efficiencies, and work smarter to meet client expectations. Public-sector construction and engineering is ready for that revolution.

About Aurigo Software

Aurigo builds software that helps build the world. Aurigo is an AI-native company that helps capital owners connect planning, construction, and operations in a single environment, improving decision-making and execution. Trusted by over 300 organizations across infrastructure and facilities, Aurigo manages more than \$450 billion in capital programs, with over 40,000 projects throughout North America. Aurigo is a privately held U.S. corporation headquartered in Austin, Texas, with global offices in Canada, South Africa, and India.

Learn more at www.aurigo.com

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Schedule your demo today to learn how Aurigo Masterworks Capital Planning Solution can help your organization streamline information, accurately track and forecast, prioritize projects and help you save time and money.



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