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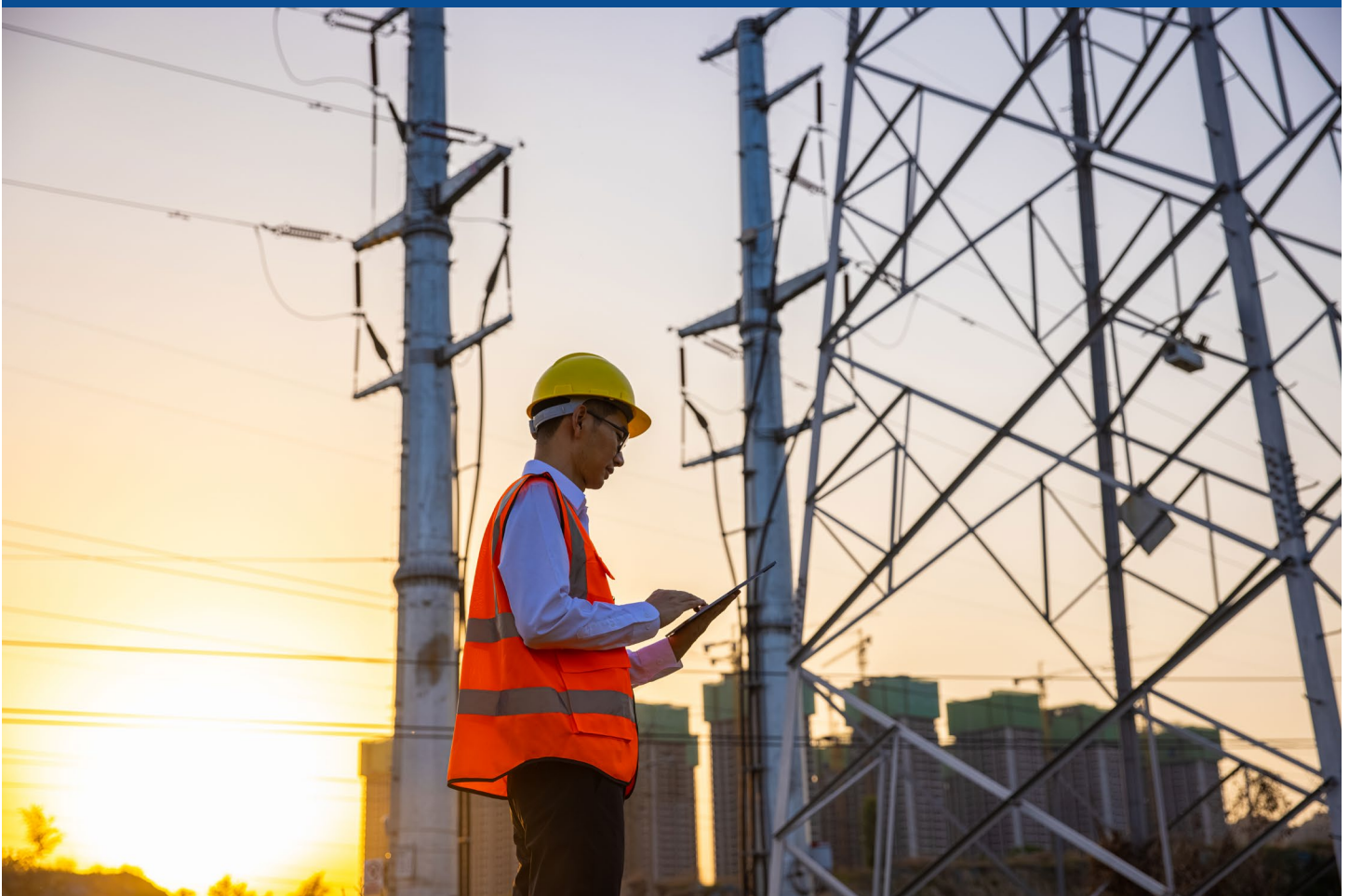
Improve Safety, Reliability, and Performance by Spatially-Enabling the Enterprise

Introduction

Around the world, utilities face multiple transformations and disruptions – from network modernization to climate change, distributed generation, and net-zero goals. Moreover, extreme weather, balancing supply and demand, and shifting consumer expectations only add to the complexity of a growing market. Indeed, the global utility market continues to prosper, with 2022 estimates at nearly **$6 trillion** and a compound annual growth rate (CAGR) of 7.9%.

And as the energy industry evolves, business leaders recognize that digital transformation—leveraging data, applications, and insights—is paramount to remaining competitive in a digital economy. Specifically, they are becoming data-driven in everything they do.

In a time of rapid change and opportunity, successful companies will employ enterprise IT to support a sustainable future that focuses on safety, reliability, and performance. In doing so, they'll meet mission demands, ensuring greater customer value, operational efficiency, continuity of services, and financial success.

A major catalyst for forward-thinking utilities is geospatial technology. Modern GIS brings together people and processes by tapping into the locational aspect of data. Utilities can connect everything from enterprise systems such as ERP and CRM to external sources like live weather and traffic feeds, IoT, customer devices, drones, satellites, and open-source data contributors. They can perform sophisticated location analytics, real-time situational awareness, and high-powered visualization to gain new insights and communicate results using data maps that are immediately discernable and shareable.

A modern GIS platform helps companies optimize the performance of utility networks, grow the business, and deliver superior service using complete information. The result? Energy organizations meet business objectives now and into the future using a spatially enabled enterprise that improves safety, reliability, and performance.

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A time of unprecedented industry change

The energy industry is in the beginning stages of a once-in-century period of change. Companies are setting net zero goals to combat climate change and severe weather. Renewable energy and carbon reduction regulation will continue. Prioritizing sustainability, they are building digitally savvy networks that rely on sensors and replacing aging assets and infrastructure to increase efficiency, lower emissions, and reduce risk. And in response to an aging workforce, they are looking to digitize and codify staff knowledge, expertise, and know-how.

In addition, customer demands have evolved, with a new generation of experience-driven consumers seeking utility services that operate more like the digital brands they love (think Apple and Google). IoT, machine learning and AI, mobile apps, and live data feeds continue to increase and become the norm in daily consumer life.

And to successfully navigate through the complexity of modern-day market influences, more businesses today are investing in technology. These investments frequently result in the acquisition of disconnected systems

Utilities face formidable challenges:

- Grid and network modernization
- Safe delivery of a commodity
- New business models
- Sustainable and renewable energy
- Lower disruptions/increased performance
- Affordable, quality service
- Climate change/extreme weather resilience
- Operational efficiencies

that operate independently; and while most utilities today maintain GIS applications, they often function outside the mainstream of the IT enterprise. This separation often results in data duplication, latency, and inaccuracy, which causes poor decision making and a lack of transparency. That's where modern enterprise GIS can help.

Why location matters

Modern GIS addresses these issues and more by connecting your systems. It provides a model-centric GIS that replaces traditional project-oriented GIS. Modern GIS enables you to develop, model, and maintain even the most sophisticated networks. Decision makers improve how the business operates and increases value to the customer.

Because utility processes revolve around all aspects of location—from where assets exist, to where events occur, and where future opportunities exist—GIS continues to provide value to energy businesses. Utility networks, service territories, staff, equipment, customers, competitors, the environment, and employees all have a location.

Using location intelligence and maps helps everything from grid modernization to emergency management to developing digital twins and new business models. Location analytics provides insights that stand out from traditional methods. And maps translate data into visual intelligence that improves communication, collaboration, and engagement.

Forward-thinking energy companies use GIS externally to engage customers, providing additional value to their services. Customers benefit from intuitive information using maps from the web. They see the progress of projects in their neighborhood or report a streetlight that is out. And they can report the location of a "wire down" or "gas odor" so their utility provider can immediately respond—creating a modern experience similar to their favorite consumer brands.

Modern GIS spurs your cutting-edge initiatives and consumer-focused strategies because it's no longer a departmental solution but an enterprise system. It can be deployed in the cloud, on premises, or as a hybrid approach. Web services make it possible to use geospatial applications and real-time location information across the enterprise.
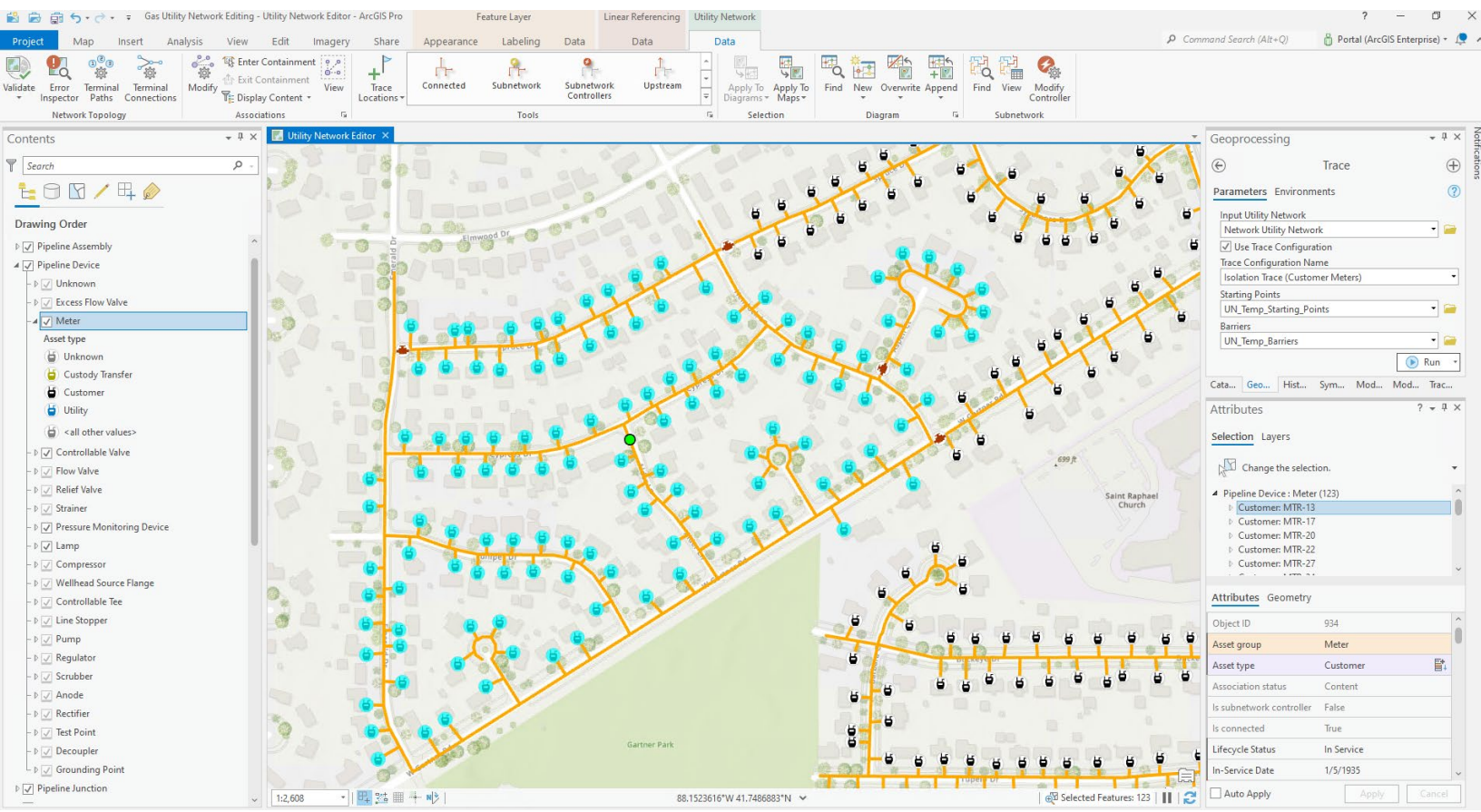
Safety

Above all else, every utility's mission is to provide the safe delivery of a commondity. And the complexity of modern utility networks only makes matters more difficult. Utilities face enormous risks from natural disasters, potential accidents, and other threats while managing high-voltage lines, flammable gas, and aging assets, making it challenging to assure the health and safety of employees, customers, and communities.

installed and optimized correctly to reduce potential system disruption and hazards. In addition, external data sources can be provided to field workers, dispatchers, and planners. This can prove particularly important during an outage, storm, or catastrophic event.

Challenges to delivering safety

- Aging assets and networks
- Inaccurate, out-of-date, and paper-based maps
- Disconnected systems, applications, and data
- Lack of field mobility tools
- Fast-changing regulations and requirements

The good news? Modern geospatial technology can help. The more utilities take advantage of location in their data, applications, and systems, the better they can mitigate, prepare, and respond to risk. Moreover, the better they can share information in real-time and collaborate using intuitive maps, the less likely it is they will face fines, isolate customers, or diminish their brand. As a result, you reduce the potential harm to people, property, and the environment.

When effectively deployed, modern enterprise GIS helps increase real-time situational awareness. You can integrate geospatial tools, ERP, and a work management system to provide a clear, location-based view of developing maintenance plans. You can assess the network (gas, water, electric, etc.) and whether it was

Location-based solutions are far-reaching. **Mobile GIS technology** provides data to the field and enables timely data exchange back to the enterprise. **Dashboards** can be configured to show where accidents, outage, or network disruptions have occurred, including safety violations and near misses. They also display real-time situational awareness in the event of an oncoming hurricane, wildfire, or other natural disasters, as well as large-scale emergencies that can potentially cause harm to the community.

Spatial analysis lets you look at clusters and trends, such as customer outages, downed poles, gas main leaks, and automotive collisions, to discover patterns that may require further investigation. **Mapping tools and location intelligence** provide visual insights to prioritize people, equipment, and resources that optimize operations and identify issues that need mitigation.

Modern GIS enables safety measures using:

- Enterprise connectivity to systems

- Advanced asset and network analysis

- Timely, accurate, and complete digital data capture

- Mobile field service mapping that works offline

- Enhanced data capture, monitoring, and reporting

In addition, GIS helps in all phases of **regulatory compliance** and reporting. For example, you can better track key performance indicators, such as OSHA recordable accidents or near misses.

You can use GIS technology and techniques to meet requirements around knowing the exact location of assets. This includes coordinates above and underground, what type of asset (a gas pipe, transmission lines, water main) exists, who installed it, their qualifications, when it was installed, as well as asset maintenance history.

Location-based tools and intelligence improve:

- Employee and customer safety

- Risk reduction and emergency response

- Accident prevention and reporting

- Community engagement

- Regulatory compliance and reporting

Omaha MUD Delivers Safe Operations | Read the Case Study

Reliability

Thoroughly intertwined with safety and performance, reliability involves optimizing the utility network to ensure service delivery in the most proficient manner possible. Yet guaranteeing the lights and gas turn on—and stay on—at the lowest possible rate remains as difficult as ever.

Gas utilities today have more significant regulatory mandates requiring more research, materials verification, tracing, and asset accuracy. On top of that, they struggle to build new networks and perform leak management, asset inspections, and other duties often because they lack trust in antiquated asset data or documentation. Likewise, electric utilities must grapple with sustainable energy transition, grid modernization, incorporating increasing percentages of renewables, and evolving business models. And for both, reducing cost, time, and complexity only increases the need for operational efficiency.

The key to overcoming these challenges today? Good data. And geospatial technology can unlock every organization's information in one application. That's because modern GIS helps companies capture, connect, manage, analyze,

and display data using location. As a result, they empower everyone in the asset lifecycle, from engineers designing new networks to executives planning investments and determining ROI, field workers performing installations and maintenance, and operations staff monitoring commodities. With modern GIS, companies can build and maintain high-functioning systems that deliver high-value service.

The benefits of service reliability

- Adherence to sustainable energy requirements

- Improved commodity delivery

- Increased regulations and government oversight

- Enhanced data transparency and completeness

- Lower costs, fewer disruptions, and better service

Better data

Now more than ever, modern GIS delivers reliability through innovation. Because GIS connects with systems such as enterprise asset management (EAM) and work order management (WMS), data can flow in between applications. As a result, you streamline processes and workflows and work cross-platform on mobile, desktop, and web-enabled devices.

And with modern technology and implementation patterns, you can increase capabilities while at the same time achieve IT simplification and reduced costs. You ensure your GIS can scale with the rest of your infrastructure because you're not tied to legacy technology. And the development of proprietary solutions that work well with open-source data and technology gives you even greater flexibility.

Better processes

Geo-enablement supplies real-time operational awareness for enhanced decision support. It enables comprehensive customer location analysis to lower costs, reduce inefficiencies in commodity delivery, and identify areas vulnerable to service disruption and time-to-restoration.

For instance, gas companies can gain a more accurate understanding of pipes, mains, pressure, and other characteristics using GIS. They can capture information, such as a gas utility pipe age, soil composition, and more, from the field for verification using GIS mobile applications. And mobile GIS works in disconnected environments for leak surveys, vegetation management, and service restoration during emergencies.

Electric utilities can better monitor their KPIs for evaluating reliability. For example, they can visualize the system average interruption duration index (SAIDI) and system average interruption frequency index (SAIFI), then analyze geographical areas to assess causes and identify where mitigation efforts need to be focused.

Brookings Municipal Utilities Streamlines Processes | Read the Case Study

Performance

Increasing a utility's performance involves many factors. Improved service efficiency, exceptional customer care, maximizing resources, and developing new business models require new ways of thinking and doing.

GIS meets these needs and more. That's because modern mapping and geo-enabled intelligence delivers insights you won't find in legacy or departmental GIS. Today's geospatial technology enables business users to discover patterns, make connections, and unearth relationships among networks and assets. It helps managers to optimize and deploy assets, workers, fleets, customers, competitors, and new business ventures—all using location.

Moreover, today's GIS offers more robust analytics and real-time modeling that helps operate today's complex electric and gas networks. Fast and scalable, it provides a foundation for connecting weather, traffic, and vehicle location services, as well as real-time data from the Internet of Things (IoT) sensors. When you add machine learning, big data analytics, and image processing—you have the ideal solution for mining data for actionable information.

Using enterprise GIS to connect corporate systems that provide a complete customer picture, including business interactions and service consumption, results in better service and exceptional customer experiences. And data maps and location intelligence are an inherently faster, more intuitive way to gain understanding and situational awareness.

Using data maps and location intelligence, you can:

- Modernize gas and electric infrastructure
- Improve transparency and engagement
- Enhance asset inspections, upgrades, and repairs
- Develop new business models and services
- Increase customer care and brand loyalty
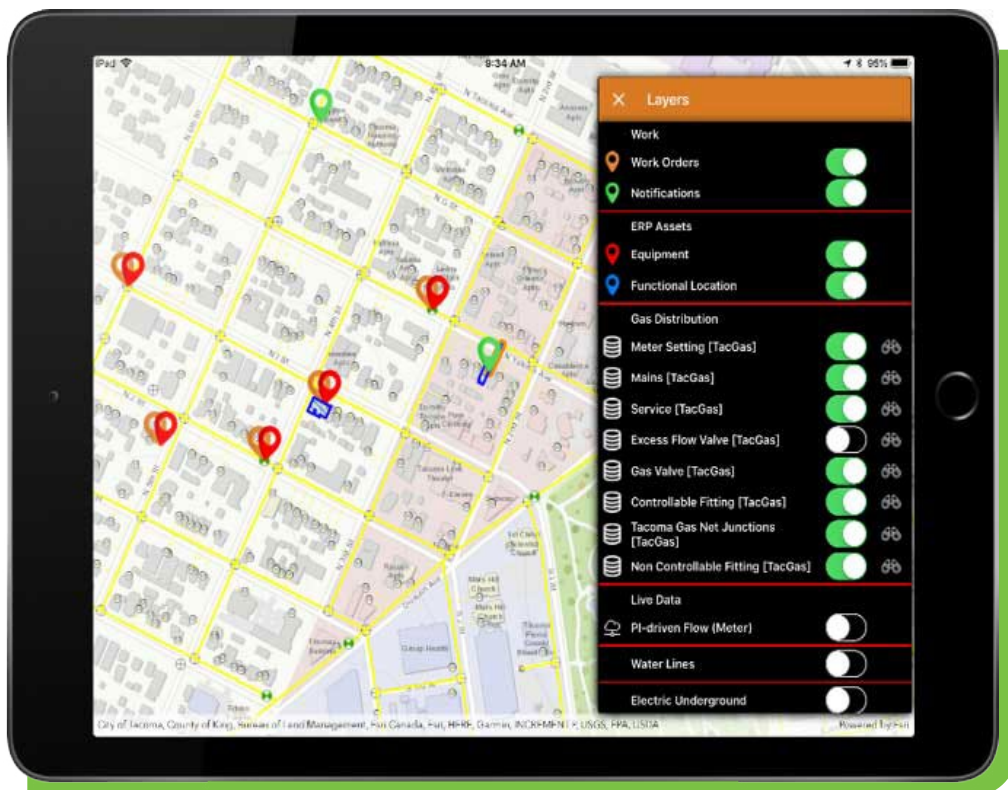
Paper-based methods, departmental GIS, data silos, and independent applications impede workflows and processes, adding additional steps and time. They inhibit coordination and communication and compound inefficiencies that result in more expensive commodities, disruptions, and customer dissatisfaction.

Network performance

GIS allows you to discover relationships between planned and unplanned construction and maintenance. You can also design and manage distributed energy and generation at lower costs. Location-based asset management allows you to proactively inspect and update assets before system failure and design networks that meet business and regulatory requirements.

Asset management

Maps can pinpoint customer usage and potential business opportunities across the service area. Staff can then begin asking questions: what areas have the highest use? What assets have poor performance? And why? Where are new, existing, and potential consumers? What areas of the population have the highest risk of service disruption?

Customer care

Enterprise GIS—with web services, dashboards, and portals-- can coordinate operations and overcome the lack of communication between systems for improved customer management. Service operators can manage customer calls to offer new programs and incentives available in the area or answer various questions, such as the locations of existing or forecasted weather-related outages.

The Use Case Benefits of Modern GIS for Utilities | Read the Blog

Modern GIS

Connecting the enterprise

Virtually every utility employs some GIS software applications. Modern geospatial transforms typical departmental GIS into a spatially enabled enterprise. It brings together previously separated systems such as advanced distribution management systems (ADMS), building information management (BIM) systems, supervisory control and data acquisition (SCADA), and ERP-based applications like work management, asset management, and customer financials. In addition, it can connect to CRM using location for incorporating customer data into a myriad of processes.

Spatially enabling the enterprise facilitates instant access to maps and asset locations and attributes. It georeferences data to enable location analytics and visualization into business processes.

Utility Network

Modern GIS, specifically deploying the Esri ArcGIS Utility Network (Esri UN), supplies high-fidelity models that accurately depict the components of the utility network. It allows organizations to maintain networks based on attributes and features that match the physical assets and align with the representation of

those assets in other information systems. It can integrate and analyze large-scale datasets and imagery for even the largest utilities.

Moreover, the Esri UN marks a dramatic shift from the traditional map-centric approach to a model-centric GIS. Companies can rely on accurate digital simulations for what-if scenarios, predictive analytics, and more.

Digital Twins

Modern, open geospatial systems combine CAD, remote sensing, imagery products, and more for a holistic solution. Operators can use digital tools, automation, and data management techniques to streamline processes. Companies supplant manual methods that require physical travel to inspect the network with a highly accurate 3D digital representation of the utility network, buildings, service territories, and more.

Modernize Your Enterprise | Read the White Paper

Modern mobile mapping

One of the most powerful aspects of GIS today involves mobile mapping, changing how field workers perform duties and enabling operational agility. Modern mobile mapping supplies verifiable fieldwork records to perform tasks, limit liability, monitor contractors, and meet regulatory requirements.

Using disparate systems and paper-based asset management in the field leads to data inefficiencies, data inaccuracies, and data latency. This results in a lack of confidence in asset data and delays in as-builting and redlining. Different mapping and asset applications that require flipping between multiple screens do little to improve a field worker's tasks and can meet with adoption resistance.

Mobile mapping solutions today supplant paper-based methods and the use of multiple apps. Fitting seamlessly in an organization's IT ecosystem, they provide staff with a singular user experience that combines GIS, work order management, and other applications to the field and back office. Workers can take advantage of relevant tools and data to do their job efficiently. Whether for work order or asset information, staff can easily collect field data and document work completed.

Moreover, with the ability to work in both online and offline environments, crews can easily view and update remote assets as needed for inspections, asset verification, modeling, and more. Teams can digitally document ground conditions and redlining using online maps.

The result? Optimized asset information and work processes that fuel both business and IT initiatives, ensuring process integrity and giving enterprises a reliable data foundation.

Mobile GIS improves how companies:

- Perform work in both online and offline environments
- Accelerate construction to as-built in record time
- Capture and correct data in the field
- Reduce errors in performing and recording work
- Ensure adoption and minimize training
- Provide critical asset data to improve work outcomes
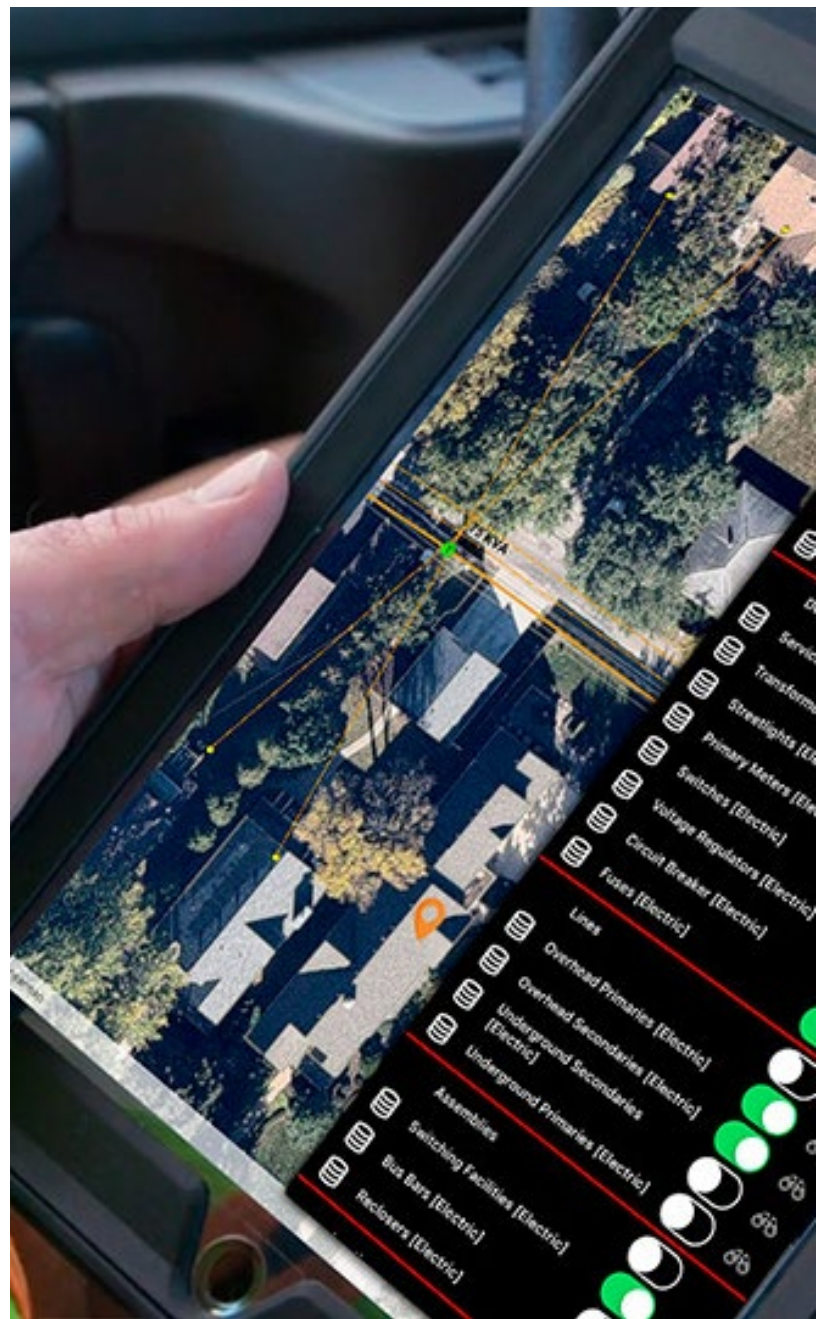
Maximize Your Investment

While more utilities are investing in IT, most projects fail or struggle, from a lack of clear business objectives to poor project scoping or simply automating obsolete processes. Indeed, an estimated **61% of projects** take longer than expected, and 57% don't meet goals.

That's why utilities looking to maximize their GIS value turn to Locana. As a trusted advisor with decades of experience and expertise, we have worked with U.S. and international utility clients of all sizes. We employ a unique delivery model and a tailored strategy to address your business problems and opportunities. And our proven delivery practices ensure projects come in on time.

Locana can serve you throughout the entire project lifecycle:

Our dedication to "owning the customer mission" means we build and innovate a project on time, on budget, and on target to deliver better business outcomes. Locana consultants, technologists, project managers, designers, developers, and industry experts bring world-class knowledge and skills in mapping and location intelligence, from proprietary GIS to open applications and data.

We work with you and listen first, then design and deliver an efficient, effective, and streamlined implementation that ensures lower acquisition and total ownership costs. We can customize solutions using cloud-native, mobile applications, and much more. And because we employ agile methodologies, scrum, and other project management techniques, you gain continuous visibility and feedback.

Why Locana?

- Extensive GIS and IT consulting experience
- Proven track record delivering self-sustaining, self-sufficient projects
- Leading industry knowledge and experience working clients
- Dedicated to transparency and ownership
- Side-by-side collaborators with a flexible approach

| PLAN | MAP | ANALYZE |
| ENABLE | INTEGRATE | BUILD |

Drive Digital Transformation with Locana | Read the Data Sheet
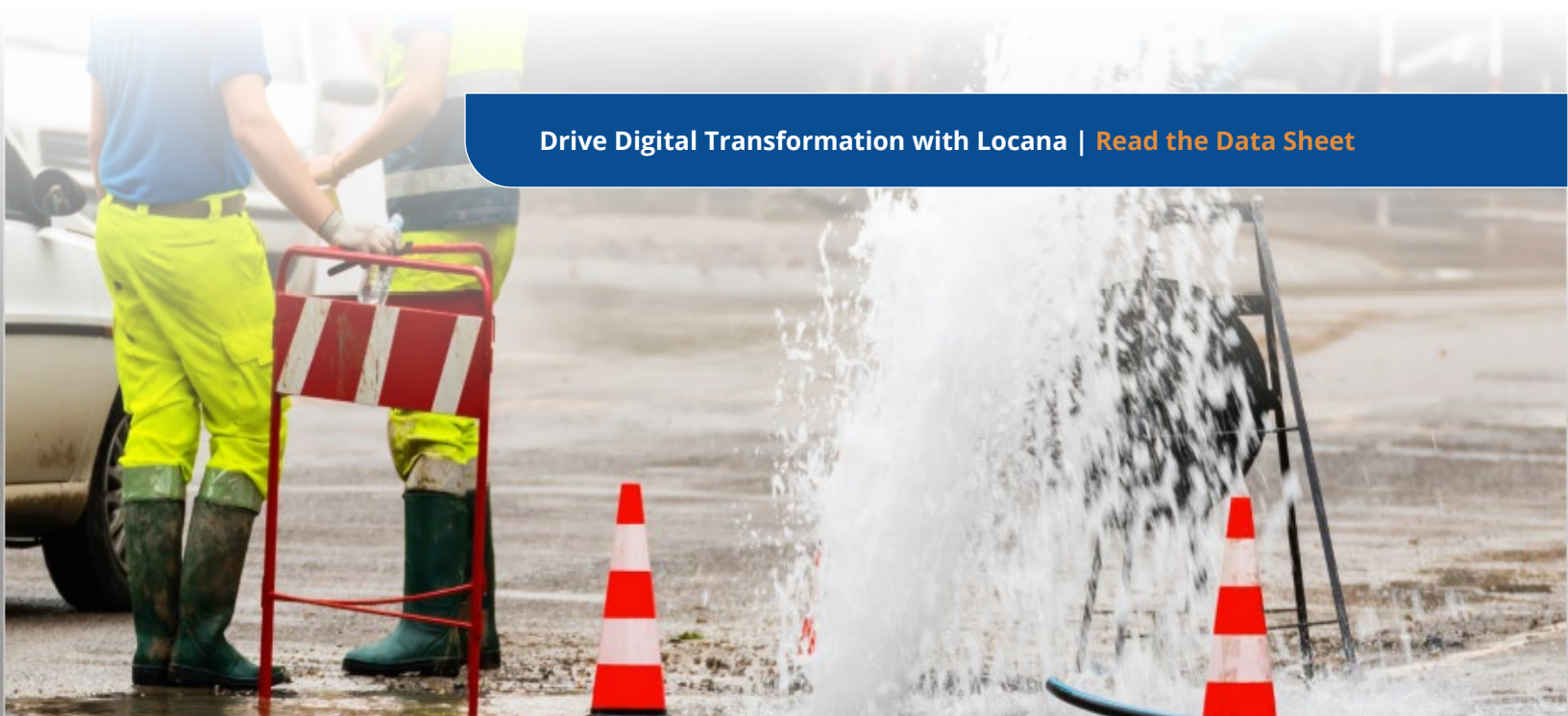
About Locana

Locana, a location and mapping technology company, provides software products and services that solve the world's most pressing business, climate, and social challenges. With decades of experience, Locana is a global leader in both enterprise geospatial solutions and innovative applications using proprietary and open-source mapping technologies. By taking a location-first approach to problem solving, Locana builds, implements, and connects solutions for public and private clients, in a wide range of domains including: utilities, land and facility management, critical infrastructure, defense, conservation, international development, and technology, among others. With headquarters in Greenwood Village, CO, the company also has major offices in Seattle and London.

Locana

Learn more about how you can deliver safe and reliable operations with integrated GIS for field workers.

Locana.co

info@locana.co

303-713-3230