INCREASING PRODUCTIVITY WITH OPERATIONS MANAGEMENT AND GIS

A How-To Guide for Local Governments

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Think back to a time before smartphones. You carried a mobile phone to communicate and a paper map to navigate. Now you can make your calls and get your directions on one high-powered device. In a similar way, there was a time when operations management and GIS existed on separate platforms. Now, they can work together seamlessly, multiplying the effectiveness of each other.

Limited budgets and the rapid pace of 21st century digital change make it difficult for local governments to keep up, let alone stay ahead of the curve. But, the importance of connecting enterprise technologies is widely acknowledged—and grows wider by the day.

Any asset management approach that relies solely on operations management or GIS will soon be obsolete. The goal of this paper is to help you understand why pairing operations management and GIS systems together is the most effective, efficient, and productive way to manage the day-to-day operations of high-performance government.

What does the new era of operations management and GIS look like?

How does a smart operations management-GIS connection increase productivity for municipalities, especially in an era when citizens demand more impact with fewer resources? It helps to examine the two categories independently before outlining what a smart linkage looks like.

Operations Management

Operations management for local government is a set of integrated, multidisciplinary strategies for maintaining, upgrading, and expanding physical assets throughout their life cycles. The fundamental goal of operations management strategies and the technologies that support them is to preserve and extend the service life of assets. This is accomplished by intervening at strategic points in an asset's normal life cycle in order to improve its performance.

[GIS] Geographic Information Systems

GIS allows users to visualize, question, analyze, and interpret data to understand relationships, patterns, and trends. As a mapping tool, it is essential to understanding what is happening and what will happen in geographic space. GIS is also used to improve fleet performance and record keeping by documenting status and change of geography. Overall, effective GIS integrates separate municipal databases (including those stored on obsolete technologies) into a centralized whole.

In other words, no one system can do it all

Each public asset in your inventory has a spatial location that plays a key role in your ability to effectively manage it. Operations management on its own lacks the accurate geospatial capabilities necessary for optimal processes and workflow. GIS on its own lacks the rich detail that enables smart, data-driven budgeting and decision making.

- GIS allows for the consumption of spatial and non-spatial attribute information about assets.
- GIS allows for analysis of assets in context with each other, especially with regard to proximity.
- GIS also offers advanced analytic capabilities found outside many typical operations management approaches, including network analysis, routing, flow analysis, and spatial correlation.
- Operations management can provide functionality lacking in GIS for asset management, namely preventative maintenance scheduling, asset health information, inspection and work history, work management capabilities, and future maintenance planning tools.
- GIS can provide very basic operations management functionality, but not nearly enough to support the needs of today's growing high-performance governments.
- When GIS is paired with a true operations management system, the power of both systems is compounded.

The 6 key principles that underpin operations management and GIS management:

1. Recognize and optimize the useful life of assets and the money invested in them.
2. Increase collaborative efficiency between municipal departments.
3. Combine mapping, scheduling, and asset management databases into a powerful integrated whole.
4. Simplify the inspection, maintenance, installation, and repair processes to ensure public assets are functional and safe.
5. Supervise and support your employees in the field.
6. Track assets and management expenses effectively and efficiently.

Aren't traditional operations management and GIS approaches enough?

No. Prior to new operations management and GIS technologies, municipal operations and their data existed in separate silos with virtually no chance of thoughtful integration. Emerging computer technologies through the end of the 20th century made these tasks easier, but still failed to address integration and many other major issues. Standard mainframe computing, for example, cannot supply the level of granular detail and accurate data—updated to the very minute—that today's software solutions offer.

Old asset management strategies are no longer efficient, or sufficient, for meeting modern high-performance government goals. Outdated mapping and charting technologies lack the GIS muscle to improve communication between teams, departments, disciplines, professional fields, organizations, and the public. Esri and Cartegraph's operations management and GIS solutions create a dynamic flow of information between users at all ends of municipal government operations.

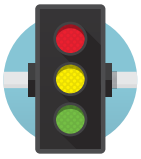
What makes technology-driven operations management and GIS so effective?

- **Empowers better asset management decisions from the office to the field.**
  Crews can eliminate duplicate work, while utility and public works managers can deploy and maintain assets more efficiently.
- **Creates more of an impact with fewer resources.**
  Implementation of GIS alone results in a savings of up to 30% in operational expenses through a reduction in fuel use and staff time. With the added power of operations management, Esri and Cartegraph technologies take these savings even further.
- **Creates an unprecedented level of municipal data integration.**
  GIS assists in areas ranging from locational coordination to disaster preparedness. Operations management facilitates informed, data-driven decisions that integrate departments, initiatives, and budgets.
- **Provides modern tools for creating benchmarks and measuring outcomes.**
  Continuous operational improvement becomes easier to achieve due to the improved degree of monitored progress.

What makes technology-driven operations management and GIS so effective? (continued)

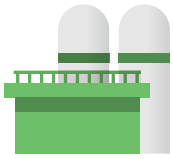
In local government, operations management is applied to nine major asset categories:


Transportation


Signals


Parks & Rec


Walkability


Facilities


Sanitary Sewer


Storm Water


Water Distribution


Flood Control

GIS is applied to four major areas:

1. Municipal mapping
2. Analysis of asset proximity
3. Project planning and tracking
4. Maintenance schedules and daily fleet movements

Where should high-performance organizations begin?

The creation of a coordinated operations management-GIS system poses logistical challenges even for high-performance organizations. Taking stock across the board of strengths and challenge areas marks a sensible starting point—especially in terms of budgets, fleet management, asset tracking, and mapping. While there is no universal solution that fits every department in every local government, these key questions can help frame the way operations management and GIS are applied together:

1. Where do our cost challenges exist?
2. In what areas do our independent GIS or operations management solutions need additional focus and improvement?
3. Which asset management procedures are clearly out of date?
4. To what extent are we completing crucial tasks, such as fleet maintenance and responding to citizen requests, in a timely and efficient manner?
5. What goals do our elected officials, department heads, and crews share for bringing asset management and mapping capabilities into a state of better coordination?

Where should high-performance organizations begin? (continued)

When combined with the answers to the questions above and followed in order, these eight best-practice steps result in an operations management-GIS strategy tuned to your organization:

1

Collect and enter data.

Smart operations management and GIS are powered by data—current, accurate data that tells you exactly what assets you have and where they're located. Collecting good data is crucial to making good decisions. This data will help you implement a productive operations management strategy while GIS assists in tracking and deploying assets across a municipal-wide network in real time.

2

Take stock of your operations management and GIS information holes.

GIS on its own can't always do the heavy lifting required for superior asset tracking and management. Yet public infrastructure assets by nature have a spatial location, something asset management alone doesn't always consider.

3

Know how operations management and GIS best work together.

Operations management excels in the areas of preventative maintenance scheduling, asset health information, inspection and work history, work management capabilities, and future maintenance planning. GIS also offers advanced analytic capabilities like network analysis, routing, flow analysis, and spatial correlation.

4

Valuate assets, evaluate location.

Valuation is an essential operations management step because it requires you to prioritize your assets and the resources necessary to sustain them. Consider the asset's purpose and place in your infrastructure, but remember: location of an asset is a key attribute in any asset inventory. GIS allows for the consumption of spatial and non-spatial attribute information about assets.

5

Train staff in the new technology—but keep it simple and quick.

Equip the entire team with support technologies like mobile apps. With a few taps, field professionals can map the best routes around traffic or, if need be, quickly find equipment rental services and options.

Where should high-performance organizations begin? (continued)

6

Put into practice.

Install, maintain, inspect, and, if need be, replace your assets—then consider their place and spatial relationships on the map grid. Start with a simple plan to multiply operations management efficiencies with GIS technology. Then do it all again for every network and every asset, especially as mapping depth increases. Pairing GIS with a true operations management system elevates the power of both platforms.

7

Follow through.

Smart operations management-GIS coordination is the byproduct of patience, planning, and execution. Regular, proactive monitoring is the key to working efficiently and the easiest way to ensure that department workers perform to your satisfaction.

8

Reiterate as part of an evolving tech-based strategy.

Monitor your progress regularly—monthly or at whatever interval makes the most sense. Use the information to fine-tune your strategy and implementation as demands and data feedback change over time.

Do you know your users?

Technology doesn't guarantee operations management strategy success. Before choosing a system or solution, it's absolutely crucial to carefully consider the needs of the people who will use the system on a day-to-day basis. Ideally, the system you choose is capable of simultaneously meeting the needs of people in different roles and at multiple levels of your high-performance organization.

What users need to find success with operations management technology:

FIELD PROFESSIONAL

- **Easy to learn and use.**
  Straightforward, intuitive, and friendly. No tech savvy required.
- **Optimized for the field.**
  Streamlined workflow enables users to complete work accurately and on time.
- **Real-time tasks and data.**
  Easy access to real-time data via tablets and smartphones.

SUPERVISOR

- **Quickly assign work.**
  Create and assign tasks to field professionals in real time.
- **Gauge progress.**
  Immediately see the progress and status of tasks and work orders.
- **Plan ahead.**
  Plan, group, and relate tasks to maximize efficiency.

GIS ADMINISTRATOR

- **Tight integration.**
  Bolsters the accuracy and value of the exisiting geodatabase.
- **Shared access.**
  Enables non-GIS users to benefit from existing maps.
- **Protection and security.**
  Review new data and edits before they're published to the geodatabase.

DIRECTOR

- **Simple reporting.**
  Easily gather and filter data and create detailed reports.
- **Advanced analytics.**
  Understand exactly how time and money is being spent.
- **Better decisions.**
  Accurate, timely data makes for well-informed decisions.

CHIEF INFORMATION OFFICER

- **Bolster communication.**
  Use real-time data to inform the public of work progress and statuses.
- **Improve customer service.**
  Respond quickly and accurately to citizen inquiries and concerns.
- **Share success.**
  Tell your community when goals are achieved and efficiencies are gained.

IT

- **Minimal deployment and maintenance.**
  The system does the heavy lifting.
- **Maximum security.**
  Complete control of security and permissions. Minimal administration.

What are the traits of good operations management technology?

Just like operations management strategy itself, there is no "one size fits all" system. However, there are steps that high-performance organizations can take to avoid mistakes and overcome the challenges associated with researching, selecting, and implementing the right operations management technology.

Things to look for when choosing an operations management system:

USER-CENTRIC DESIGN

When choosing an operations management system, consider the ease of use and intuitiveness of its design. A clean and simple interface enables workers to concentrate on the task at hand, rather than trying to muddle their way through inefficient software that makes tasks more difficult to manage and complete.

MOBILITY

The operations management system you choose needs to provide optimal power and functionality for the mobile workforce. Look for a system that performs as well, or better, on a mobile device as it does in the office. That way, no matter where the asset is located, your mobile workforce has everything it needs to access and complete work accurately and on time.

DATA ORGANIZATION

Does the system make it easy to input, view, and find data? If not, look elsewhere. Quick, easy access to well-organized data, such as a particular asset's work and inspection history, helps your team to make well-informed decisions when performing their work in the office or on the go.

ADAPTABILITY

Identify your technology needs today and consider how those needs might evolve in the future. Use that knowledge to choose technology that has the ability to expand and grow with the needs of your community and the operations that service it.

INTEGRATION

It takes more than one system to keep an organization running efficiently. Operations management is the place where all those enterprise systems connect. The right system integrates easily with everything from your fuel management system to your 311 request platform, and will share data with them in real time.

CROSS FUNCTIONAL

Any operations management system must be able to meet the needs of multiple departments and areas of your organization. Organization-wide thinking—along with the communication and collaboration that makes it successful—isn't possible using a system that creates data silos. Productivity and decision making improve when every user has access to the best data available.

Now You Know

Now that you have a basic understanding of the what, why, and how of operations management-GIS in the 21st century, you can begin thinking about how your high-performance organization can integrate best practices to become more effective, efficient, and productive for your citizens. With the insight, answers, and steps outlined in this paper, you'll position yourself to make better decisions about when and where to begin implementing operations management-GIS strategies with smart technology into your day-to-day operations and save money while doing so.

Operations Management and GIS: The Power of "And"

Operations management and GIS systems perform well on their own. GIS on its own is also good. But put them together and you've got something great. Why run two good systems separately if you can integrate them and create a more powerful system that empowers you to capture data, analyze it, and prepare for the future?

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Cartegraph is in the business of building high-performance government. They offer software solutions that help local government agencies manage their physical assets and associated operations. With Cartegraph, users optimize the life of their infrastructure, deploy maintenance resources efficiently, and increase productivity.

To build high-performance governments, Cartegraph uses a comprehensive, three-pronged approach that combines success coaching, expert consulting, and state-of-the-art software solutions for asset, work, and resource management to help agencies capture data, analyze it, and prepare for the future. For more information, visit cartegraph.com.