Telematics for Public Works Operations

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For public sector fleets, data-driven operations are critical to optimizing costs, maintenance, performance and more

But many organizations lack reliable data to inform their decisions. Telematics solutions fill the gap, providing the insights needed to improve operations and future planning for everything from winter maintenance to emergency events.

Since the industry is constantly evolving, one of the biggest challenges agencies face in managing their fleets is staying on top of changes to both technologies and associated regulations. Organizations confront ongoing transformation, including the adoption of digital vehicle inspection reports (DVIR), changes to emissions mandates, the introduction of electric vehicles, and evolving data security trends and requirements.

Driving much of this change is the ever-increasing strength of networks, particularly the shift to 5G, which presents unprecedented new opportunities for internet of things (IoT) connectivity. Against this backdrop of disruption, government agencies must evaluate their technological needs, priorities and goals and choose the best solution to optimize their fleet.

As you consider which telematics solution (also known as GPS-based automatic vehicle location, or GPS-AVL for short) to implement, there are countless factors to consider, and you may be comparing features across several different vendors. This guide breaks down the key questions and issues you'll want to keep in mind, and concludes with a checklist to ensure you're making the right decision for the long haul.

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CHAPTER 1

How telematics can help improve public works fleet efficiency

Telematics solutions are an important part of operations management for fleets of all shapes and sizes. For public works fleets especially, telematics can be incredibly useful in boosting efficiency for seasonal and ongoing maintenance vehicles.

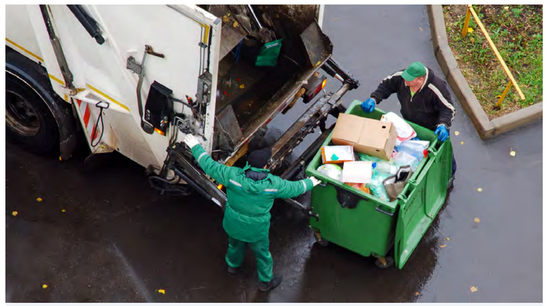
Complex fleets, like those that support winter operations, often require sophisticated integrations to properly manage their programs. But with so many different metrics to track, choosing the right technology becomes crucial for government agencies.

Telematics delivers benefits for every type of public works operation

Winter operations

- Integrates with spreader controllers to monitor material usage
- Tracks route completion in real time for transparency and compliance
- Automates common workflows to improve customer service

Learn how MassDOT uses telematics for their winter operations



Waste & recycling management

- Integrates with dashcams for real-time video streaming
- Tracks fuel usage, idling trends and driving behaviors to reduce fuel costs
- Optimizes routes for reduced mileage

Discover how the City of Spokane went paperless for their waste programs

Water, utilities & road maintenance

- Delivers complete visibility of workforce for faster emergency response
- Provides rugged devices to track vehicles in harsh conditions
- Enables predictive maintenance for improved uptime and driver safety

Find out how the City of Austin weathered winter storm Uri with telematics

Parks & recreation

- Supports vehicle-sharing and motorpools for cost savings and efficiency
- Offers insight into fleet usage to aid in rightsizing
- Reduces downtime for improved customer service

California Department of Conservation gains real-time fleet visibility with telematics

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A telematics solution designed to meet the unique challenges of public works fleets offers multiple benefits for managing operations, allowing you to:

Improve operational efficiency and drive down costs

- Monitor and control a material (salt, sand, etc.) usage
- Use data on fuel usage and idling to cut fuel consumption and assess electric vehicle suitability

Missouri DOT uses telematics to break down reporting silos

Monitor operational status and levels of service

- Manage entire fleet through a single, consistent system
- Monitor route completion and individual vehicle functionality

Arlington County is all about accuracy in operational reporting

Promote operator safety

- Track unsafe driving behavior and customize driver training
- Provide in-vehicle driver alerts and receive instant collision notifications

Franklin County takes driver safety to the next level with telematics

Improve citizen satisfaction

- Increase transparency by publicly sharing vehicle locations and route completion
- Improve public safety by enabling citizens to plan their routes based on real-time data

Charlottesville, VA building public trust through telematics

Gain insight into vehicle location

- Track precise location and route of every vehicle in real time
- Dispatch efficiently based on complete visibility of fleet

Sacramento County making data-driven fleet decisions

CHAPTER 2

Telematics against the elements: Winter operations

Exploring the benefits of telematics in winter road maintenance helps illustrate how the right solution can streamline large, complicated public works operations with data-driven insights.

Winter driving conditions pose great risks to citizens, and it's the job of winter operations fleet managers to do everything in their power to mitigate these risks. Well-managed winter operations are pivotal for ensuring the safety of all motorists, and citizens at large.

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While safety comes first, winter operations fleet managers are also responsible for meeting environmental compliance mandates and managing operational costs.

Let's look at how telematics helps manage these multiple obligations, allowing you to:

Monitor fleet health

When snowy weather hits, winter operations fleet managers must be prepared to spring into action.

Fleet managers can use telematics to understand vehicle faults and diagnostics and monitor sub-optimal vehicle performance for indicators of pending failures.

It's also easy to develop preventative maintenance plans based on real-time data, ensuring snow removal equipment is available when needed.

Dispatch efficiently

Even the best plans sometimes need adjusting due to unforeseen situations.

If public works operators need to dispatch a vehicle to help with a tough assignment or replace another shift, telematics delivers the visibility required to make an informed decision based on the proximity of all available assets.

Knowing the exact whereabouts of their vehicles enables fleet managers to make any necessary changes without slowing down snow clearing.

Efficient dispatching – whether planned or unplanned – also promotes increased operational cost savings.

Monitor material usage

Winter operations staff are responsible not only for providing clear roadways, but doing so in a sustainable way that avoids excessive material usage.

Research has clearly shown that the overuse of de-icing agents poses harm to the environment and human health by contaminating groundwater and the soil.

Telematics provides winter operations staff with insights from the controller, such as solid application and liquid application rates.

With these metrics, operators can make informed decisions to help safeguard both our motorways and the natural environment.

Assist with dispute resolution

Telematics offers winter operations staff a tool to support or refute malicious claims.

The combination of plow position status, spreader controller data and precise vehicle location with an exact timestamp helps paint a detailed picture of all vehicle activity at the time of a claim.

There's evidence that the use of telematics helps reduce the cost of fleet collisions.

Strengthen compliance and accountability

Telematics solutions allow public works staff to access live service maps to view real-time compliance to levels of service (which also includes route completion metrics).

To go above and beyond for the community, they can make service-level information available to citizens via public information systems.

These systems give motorists mobile application and website access to updated data on snow removal status.

With this type of information in hand, motorists can plan their commutes to avoid potentially dangerous roadways.

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CHAPTER 3

Adapt your fleet operations to every situation with telematics

Telematics solutions can improve today's public works operations and tomorrow's planning.

To maximize service and cost savings, public works service agencies and contractors must carefully allocate the resources they have available now while planning for the future. The right telematics solution improves operations in all three categories of public works events:

Planned events occur based on schedules, such as solid waste pick up, most street sweeping and mosquito fogging. They are predictable and make up the bulk of activity.

Urgent events such as snowfall or post-storm debris removal are expected, but it's impossible to pinpoint when they're coming.

Emergent events are outside the normal scope of a public works agency's planning. These include both urgent events that grow past typical scale – like several feet of snow in an area that typically sees inches – and events outside the usual public works scope, such as natural disasters, pandemics and citizen unrest (riots).

Planned Events

For planned events, municipalities and other agencies can use telematics to support scheduling, equipment purchasing and preparation.

Through telematics, public works leaders can confirm that equipment is in good working order prior to being dispatched for specific work to keep daily service on track.

Telematics can also benchmark the capacity of current staff and equipment to verify the need for additional government resources, or reallocate existing resources to other projects when excess capacity is detected.

When combined with Geographic Information Systems (GIS) mapping of routes and service locations, a telematics solution can give real-time feedback on completion rates and allow agencies to proactively detect missed service and insufficient resources before citizens complain.

Urgent Events

Urgent events present a public works agency with some of its biggest challenges. A fresh snowfall, new storm damage or a community event that leaves significant damage are all examples of urgent events.

By providing insight on route completion, fleet location and more, telematics helps agencies measure their event response and meet levels of service.

Telematics solutions also enable agencies to benchmark the clean-up or repair activity for reporting back to their public funding source, highlighting a clear return on investment for taxpayers.

When there are damage claims against public works agencies during urgent events, telematics can help clarify whether their fleet vehicles were involved, what speeds they were traveling and whether driver behavior played a role.

Emergent Events

In emergent events, public works agencies are first responders and need situational awareness.

They're often asked to work outside their usual jurisdiction doing things they don't normally do. During the recent COVID-19 pandemic, for example, many agencies were pressed into service transporting medical equipment, PPE and supplies.

Telematics offers vital insight to both emergency management groups not familiar with an agency's public works assets and that agency's leadership. They can visualize their shared assets and make informed decisions much more quickly.

For this reason, many regional governments will cooperate to purchase telematics that allows them to see their entire asset pool in one single view.

Whatever the situation, public works operations can be improved with telematics. Being able to plan work, execute the plan and allocate resources all requires data that can most easily be generated by telematics. Systems integrations with work order management, GIS and public information software can also deliver additional value.

CHAPTER 4

A decision-maker's checklist for choosing a telematics solution

Now that we've covered why telematics is so valuable for public works operations, let's explore how to choose the best telematics provider for your agency or organization.

There are countless factors to consider, and you may be comparing features across several different vendors. This checklist breaks down the key questions and issues you'll want to keep in mind.

1. Clarify your objectives and requirements

Planning and future-proofing your public works telematics program starts long before you select a vendor. First, you have to understand the current challenges and mandates that are driving your agency to explore telematics. Defining your priorities, strategies and business goals is crucial before you can find a partner that supports and empowers you to achieve them. It may be helpful to consider how vendors measure up in the following areas:

Security

Ensure potential providers have robust data security policies, the highest possible cybersecurity standards and necessary certifications (for example, FedRAMP).

Safety

Evaluate telematics providers' capabilities in areas such as safe driving reporting, risk management summaries and vehicle inspection reporting with centralized data.

Fleet optimization

Assess vendors' ability to minimize costs by tracking variables such as idling, fuel efficiency and engine data for preventive maintenance.

Compliance

Investigate vendors' capacity to streamline fleet compliance with features such as electronic logging and integrated vehicle inspection applications, as well their ability to provide the tools to prove public works activity compliance against required levels of service standards.

Expandability

Consider whether a solution enables expansion through features such as third-party device integration, hardware add-ons and integration with OEMs, and whether it provides an interface with the solution platform to obtain data and/or build solutions as an extension of the platform (i.e., Software Development Kits [SDKs]).

Sustainability

Explore vendors' available tools to support environmental sustainability – such as fuel consumption reports and compatibility with electric vehicles/hybrid electric vehicles – and their ability to provide electric vehicle suitability assessments.

2. Identify key vendor attributes

Successfully implementing a telematics solution requires an experienced, reliable and results-driven partner. Identify vendor criteria to eliminate some of the guesswork as you evaluate various vendors' offerings.

3. Consider case studies

Working through a successful path to procurement ensures your telematics program implementation is completed on time, stays on budget, complies with regulations, and achieves near- and long-term success. Ask for evidence on how a vendor has helped other public works agencies succeed.

4. Define your key measures of success

What does successful implementation look like for your agency? Understanding the answer to that question will help you make a purchasing decision that ensures a smooth onboarding process, complete stakeholder buy-in and satisfaction, and easy agency- wide adoption of your new telematics solution.

5. Understand how you'll be supported at every stage

Customer support is a critical component, from day one onward. For onboarding: will your vendor support you with project management, solution engineering, field service and training programs? And for post-deployment, will they offer account management, solutions engineering, technical support and ongoing education?

CHAPTER 5

How to successfully implement telematics in your fleet

Apart from choosing a telematics provider, implementation is one of the most daunting tasks for a fleet manager. Telematics solutions dramatically alter public works fleet management – for the better, no doubt – but change is always difficult in complex operations.

As technology changes, fleet managers also need to retrofit their fleet with replacement hardware. Mandatory cellular network turn downs (2G, 3G and eventually 4G), the addition of electric vehicles, additional sensors to satisfy the security requirements of a logistics contract or even adding public works functionality are examples of events that would trigger a fleetwide retrofit.

The current, and most urgent, example is the planned 3G cellular network shutdown in the U.S. This technology sunset requires many fleet managers to replace their older devices. It also presents them with the opportunity to upgrade their solutions.

Public works operators have enough on their plates with constantly changing technology and compliance requirements.

These 11 steps will help ensure a smooth rollout during a large telematics implementation:

1. Know the size and shape of the project

It sounds like an oversimplification, but taking the time to document a complete vehicle list, home location for each vehicle, vehicle availability and the existing installation is key to the rest of this list. Be sure to remove any vehicles from the list that will be decommissioned before the end of the upgrade window and plan for new additions that will be coming in during the same time.

2. Review your solution

Take a hard look at the data and insights you're receiving from your solution so that you can take advantage of additional functionality you may not have needed during the initial installation. For example, has driver behavior proven harder to coach than anticipated, triggering the need to add camera technology? Would you gain market share by adding temperature sensors to your refrigerated trucks? Now is the time to make those changes.

3. Appoint a project manager at every partner organization

This is an often overlooked step that can prevent problems from occurring in the future. The end-customers and any other interested parties like third-party installers should each set a project manager for the implementation.

4. Establish and keep a communication rhythm

Weekly meetings with all project managers and other stakeholders offer the assurance that no more than a few business days will go by before everyone can discuss an issue. Even if there's very little to discuss, keep the schedule going. Some of these meetings will be five minutes long and some will be an hour. It will all depend on the nature of what's going on that week, but constant communication is critical.

5. Develop a statement of work, and keep it updated

One of the project managers should take the lead in developing a project plan or statement of work that outlines who does what, key deliverables and deadlines. By agreeing to these specific goals in advance, and making the inevitable changes together, the working group can avoid confusion and hold each other accountable.

6. Develop field best practices

Before undertaking dozens or hundreds of vehicles at a time, the team should develop a step-by-step description to remove the old device, install the new one and any new add- ons, document the installation and update the portal. Existing documentation can serve as a starting point, but specifics will need to be discussed. Using an assembly line approach is often effective.

7. Create a job aid

By documenting the best practices developed above, the project management team can turn any employee with basic mechanical skills into an installer. When a small number of vehicles can't practically be brought into a central location or a third party must be hired, a thorough job aid can provide training before the installation and accountability after. Setting good expectations for the final product is always a good idea.

8. Plan the whole project, and update it often

After establishing procedure and a job aid, but before fully diving into the installation project, the project management team should update the statement of work to include estimated installation timelines for each site and vehicle type. This plan should be examined at least two weeks in advance of any planned activity to ensure any needed hardware can arrive on time and there are no last minute surprises.

9. Review as you go

Don't wait until the last installation to review deliverables. One member of the project management team should be responsible for confirming that no mistakes have been made in naming vehicles by comparing vehicle name, VIN and device serial number to confirm they're all showing up as expected.

10. Never stop retrofitting

Each time a device is reinstalled into a new vehicle, it should be evaluated to confirm that the cellular network technology is viable for the projected life of that vehicle. Additionally, evaluate whether it supports any potential add-ons or changes and is in good working order. The more devices you upgrade ahead of time, the more risk you can mitigate.

11. Leverage OEM technology

Take the time to work with your provider to understand the data that comes from OEM telematics units (from vehicle manufacturers) so that you're ready to leverage the insights. If your project is delayed due to extreme weather or other factors, knowing which vehicles can leverage OEM telematics will empower you to use them and reallocate your installation resources to those that can't. Fleet managers can use OEM technology on new deliveries of vehicles to quickly deploy them, and then replace them with a more robust implementation as resources allow.

CHAPTER 6

Geotab Public Works

A smarter, more intuitive solution to manage costs, material usage and compliance

Geotab Public Works is a scalable and robust solution for government fleet management. It helps government agencies manage vehicles such as salt spreaders, snow plows, street sweepers and waste management vehicles.

Watch this video to learn more.

Available in the MyGeotab software platform, the Geotab Public Works solution supports timely servicing of all infrastructure while controlling costs, tracking material usage and more. Separate government fleets by databases or have a full view of all fleet types in one database. Customize and align the Geotab Public Works solution to your government needs and fleet goals.

But don't just take it from us. Our customers say it best.

Missouri Department of Transportation

Maximizing data value with a statewide telematics solution

The Missouri DOT needed to break down information silos created by multiple telematics solutions from separate vendors. By adopting a single, centralized Geotab platform, they can now capture information statewide and maximize the full potential of the data gleaned from fleets across 114 counties. Geotab Public Works:

- Delivers “heat sensor” map overlays for driver congestion
- Provides visibility into mobile workforce in areas such as fuel usage and driver behavior
- Enables automated vehicle location services, dispatch, and vehicle diagnostics

“Geotab has provided us with a system to manage the safety, productivity and utilization of our diverse fleet.”

Paul T. Denkler, P.E. Assistant District Maintenance Engineer for MoDOT’s Central District and team lead for MoDOT’s AVL/GPS group.

Town of Blacksburg

Moving from assumption-based to data-based decisions

The Town of Blacksburg used to rely on rough measurements and manual observation to determine how much salt its fleet used for winter operations. With Geotab, management can now make decisions based on real-time data, even in a rural area with connectivity issues. Geotab Public Works:

- Enables consistent uptime by using the cellular carrier with the best coverage
- Offers IOX add-ons for monitoring material usage in winter operations
- Delivers automated, customized reporting for increased transparency

"This is the first time I've ever worked with a company as knowledgeable and helpful as the team at Geotab. No matter who I speak to, or what issues I may come across, the entire team is ready to help at any time. It's a relationship I truly look forward to continuing for many years into the future."

John O'Shea, Safety and Special Projects Manager for the Town of Blacksburg – Department of Public Works

Massachusetts Department of Transportation (MassDOT):

Balancing safety, efficiency and sustainability

The Massachusetts DOT is using telematics paired with Automatic Vehicle Location (AVL) and GPS equipment to tackle one of the central challenges confronting winter operations professionals: monitoring and reducing road salt usage. With an advanced telematics solution, they can:

- Easily access granular information such as precipitation type and intensity, road conditions and dewpoint
- Enable data-driven decisions about the most effective and least environmentally damaging methods for clearing particular road types
- Offer access to live service maps to view real-time route completion tracking

"Now we can see the precise location of fleets, measure vehicle performance and evaluate operator behavior. All of this information helps us optimize performance and manage operating costs."

Mark Goldstein, MassDOT
Highway Operations

Learn more about Geotab Public Works.

About Geotab

Geotab is advancing security, connecting commercial vehicles to the internet and providing web-based analytics to help customers better manage their fleets. Geotab's open platform and Marketplace, offering hundreds of third-party solution options, allows both small and large businesses to automate operations by integrating vehicle data with their other data assets. As an IoT hub, the in-vehicle device provides additional functionality through IOX Add-Ons. Processing billions of data points a day, Geotab leverages data analytics and machine learning to help customers improve productivity, optimize fleets through the reduction of fuel consumption, enhance driver safety, and achieve strong compliance to regulatory changes. Geotab's products are represented and sold worldwide through Authorized Geotab Resellers.

To learn more, please visit **www.geotab.com** and follow us **@GEOTAB** and on **LinkedIn.**

This white paper is intended to provide information and encourage discussion on topics of interest to the telematics community. Geotab is not providing technical, professional or legal advice through this white paper. While every effort has been made to ensure that the information in this white paper is timely and accurate, errors and omissions may occur, and the information presented here may become out-of-date with the passage of time.

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