Roadway Safety Request for Information & Ideas

Massachusetts Department of Transportation

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BD 24 1030 CP01 CP01 97530

GEOTAB

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Introduction

Please find enclosed Geotab's response to MassDOT Roadway Safety RFI-012924. Ranked as the #1 commercial telematics vendor worldwide by ABI Research, Geotab has over 4 million connected-vehicle subscriptions processing over 75 billion data points daily, Geotab's telematics solutions help customers make better data-driven decisions, to achieve their productivity, safety, and sustainability goals. Our experience in the government space is unparalleled in the industry. Geotab has recently been awarded a new single-source contract by the General Services Administration (GSA) to provide telematics solutions for over 400,000 federal GSA-leased and agency-owned vehicles, and we also recently announced that surpassed the 1M public sector connected-vehicle subscriptions mark.

Geotab is the single-sourced state provider to California, Minnesota, Ohio, Illinois, North Carolina, Colorado, Oklahoma, Nevada, Missouri, Connecticut, Wyoming, and has over eleven state Dept of Transportation clients, including the two largest TxDOT and CalTrans. Our success in this market is based on Geotab's unique open platform for fleet management, ensuring easy integration with the Geotab Software Development Kit (SDK) and APIs. Geotab's integrations include ESRI, Chevin, FleetIO, and AssetWorks, and additional integrations include in-vehicle cameras, real-time temperature tracking and tire pressure monitoring, as well as innovative mobile apps, third-party integrations, business services and more.

Geotab is trusted with sensitive government data for clients such as the Army, Navy, Air Force, Marines, and Department of Homeland Security. Our certifications and authorizations include ISO/IEC 27001, FedRAMP, FIPS 140-2, and the Cyber Essentials Certificate.

The Geotab solution is currently available on the State of Massachusetts Operational Services Division Telematics Contract and is the current telematics provider for the Massachusetts Department of Transportation, amongst other Massachusetts State and local agencies. Many of the items referenced within this response are available today through your current deployment.

Geotab's Response to Civic Research Questions on Telematics

1. What are we able to learn about the relationship between distracted driving and land use (or other variables)?

Camera technology is a MyGeotab Add-In that uses machine vision and AI to provide insight on risky driving behavior throughout your fleet. The solution can be configured to provide audio alerts signaling risky driving events including location, and provide live-stream footage from road-facing and in-cab cameras.

Integration with the MyGeotab platform means that companies can manage all fleet cameras from a single cloud dashboard. Through email alerts, containing video footage of risky driving incidents and location, businesses can use it to work with employees to help boost safe driving habits.

Benefits of distracted driving cameras for safety

Distracted driving cameras can be used to help coach drivers, enabling them to identify and reduce risky driver behaviors, including distracted driving. Here's how driver coaching and intelligent dashcams with MV+AI can help:

- Improve driver behavior
- Learn from real-world examples of distracted driving
- Encourage drivers to course correct
- Reduce the risk of collisions
- Increase road safety

2. Is there a geographic correlation between different types of poor driving behavior (speeding, distraction, harsh braking, etc.)?

Yes, Geotab offers a robust reporting system that includes a wide range of pre-configured reports and notifications designed to provide insights to your fleet's productivity, safety, and environmental data, among others. Geotab's reporting and notifications capabilities give fleet managers even more control over their data and tailoring it to their needs. These reports and notifications include video footage and vehicle's geographic location when a poor driving behavior occurs such as speeding, distraction, harsh braking etc. businesses can use it to work with employees to help boost safe driving habits. Reports can be configured with different timeframes, filters, and sorting options. Custom reports can be created using Microsoft Excel and once uploaded to MyGeotab, the data can be displayed on an interactive dashboard. Reports can also be exported or scheduled to be sent to selected users via email on a daily, weekly, or monthly basis. Reports can be configured with different timeframes, filters, and sorting options.

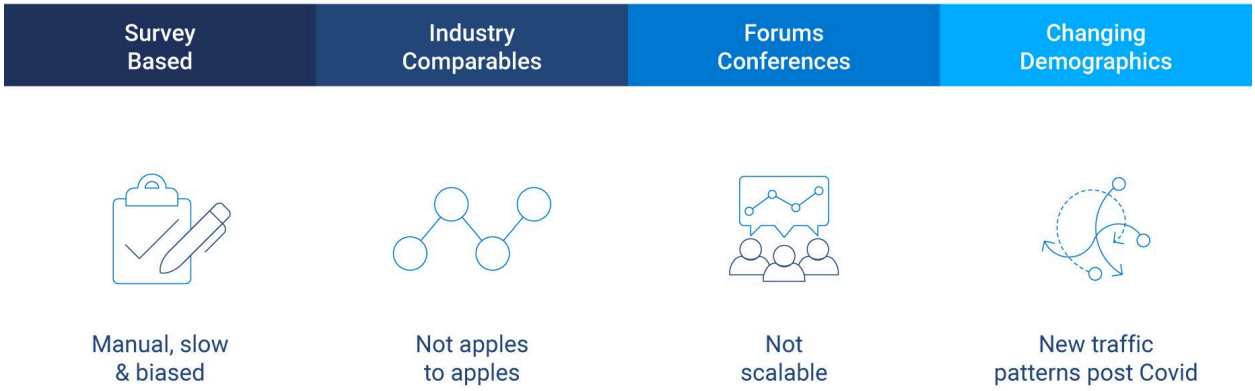
Furthermore, with Geotab's Open API, vehicle data can be integrated with other software to visualize and analyze geographical patterns. This capability is used for multiple applications, including fleet management, urban planning, traffic congestion analysis, environmental monitoring, and more. The integration of telematics data with software like ESRI's ArcGIS, QGIS, or other platforms enables stakeholders to make informed decisions on various aspects such as route optimization, safety enhancements, environmental impact reduction, and infrastructure development.

We understand that Massachusetts DOT leverages ESRI's GeoEvent Server. The Geotab Connector for GeoEvent Server allows you to ingest Geotab's robust telematics data into ArcGIS GeoEvent Server. ArcGIS GeoEvent Server enables real-time event-based data streams to be integrated as data sources in your enterprise GIS. Event data can be filtered, processed, and sent to multiple destinations, allowing you to connect with virtually any type of streaming data and automatically alert personnel when specified conditions occur, all in real time. GeoEvent Server changes your standard GIS applications into frontline decision applications, helping you respond faster with increased awareness whenever and wherever change occurs.

Contextual Safety: Unraveling the 'Why' Behind the 'What'

At Geotab, we're dedicated to not just identifying 'what' happens, but we're committed to understanding 'why' it happens. To this end, we've conceptualized an innovative contextual safety framework that takes into account three crucial factors: vehicle roadworthiness, driver behavior, and external factors like weather and congestion.

The Challenges with Benchmarking Risk Today

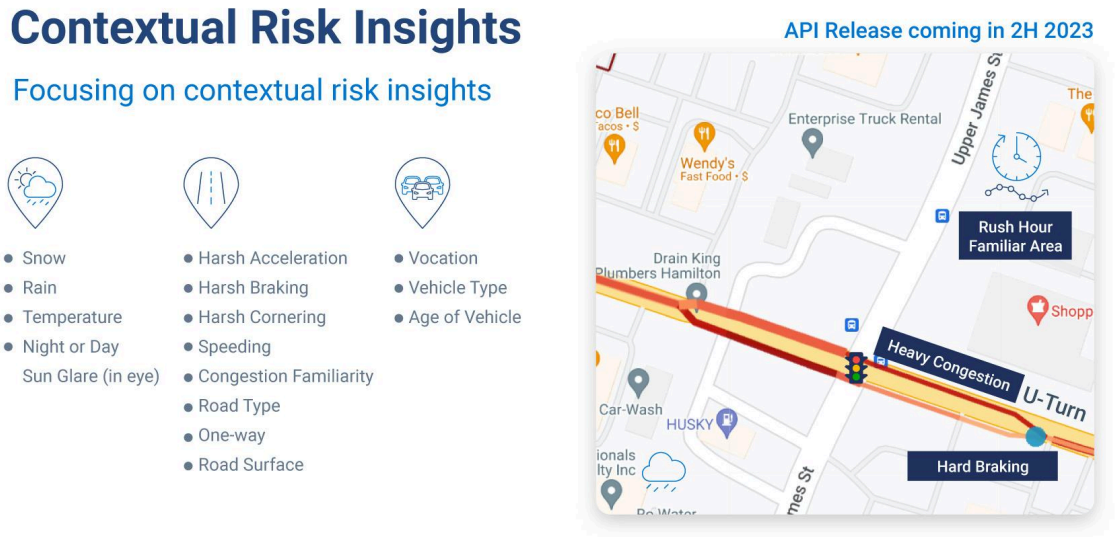


AI isn't just an analytics tool for us, it's a virtual guide, providing predictions that help us recommend the best course of action for each situation. This could involve pulling a vehicle off the road if maintenance issues are detected or even providing individualized driver training for those who need it. This forward-thinking approach paves the way for breakthrough opportunities such as trip-based insurance and shared mobility.

Consider these scenarios to appreciate the importance of context in driving. For instance, driving at the speed limit on a snowy day in Toronto might not guarantee safety. Weather conditions such as snow, rain, or the angle of the sun can substantially influence a driver's performance.

Similarly, let's reflect on the term 'hard acceleration'. When a driver accelerates to merge onto a busy freeway, can we categorize it as speeding, or is it an essential maneuver for everyone's safety? Additionally, what if a driver's performance declines, or they are driving in unfamiliar territory? These

questions highlight the significance of context, reinforcing our commitment at Geotab to leveraging AI for better road safety outcomes.



3. How might we use telematics to inform traffic signal timing and phasing to improve safety for Vulnerable Road Users?

MyGeotab is built on an open platform, enabling multiple ways of integrating with external platforms and systems. The most common way is through the Geotab Software Development Kit (SDK), which is an open API. Geotab's SDK and open API, can be leveraged to provide real time asset location and other vehicle diagnostics to 3rd party systems that control traffic signal timing. A detailed description of Geotab's SDK is provided in our response to Telematics Services Question 4.

4. How might we use telematics information, such as driver distraction or seatbelt use, to inform driver education activities and campaigns?

Geotab telematics information can be a valuable asset when it comes to creative ways to improve safety. By leveraging data on driver behavior, such as instances of driver distraction or seatbelt use, educational programs and campaigns can be tailored to address the specific issues that drivers face. Here are some ways this data can be used to improve safety.

The Driver Safety Scorecard helps to see which drivers or vehicles need training with certain behaviors (example speeding, seatbelt, harsh driving, etc.). The report is built to be customized to your fleet depending on your needs. The Driver Safety Scorecard report focuses on three primary elements of unsafe driving: aggressive driving, seat belt usage, and speeding. Education programs or campaigns can use this information to create content that specifically addresses these issues, such as the dangers of texting or using a phone while driving. Data can pinpoint specific regions with higher rates of distracted driving or seatbelt noncompliance. Campaigns can then be more heavily promoted in these areas to heighten awareness and change behaviors. For further information, please see the following article: [What

are Driver Scorecards? How do they Work?, Geotab's Blog on the driver safety scorecard or a sample Driver safety scorecard.

Real-World Examples/Accident Reconstruction. Actual data from Geotab's Accident Reconstruction feature allows agencies/companies to obtain second by second data leading up to a collision. Geotab's curve based tracking algorithm transmits important track points throughout a trip. When a collision is detected, each and every point leading up to the event is transmitted immediately to reconstruct the incident with no interruption in data. Data such as appropriate driver activity regarding speed, location, driving behavior, etc. By detecting collisions in near real-time, customers may also be able to mitigate the liability from chemical spills, interrupted services, and effects on traffic. Geotab provides device logs, engine data at the time of the collision, device accelerometer logs (acceleration side to side, acceleration forward or braking), RPM, GPS location view, trip view, and reconstruction details; all of which help to provide transparency around the lead up to the accident and the accident reconstruction itself. If an accident is detected, a text message, email, or desktop screen pop-up alert can be set up, which provides the manager with the first notice of loss. More info on collision reconstruction, refer to the white paper available here.

Behavior Modification. Telematics devices can provide real-time feedback to drivers, alerting them when they engage in risky behavior, like distraction or forgetting to fasten their seatbelt. This immediate reinforcement can encourage better habits.

Enforcement Strategies. Data showing high rates of noncompliance with safety practices can inform targeted enforcement efforts, such as seatbelt checks or anti-texting while driving enforcement days.

5. Beyond aggregated and anonymized driver behaviors, can vehicle data like low tire pressure, brake wear, or wiper information be used in creative ways to improve safety?

Geotab's GO devices support over 10,000 vehicle make/models and reads thousands of standard and proprietary engine diagnostics (odometer readings, low tire pressure, braking, engine hours, etc.), leveraging one of the world's largest vehicle diagnostic libraries. The GO9 device attaches to the vehicle's OBD-II port and can be securely mounted with either a zip tie or a harness. The GO9 device supports light, medium and heavy duty on-road vehicles, while Geotab's GO9 RUGGED is ideal for off-road ("yellow" iron type) vehicles.

Vehicle data on low tire pressure, brake wear, or wiper conditions can be leveraged creatively to enhance vehicle safety and maintenance in several ways:

Predictive Maintenance. Geotab is actively investing in predictive maintenance capabilities that use vehicle data to determine when a failure is imminent, or a maintenance interval is required. Fleets can save time and money by preemptively addressing maintenance concerns, in addition to saving on the costs of unscheduled downtime.

Geotab's vehicle maintenance software helps to increase the lifespan of fleets by catching small problems before they become large, expensive ones. With MyGeotab, fleet managers can forecast and schedule their fleet's regular service tasks and inspections, and keep accurate records of vehicle issues, maintenance schedules, and parts inventories to ensure the maintenance scheduling process always runs smoothly. Fleet managers can also coordinate use with the MyGeotab Driver Scorecard and proactive coaching to help minimize wear and tear.

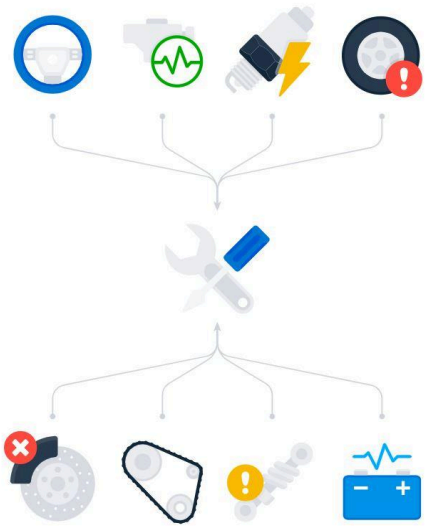
Using MyGeotab's engine diagnostics solutions, fleet managers can keep their drivers safe, maximize vehicle uptime, and flag potential problem areas so they can plan fleet operations effectively.

Geotab's fleet maintenance tools include:

- Remote diagnostics to identify small problems before they become large, expensive ones.
- Inventory management to streamline the maintenance scheduling process and ensure that important parts are on hand when they are needed.
- Predictive maintenance to reduce vehicle downtime and costly breakdowns on the road by anticipating future maintenance requirements.
- Maintenance scheduling and reminders to keep on top of the fleet's preventative maintenance program and ensure no inspections, services or faults slip through the cracks.
- Work order management to easily log defects from anywhere and track their resolution.
- Maintenance cost reports to track work completed and report on costs and trends, helping fleet managers target areas where they can improve their bottom line.

Maintenance Center

A healthy, well maintained fleet is paramount to a business' success.



Avoiding unnecessary costly repairs or business downtime is a top priority that impacts business reputation, driver safety, and bottom line; however, the information fleet managers need often resides in disparate places.

Geotab's Maintenance Center is a centralized location in the MyGeotab platform that provides fleet managers with a holistic view to keep assets running, identify maintenance status or trends, identify issues, and review maintenance records. It provides an understanding of the costs of maintenance per asset.

The benefits of Maintenance Center include:

- Track maintenance schedules and fault events from all your vehicles in one place
- Easily understand maintenance costs and compare across a diverse range of vehicles
- Preventative maintenance insights minimize downtime and repair costs.

Driver Assists and Alerts. Safety Scorecards: Combining data on tire pressure, brake condition, and wiper usage, among other factors, could contribute to a comprehensive vehicle safety scorecard informing drivers of their car's health status.

Fleet Management

- Fleet Safety Analytics: Fleet operators can analyze aggregated data from all vehicles to optimize maintenance schedules across the fleet, improving overall safety and reducing downtime.

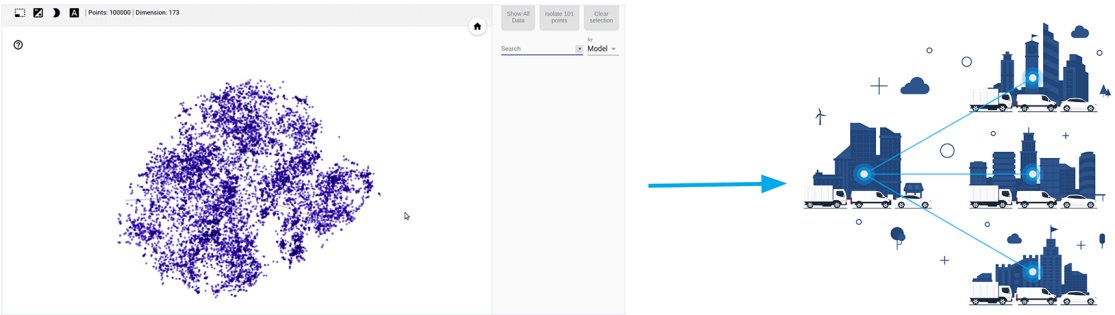
- Route Optimization: For fleets, long stretches of heavy braking could indicate problematic routes; analyzing this data can help in rerouting to safer paths.

By using vehicle data, a variety of strategies to not only anticipate and prevent issues that can lead to accidents or vehicle damage but also to improve overall vehicle performance, enhance road safety, and elevate driver awareness regarding vehicle condition and maintenance.

Safety benchmarking using machine learning

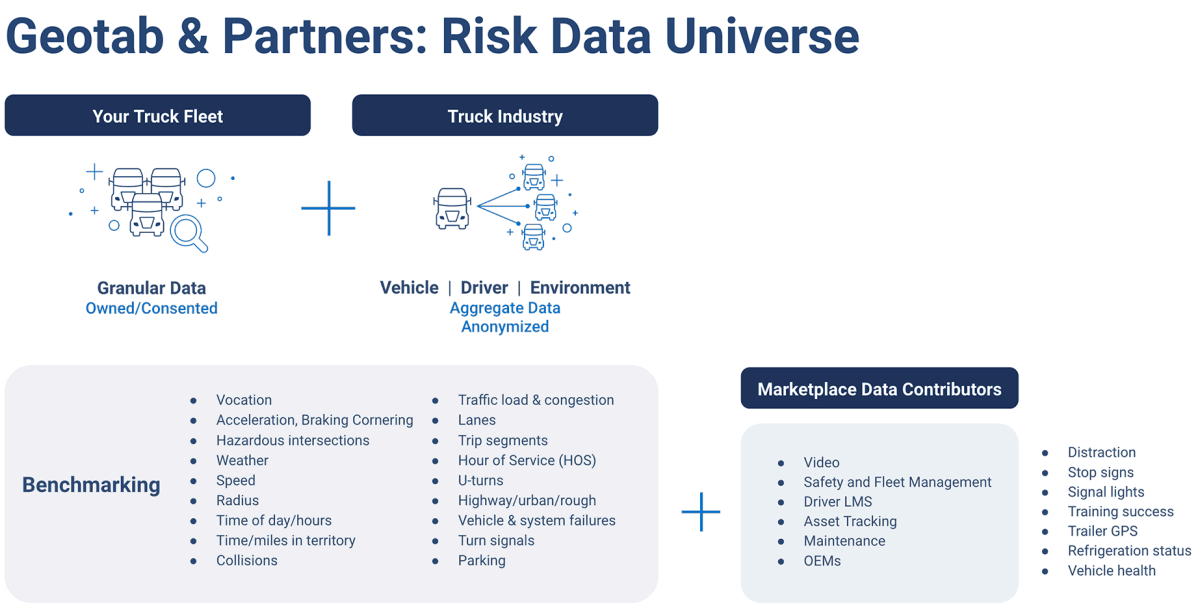
Geotab leverages the power of machine learning (ML) by applying it to telematics data from over 2.9 million connected vehicles. We can benchmark vehicles in individual fleets against hundreds or thousands of comparable vehicles so effectively finding their "twins" in the Geotab client base. We like to think of this as finding a 'DigiTwin' for each vehicle. An example of this functionality is the work of identifying each **vehicle's vocation**. This approach has also allowed us to **benchmark safety** at the vehicle and fleet level in the Geotab **Analytics Lab**.

AI Digital Twin Benchmarking



Contextual Risk Index: Contextual Safety Meets Machine Learning

To combine the power of context with the power of benchmarking, Geotab has also launched the Contextual Risk Index (CRI) to measure the predictive value of the three factors we mentioned above (roadworthiness, driver behavior and environmental conditions) taking a minimum viable product (MVP) approach to data validation. More details are below:

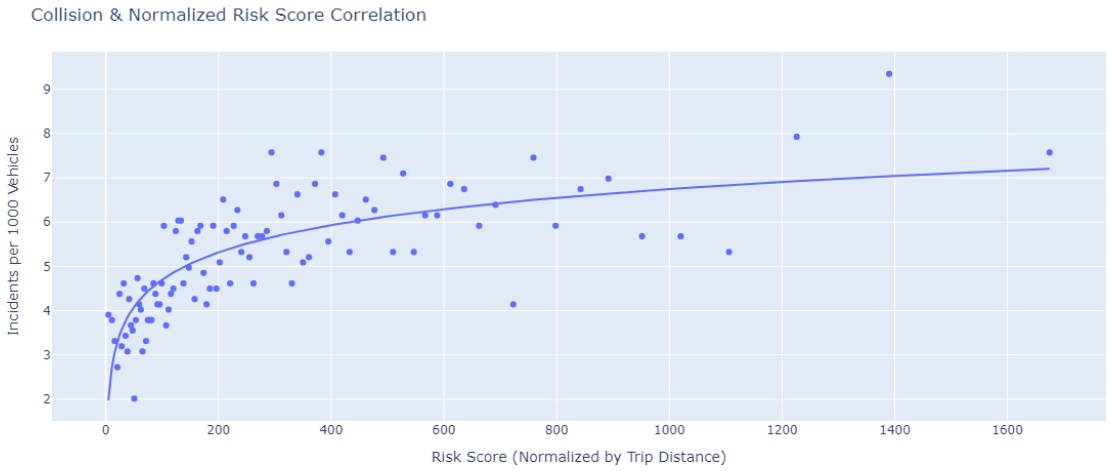


Geotab partners with TNEDICCA to study the connection between dangerous locations and risk

Case in point, Geotab partnered with traffic safety intelligence firm TNEDICCA on a pilot to explore the impact of dangerous locations on the risk signal perceived.

TNEDICCA's mission is to reduce future traffic crashes through the better use of data and analytics. They built the most comprehensive crash location database of more than 30 million crashes, covering 94% of the U.S. auto insurance market. The company provides solutions to the auto insurance, navigation service, automotive manufacturing, and transportation planning industries.
For Geotab's analysis, we looked into over 600 million trips across over 800 thousand of our vehicles. When we analyzed our vehicle movement patterns against the risk scores mapped out by TNEDICCA, we found clear and positive correlations. Vehicles that travel through inherently riskier geographical locations are susceptible to higher collision risk.

For our analysis, we adjusted the risk scores by removing the impact of vehicle total mileage — so that we can isolate just the risk associated with traveling through collision-prone locations. In other words, if your vehicles constantly travel through collision-prone locations, they are more likely to be involved in a collision as well.



6. What are the societal benefits of better pavement condition for non-motorists?

Improved pavement conditions have tangible benefits for society as a whole, and non-motorists such as pedestrians, cyclists, skateboarders, and individuals with mobility aids can especially gain from well-maintained pavement. Here's how they benefit:

Enhanced Safety:

- Reduced Trip and Fall Hazards: Smooth pavement minimizes the risks of tripping and falling, which is particularly important for vulnerable populations like the elderly, children, or those with disabilities.
- Decreased Accident Rates: Cyclists and skateboarders are less likely to crash due to potholes, cracks, or uneven surfaces, which can be quite dangerous at higher speeds.

Increased Accessibility:

- Mobility Aid Use: Individuals who use wheelchairs, walkers, scooters, or strollers can move more freely on well-maintained pavements without the obstacles that damaged surfaces present.
- Universal Design: Better pavement conditions align with the concept of universal design, making public spaces accessible and usable for as many people as possible.

Encouragement of Active Transportation:

- Promotion of Walking and Biking: High-quality pavements encourage people to walk or cycle, contributing to healthier lifestyles and potentially reducing obesity rates.
- Reduction in Vehicle Dependency: When pavements are in good condition, people may be more likely to choose active transportation modes over driving, which can lead to less traffic congestion and lower vehicle emissions.

Economic Benefits:

- Property Values: Neighborhoods with well-maintained pavements are often perceived as more attractive, potentially leading to higher property values.
- Retail and Business Uplift: Better walking conditions can increase foot traffic in commercial areas, potentially leading to increased sales for local businesses.

Environmental Improvements:

- Reduced Pollution: Encouraging non-motorized transport contributes to reductions in air pollution, greenhouse gas emissions, and noise pollution.
- Stormwater Management: Well-designed and maintained pavements can include permeable materials that help manage stormwater, reduce flooding, and mitigate the urban heat island effect.

Social Inclusion and Quality of Life:

- Social Cohesion: Good pavement conditions make it easier for everyone to participate in community life, fostering increased social interactions and a sense of belonging.
- Aesthetic Appeal: Neighborhoods with well-maintained infrastructure are more pleasant, which can improve mental well-being and community pride.

Reduced Maintenance Costs:

- Lower Overall Cost: Although maintaining pavement can incur costs, well-kept pavements require fewer repairs over time, translating to long-term savings for local governments.

Educational Impact:

- Safe Routes to School: Improved pavement conditions around schools ensure that children have safe routes for walking and biking to school, encouraging independence and physical activity.

Reduced Legal Liability:

- Lower Risk of Injuries and Lawsuits: Municipalities face fewer lawsuits related to injuries from poor pavement conditions, which can be a significant financial and reputational benefit.

By investing in better pavement conditions, societies can reap rewards that go far beyond the surface, including health, economic, social, and environmental benefits, particularly for those who navigate public spaces without a motor vehicle.

7. How do you envision MassDOT might use ubiquitous telematics data to supplement:

a. our existing (annually refreshed) pavement condition collection program that informs our resurfacing plan,

b. data to make spot improvements (e.g. a pothole finder),

c. information for snow/ice operations, or

d. ways to capture roadway marking quality MassDOT Roadway Safety Request for Information & Ideas 9

Assist with resurfacing plans

Telematics data can be used to gather real-time information about road conditions from a broad range of vehicles across the entire network. This can complement traditional annual surveys by providing continuous, up-to-date data.

- Early Detection & Continuous Monitoring: vehicles equipped with vibration sensors and accelerometers can detect subtle changes in the pavement surface, highlighting areas that may need resurfacing before they become severe.
- Prioritization: Data analytics can help to prioritize resurfacing plans based on actual road usage and deterioration rates, improving the efficiency of resource usage.

Geotab's Public Works
Geotab Public Works helps government agencies manage vehicles such as salt spreaders, snow plows, street sweepers, and waste management vehicles. Geotab Public Works Solution has the ability to connect with Winter Operations vehicles ground speed technology to monitor material application information in real time, Road & Air Temperature Sensors, MARWIS - Mobile Advanced Road Weather Information Sensors, MD30 from Vaisala which monitors road and runway conditions, and transmits weather data. All of which are extremely helpful data sets in making decisions during critical operations. Our solution helps departments meet infrastructure service levels while controlling costs, tracking material usage, and more. Plowing and salting roads and highways, street sweeping, and waste collection are critical services delivered by local governments and municipalities. Optimizing these maintenance operations maximizes mobility and sanitation in the community while minimizing collisions due to traveling conditions.

Geotab's Public Works solution allows fleet managers to manage public works operations in near real-time – from winter maintenance fleet's salt usage and activity to street sweepers' and waste management vehicles' route completion – in order to build smart, efficient cities.

With Geotab Public Works, fleet managers can:

- Automate time-consuming workflows: Fleet managers can deliver a high level of service by measuring the activity of the fleet with simplified near real-time reporting into which roads have been serviced.
- Optimize performance: The Geotab Public Works solution provides data on fuel usage and idling that can cut fuel consumption and assess electric vehicle suitability, while improving driver behavior with near real-time visibility into seat belt usage, speeding, harsh cornering, and braking.
- Manage operating costs: Fleet managers can monitor how much salt is being used to avoid overusing materials, improve routing for optimal uptime and reduced mileage, and support vehicle sharing and motorpools for cost savings and efficiency.

The Geotab Public Works advantage for government fleets provides:

- Automated reporting for regulatory compliance and billing
- Active tracking for winter maintenance and waste management activity
- Accident detection with near real-time notifications
- Accurate measurements of winter equipment usage
- Route completion for reduced mileage
- Idling and fuel consumption trend reports
- Preventive maintenance
- Near real-time reporting on:
    - Salt usage and plow time for winter vehicles
    - Broom and water time for street sweepers
    - Mechanical arm count for waste collection trucks

8. What sustainability metrics (like fuel consumption) are you able to provide insight into that could also correlate to safety improvements?

Geotab can offer insights into numerous sustainability metrics that can also correlate with improvements in road safety. The following are some examples:

Fuel Consumption and Efficiency:

- Idle Time Reduction: Geotab can monitor and report on vehicle idle times. Reducing idling not only saves fuel and cuts emissions but may also lead to safer road conditions as drivers remain more attentive when their vehicle is in motion.
- Driving Behaviors: Monitoring acceleration, braking, and speed can encourage more fuel-efficient driving behaviors, which tend to be safer. Sudden starts and stops, as well as speeding, are less common among drivers who adhere to eco-driving principles.
- Identify fueling events and quantities by integrating engine fuel data, GPS-traveled distance, and optional fuel card transactions. This allows us to accurately calculate and report a vehicle's fuel consumption in miles per gallon (mpg). Reports such as the Fuel Usage Report and Fill-Ups reports provides an overview of the amount of fuel used in a selected time period and the fill-ups in a selected period of time. By leveraging MyGeotab's open API, integration with fuel cards can provide further fuel usage monitoring.

Carbon Footprint:

- Emission Tracking: Data on vehicle emissions can help identify vehicles or fleets with high pollution levels, indicating a need for maintenance or replacement. Road safety is enhanced when vehicles are well-maintained and performing optimally.
- Route Optimization: Telematics can help optimize delivery and travel routes to reduce distance driven, thus decreasing emissions. Shorter, more efficient routes can also lead to less driver fatigue and reduced potential for accidents.

Vehicle Health and Maintenance:

- Preventive Maintenance Alerts: By monitoring vehicle diagnostics, Geotab can encourage timely maintenance to prevent breakdowns or component failures that could lead to accidents.
- Tire Pressure Monitoring: Proper tire inflation is crucial for both fuel efficiency and safety. Properly inflated tires have lower rolling resistance for better fuel economy and decrease the risk of tire blowouts.

Fleet Management:

- Fleet Utilization: Telematics can enhance the utilization rates of fleet vehicles, ensuring each is used efficiently. Optimized fleet utilization can reduce the total number of vehicles on the road, thereby potentially lowering accident rates.
- Vehicle Lifespan: Tracking and improving the longevity of a vehicle can reduce the need for manufacturing new vehicles and associated environmental impact. Longer-lasting vehicles also tend to be more reliable and safer on the road.

Electrification of Fleets:

- EV Suitability Assessment: Geotab can analyze usage patterns to identify which vehicles or routes are most suitable for electrification, helping to enhance sustainability without compromising functionality. Electric vehicles (EVs) also offer the promise of safer outcomes due to their lower center of gravity and fewer moving parts to maintain.

Smart Charging and Energy Use:

- Energy Monitoring: For electric and hybrid fleets, Geotab can track energy use and help optimize charging times to take advantage of lower rates or renewable energy availability, thus reducing overall energy consumption. Smart charging strategies can also improve safety by ensuring vehicles are adequately charged for their routes and less likely to encounter power issues on the road.

By analyzing these metrics, Geotab not only helps organizations reduce their environmental footprint but can also create a safer driving environment. The intersection of sustainability and safety is critical as it positions road safety improvements within a broader framework of ecological responsibility and resource efficiency.

9. Show us something unique about your work that would provide new actionable insight for MassDOT in helping us prioritize resources.

Geotab's unique offering that could provide new actionable insights for large states in resource prioritization is its advanced data analytics and machine learning capabilities applied to vast amounts of driving data. This telematics data goes beyond standard GPS tracking and includes vehicle diagnostics, driving behavior analytics, and environmental factors.

Electric Vehicle Integration. EV Readiness Assessment: For states looking to convert to electric fleets, Geotab can analyze routes, vehicle usage, and charging infrastructure to assist in planning and transitioning to electric vehicles, ensuring that the shift is both sustainable and operationally sound.

Custom Reporting and Benchmarking. Performance Dashboards: Geotab provides states with custom dashboards and reports that benchmark their performance against best practices and peer organizations, helping them identify areas for improvement.

SDK/Open API. MassDOT can integrate their fleet telematics data into their own software by leveraging Geotab's open source Software Development Kit (SDK).

Geotab is your source for comprehensive vehicle data, enabling customers and partners to gain valuable insights and foster innovation. Utilizing our big data analytics and machine learning, entities like MassDOT can effectively optimize resources and enhance operational efficiency. Geotab offers a suite of tools, including support for electric vehicle integration, custom reporting, and seamless data integration through an open API, ensuring data-driven success in your strategic planning.

10. How would your tool support insights in both heavily populated areas and more rural areas in Massachusetts?

Geotab can offer valuable insights for diverse environments like heavily populated areas and rural regions of Massachusetts by providing granular and wide-reaching data through its telematics platform. The versatility of the data captured allows for tailored approaches to the unique challenges each area presents.

Heavily Populated Areas:

- Traffic Congestion: In urban environments, Geotab's telematics can gather data on traffic flow to identify bottlenecks and peak congestion times, enabling traffic planners to optimize signal timings and implement dynamic traffic management strategies.
- Public Transit Efficiency: Telematics data can support public transit by optimizing routes and schedules, reducing wait times, and improving the reliability of services, which can encourage residents to use public transit instead of personal vehicles.
- Emissions and Air Quality Monitoring: Telematics can track vehicle emissions and idling trends, offering insights into air quality impacts and allowing regulators to design initiatives aimed at reducing vehicle emissions in high-density areas.

Rural Areas:

- Road Safety: Geotab's telematics can identify rural roads with higher rates of accidents or risky driving behaviors, leading to targeted safety campaigns, enhanced warning signage, or infrastructure improvements like better road markings or lighting.
- Vehicle Maintenance and Breakdowns: Telematics can monitor vehicle health proactively, which is particularly important in rural areas where breakdown services may take longer to arrive, and preventive maintenance can lead to better safety and reduced downtime.
- Resource Allocation for Road Works: Using data on vehicle travel patterns and road wear, the state can prioritize maintenance and resurfacing efforts where they are most needed, ensuring that even less-traveled rural roads are kept in good condition.

By leveraging the diverse set of data points provided by Geotab's telematics, Massachusetts can better understand and respond to the unique transportation challenges and opportunities across its different regions, leading to improved safety, efficiency, and sustainability statewide.

11. How could your tool be leveraged to support the work of cities and towns in making their roadways safer through annual construction project planning?

As the underlying source of the telemetry data, Geotab ITS provides aggregated actionable insights and urban analytics for governments. These insights are provided in a modular, open platform, Altitude, and exposed via a salient web interface and Application Programming Interfaces (APIs) so that one can interact with the data, and integrate it into internal systems, processes, and workflows. The end result is a secure and smart transportation and mobility platform that can be used to study historical and near real-time mobility metrics and trends. This platform is the foundation from which one can identify areas for mobility improvements, model and predict the impact of specific interventions, and monitor their effectiveness.

The platform is rooted in geospatial exploration and provides a means for users at any level to obtain actionable insights. All data is snapped to the Open Street Map (OSM) road network and can be segmented by date, time, and mode of transportation. Whether you're a traffic planner and need to leverage our web UI for a stop analysis or a data engineer that simply needs to extract data insight via a geographic-specific API call, the platform provides flexibility for both. We have found that the utility of data greatly increases with the user's ability to visualize and understand the insight, and have architected the Altitude platform to enable this rich visual analysis while providing a strong backbone for data integration at scale.

Response to Telematics Services Questions

1. Demonstrate that you can conflate your data insights to MassDOT's road inventory file (see MassDOT Assets below) and to Open Street Map or describe in some detail the process required to do this for roadway segments and the estimated time involved to do so.

MyGeotab is built on an open platform, enabling multiple ways of integrating with external platforms and systems. The most common way is through the Geotab Software Development Kit (SDK), which is an open API. Geotab already has integrations with many popular solutions, including ESRI. The ESRI supported Geotab Connector for GeoEvent Server allows customers of Geotab and ESRI to ingest data from Geotab into ArcGIS GeoEvent Server. It is based on Geotab's data feed and obtains data securely through standard HTTP protocol. The connector pulls telematics device status, GPS location, DTC codes, odometer & other engine measurements, trip data and rule-based exception events. For more information, see Geotab Connector for GeoEvent Server.

MyGeotab supports a variety of maps, allowing you to select the most useful map for your area of interest. Customers can change the map at any time by selecting Map > Map Type from the list of available providers: Google Maps, HERE maps, Mapbox maps. The Geotab map functionality can be viewed in both road, atlas, and satellite views. Users are able to zoom in and out, drag zoom, pan, center, and auto center. MyGeotab also supports custom maps. This powerful feature allows your organization to design business-specific maps that combine with the application's vehicle information. Some possible usages include maps that show customer-centric information, underground water flow, municipal boundaries, or city infrastructure (power, roads, sewage, etc.).

The application supports custom map implementations based on OpenLayers. Geotab currently supports four types of layers:

- xyz- Tile Server arranged by a standard XYZ grid
- osm - OpenStreet Map tiles
- wms - OGC Web Mapping Services
- ArcGIS93Rest - Mapping Services hosted by ArcGIS server 9.3 above

For more information, refer to Geotab's Custom Map Guide.

Devices on the Public Works ProPlus plan allows users to select between Google Maps (Street, Hybrid, and Satellite) as well as other types of Customer map data (which allows users to benefit from displaying map layers as either a base map or dynamic maps). When using their own map data, Customers have the option of hosting the data on their own ArcGIS server or ArcGIS online account. Geotab would simply require certain information such as credentials to access the URL (if needed). This option provides immediate visibility of any GIS data changes within the AVL system and provides Customers with control over the look and feel of map layers. If a demilitarized zone with open connection to ArcGIS server is not available, Geotab can also host Customer map data. Geotab would simply require all GIS data and Geotab would take care of all tiling and processing related to map presentation. Both options are included with the Public Works ProPlus plan.

2. Please describe how you protect and preserve privacy with your product.

Geotab takes a rigorous approach to data security, following the principle of continuous improvement, and provides one of the most secure telematics solutions on the market today. Our platform security is designed for the protection of Customer data.

Key implementations include:

- GO device and network interfaces use authentication, encryption, and message integrity verification.
- GO devices are individualized — each device uses a unique ID and non-static security key making it difficult to fake a device's identity.
- Over-the-air updates use digitally-signed firmware to verify that updates come from a trusted source.
- Independent third-party experts validate the platform from end-to-end.
- Geotab's GO device was the first telematics device to achieve FIPS 140-2 validated by NIST (certificate #3371), and Geotab is currently pursuing FIPS 140-3 certification.
- Geotab achieved full FedRAMP PMO Authority To Operate (ATO) certification.
- Geotab is ISO 27001 certified.

To protect its Customers' critical data, Geotab has a dedicated Chief Security Officer (CSO) and security team focused on developing industry-leading cybersecurity technology. Geotab continuously reviews, improves, and validates its security processes, so its systems remain resilient to intrusions.

Geotab uses encryption to protect data at all times throughout the entire chain of custody. Geotab's GO device was the first telematics device to achieve FIPS 140-2 certification, ensuring Data at Rest (DaR) on the device and in transit (DiT) over the cellular network is protected. Customer data in the MyGeotab solution is encrypted using AES 256 disk encryption provided by Google and leverages TLS 1.3 for network communications.

Geotab participates in many industry groups such as SAE, IEEE, W3C, Auto-ISAC, NMFTA, and ATA, and contributes to special industry projects to remain at the forefront of cybersecurity developments. Geotab collaborates with leading stakeholders to advance security across the industry, and its security team regularly engages with global thought leaders and experts in the vehicle cybersecurity space. Geotab employs white hat security researchers who attempt to uncover hidden vulnerabilities within its telematics systems and validate security enhancements. This focus on security has resulted in involvement in multiple federal agency projects with DOT-Volpe, DHS, FBI, NHTSA, and NIST.

Geotab achieved ISO 27001 Certification and continues to hold this certification through annual audits. As innovation continues to outpace regulation, Geotab remains committed to being an authority in the security space and a leader in connected-vehicle technologies.

Geotab Inc. and its affiliates are committed to protecting the privacy and data of its Customers, Partners, users, website visitors, and attendees of Geotab sponsored events. Geotab is continually designing its products and services to make it easier for its Customers to comply with data privacy laws and industry standards. Geotab's privacy and security policies are available to Customers and the general public through the Geotab website.

All Geotab employees are bound by confidentiality requirements, trained in protecting privacy and data, and appreciate the importance of enforcing and maintaining the security of Geotab's Customer data, as well as that of Partners, website visitors, and attendees of Geotab-sponsored events. Geotab's services support compliance with applicable privacy laws, including the General Data Protection Regulation (GDPR).

3. Please explain your business model or models for working with government transportation authorities.

The Geotab solution is currently available on the State of Massachusetts Operational Services Division Telematics Contract and is the current telematics provider for the Massachusetts Department of Transportation, amongst other Massachusetts State and local agencies. Many of the items referenced within this response are available today through your current deployment.

A world leader in connected transportation solutions

Geotab is a global leader in connected transportation solutions. We provide telematics — vehicle and asset tracking — solutions to over 50,000 customers in 160 countries. For more than 20 years, we have invested in ground-breaking data research and innovation to enable partners and customers, including Fortune 500 and public sector organizations, to transform their fleets and operations. With over 4 million subscriptions and processing more than 75 billion data points a day, we help customers make better decisions, increase productivity, have safer fleets, and achieve their sustainability goals. Geotab's open platform and Marketplace, offers hundreds of third-party solution options. Backed by a team of industry leading data scientists and AI experts, Geotab is unlocking the power of data to understand real-time and predictive analytics — solving for today's challenges and tomorrow's world.

Relevant Experience and Qualifications

Geotab's industry experience is unparalleled. Over the past two decades, Geotab has collaborated with government agencies, gaining extensive expertise and qualifications in offering telematic solutions and services. Geotab's exceptional industry experience sets it apart from its competitors. The examples below demonstrate Geotab's ability to meet and exceed large-scale telematics operations. We feel this is paramount to the State when evaluating a potential telematics partner.

1. **Installation Coordination: Texas Dept of Transportation:** Geotab installed over 12,000 across the entire State within (8) months. Collaborating with TXDOT, we ensured seamless coordination among vehicles, products and staff to complete tasks required within the project timeframe successfully.

2. **Customer Onboarding**: **GSA Federal Fleet:** GSA (General Services Administration) provides centralized procurement for 75 U.S. federal agencies on over 200,000 vehicles. Geotab is responsible for tailoring onboarding and training to 75 different agencies and sub-agencies across the globe.

3. **Project Management**: **PepsiCo**: PepsiCo is a global multinational. Geotab provided Project Management across different operations, languages, laws and vehicles to assist one of the most forward-thinking fleets in the world of seamless telematics services.
4. **Rapidly changing Fleet**: **State of California**: Needed a partner that could fulfill a 10-year telematics commitment assisting California's transition from internal combustion engine (ICE) to Electric Vehicles (EV). Unlike internal combustion engine vehicles, EVs don't conform to industry standards. This makes it difficult to access their data. Geotab Engineering now supports over 300 EV models!

5. **Safety**: **New York City:** New York City is on a journey to achieving its goal of becoming the "safest city in the world." Vision Zero's goal is the elimination of traffic fatalities and severe crashes while increasing safety and mobility for all. New York City went all in with Geotab technology, where we provide:

    a. Monitoring driver behavior to create custom scorecards and driver education.

    b. Delivering information about road quality (potholes, cracks, etc.) that affect road, vehicle, and driver safety.

    c. Assessing the before and after safety profile of street improvements and redesigns.

6. **API integration**: **AT&T** has over 80,000 vehicles and is transitioning to Geotab. Using Geotab APIs, AT&T is migrating existing system data to the Geotab platform without missing data. This is a massive undertaking proving Geotab's engineering prowess.

7. **Predictive Maintenance**: **United Parcel Service (UPS):** Battery failure in the field has a massive impact on UPS operations. UPS wanted to use data-driven analytics rather than mileage or human predictably to determine battery performance. UPS now uses Geotab machine learning to develop models which predict component failures.

8. **Digital Logs**: **Ryder:** Required digital logs for its more than 10,000-unit fleet. Today Ryder uses Geotab to keep accurate logs with reminders for drivers to log in and out, real-time availability and alerts for hours of service (HOS).

9. **Security**: **Department of Homeland Security:** When the Department of Homeland considered adopting telematics on all 30,000, they needed confidence that the vendor could exceed current security standards. Geotab has built a leading security posture by becoming the first telematics company to receive FIPS 140-2 validation for its cryptographic modules, full SaaS FedRAMP authorization, and ISO 27001 certifications.

10. **Winter Operations: Maryland Dept of Transportation.** Requires a telematics partner that does not limit its ability to interface with various controllers to measure Spreader operation, Brine control, Material flow, Plow operation, Wiper operation, Forward and rear-facing video feeds, Warning lamp operation, and Current weather conditions, including road surface temp and pavement condition. Geotab offers all this plus the ability to capture and deliver data in real-time to public-facing sites!

11. **Smog Checks**: **California Department of Transportation (Caltrans):** Government agencies that own and operate vehicles in California are subject to Smog Check Program requirements. Vehicles were required to be tested at a Smog test location, which was a significant cost to Caltrans operations. Geotab worked with the Bureau of Automotive Repair, and now all government clients in California equipped with our device can provide real-time automated Smog Checks.

12. **Esri Integration, DC Dept of Public Works:** utilizes Geotab data within their Esri environment to facilitate advanced analytics, geospatial reporting, and allows for connectivity to other internal enterprise systems. This allows Public Works to build their own dashboards (i.e., winter operation's dashboard) combining other data with telematics to action their daily operations. They accomplish this by interfacing with MyGeotab's SDK, which provides access to their fleet telematics data in a manner that can be pulled in directly to Esri's ArcGIS geospatial database environment.

A sampling of North American based customers using our solutions include the following customers.

Greater than 10,000 vehicle fleet using Geotab. * greater than 100,000	
• * US General Services Administration • * United States Postal Service • New York City • State of California • US Air Force • Department of Homeland Security • Caltrans • Texas DOT • State of Colorado • Nutrien Ag • PG&E • Ubeeqo • Donlen • Penske	• *UPS • Ryder • *Amazon • *Enterprise Truck • *AT&T • *PepsiCo • Coca Cola • Autozone • Johnson Controls • Rollins • Advance Auto Parts • Clutch Technologies
State contracts	
• California • Minnesota • Colorado • Ohio • Oklahoma • Nevada • Wyoming	• Utah • Connecticut • North Carolina • Missouri • Massachusetts • West Virginia
State Departments of Transportation	
• Caltrans • Texas DOT • Colorado DOT • Missouri DOT • Pennsylvania DOT • Massachusetts DOT • North Carolina DOT	• Utah DOT • Kentucky DOT • Oregon DOT • Nevada DOT • Vermont DOT • Maryland DOT • Delaware DOT

4. If relevant, please share how MassDOT would be involved in developing the product or if there are any opportunities for customization.

MyGeotab is built on an open platform, enabling multiple ways of integrating with external platforms and systems. The most common way is through the Geotab Software Development Kit (SDK), which is an open API. Geotab already has integrations with many popular solutions including ESRI, AssetWorks FleetFocus M5, Chevin FleetWave, WEX, Maximo and more. Additionally, developing new solutions is made simple with the SDK and Geotab's free data-streaming solution, the MyGeotab API Adapter.

The open platform encourages collaboration and innovation. There is no lock-in and customers control their own data. Integration with other programs or systems is simplified with the ability to expand, flex, and scale as needed. The tools that allow for integration through the API are Geotab's Software Development Kit (SDK) - a powerful set of tools for automating tasks and working with the data in MyGeotab - and APIs. The SDK and APIs are channels to get data in and out of the system. A summary of the different integration alternatives allowed by Geotab SDK is below:

- Data Feed: The data feed is the primary method used to synchronize data from the telematics system to another system using the API. The GetFeed method can be polled at intervals to get new and updated data from the system. The feed API works with a token that is passed on every request and sent back with the payload on every response. This allows Geotab to track "up to which point in time" Geotab has already sent the receiver data. It also allows the receiver to stop and seamlessly resume the data feed.
- Embedded version of MyGeotab: Each of the MyGeotab pages has a URL (Uniform Resource Locator) associated with the page that allows that page to be embedded or linked into the users own application. This is a great way for the user to leverage MyGeotab and make it part of their services.
- Integration of third-party devices: MyGeotab accepts data logging from telematics devices not manufactured by Geotab ("third-party devices"). MyGeotab provides a unified interface for all fleet information, enabling the user to manage their vehicles regardless of the telematics hardware they have installed. A MyGeotab database can store information from GO telematics devices and third-party devices at the same time - allowing for a single point of coordination across a fleet consisting of a variety of devices. More than 30 third-party devices have already been integrated following these mechanisms.
- Add-Ins in MyGeotab: Add-Ins are used to extend the functionality provided by MyGeotab and Geotab Drive. An Add-In is JavaScript, HTML and CSS loaded into the MyGeotab or Geotab Drive portal and resides directly inside the user interface. This allows third-parties to create a seamless user experience and provide solutions that would otherwise require the user to visit a different website altogether. Geotab provides helper libraries for C# and JavaScript, however, any language or application capable of making HTTP (HyperText Transfer Protocol) requests can access its full functionality.

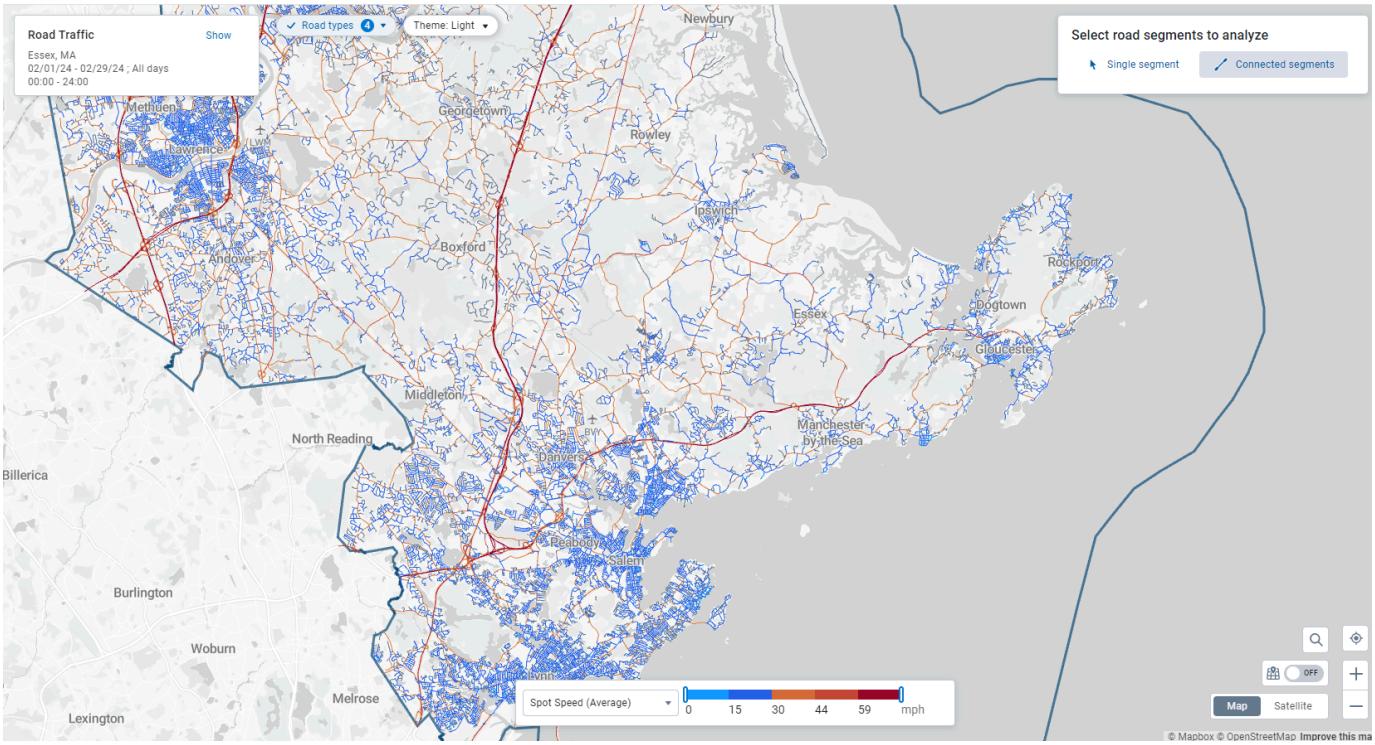
Requests made to the Geotab API are performed over HTTPS. The minimum SSL/TLS version supported by the MyGeotab API is TLS v1.2. API request parameters and the results are transported in the lightweight JSON format. Requests to the API can be invoked using HTTP GET or POST. HTTP POST requests use the JSON-RPC standard. For more information, please visit Geotab's blog post on: Why choose an open platform system for fleet management?

MyGeotab uses Microsoft Excel as its report writer, and also provides enhanced reporting capabilities through the Geotab Data Connector. Fleet managers can consolidate fleet, financial and HR data into one stream for instant trending and long-term analysis within the most popular BI tools, such as Tableau or PowerBI.

5. Please indicate the monthly volume of drivers/vehicles reflected in your data for Massachusetts roadways and the estimated percentage of drivers out of all of those on the roadway represented in your dataset.

Through the Geotab Altitude transportation analytics platform, Geotab ITS delivers contextual aggregate insights from more than 4M+ connected commercial vehicles that are equipped with GO devices today. The platform provides DOTs with visibility into true origins and destinations, popular routes, stop analytics, congestion levels and more.

In any given month, there are more than 51K Geotab connected class 1-8 vehicles in Massachusetts. These vehicles generate more than 5.4M trips and drive more than 67M miles per month.



Overview of Geotab connected commercial vehicles and trucks snapped to the OSM road network in Essex County, MA. MassDOT is able to drill down into speeds, travel times and observed counts on any given road segment.

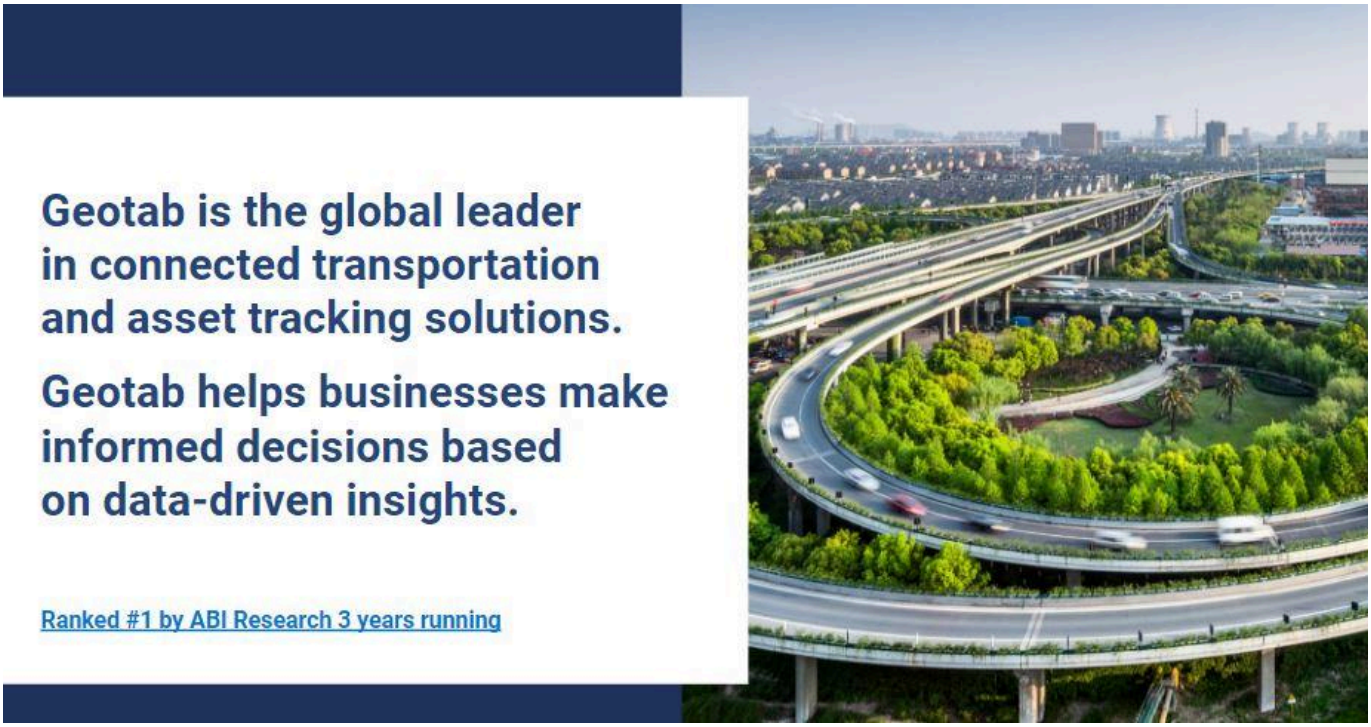
6. Indicate if you have a demonstration with Massachusetts-based data that you would like to present in a workshop with MassDOT staff. Please include the topic you'd like to address and a few sentences on what you want to share.

At the States earliest convenience, the Geotab team would like to present MassDOT staff with an overview of the Geotab telematics and ITS solutions that includes an overview of the Massachusetts state contract, current clients installed with telematics today, government and commercial telematics clients, and discuss ITS insights.

Geotab Overview

About Geotab Inc.

Geotab Inc. (Geotab) is a Canadian headquartered company that has created an end-to-end telematics and secured data platform that provides fleet owners with insights designed to support them in making operational improvements, providing profit opportunities as well as socioeconomic benefits, and enabling innovation built on data.

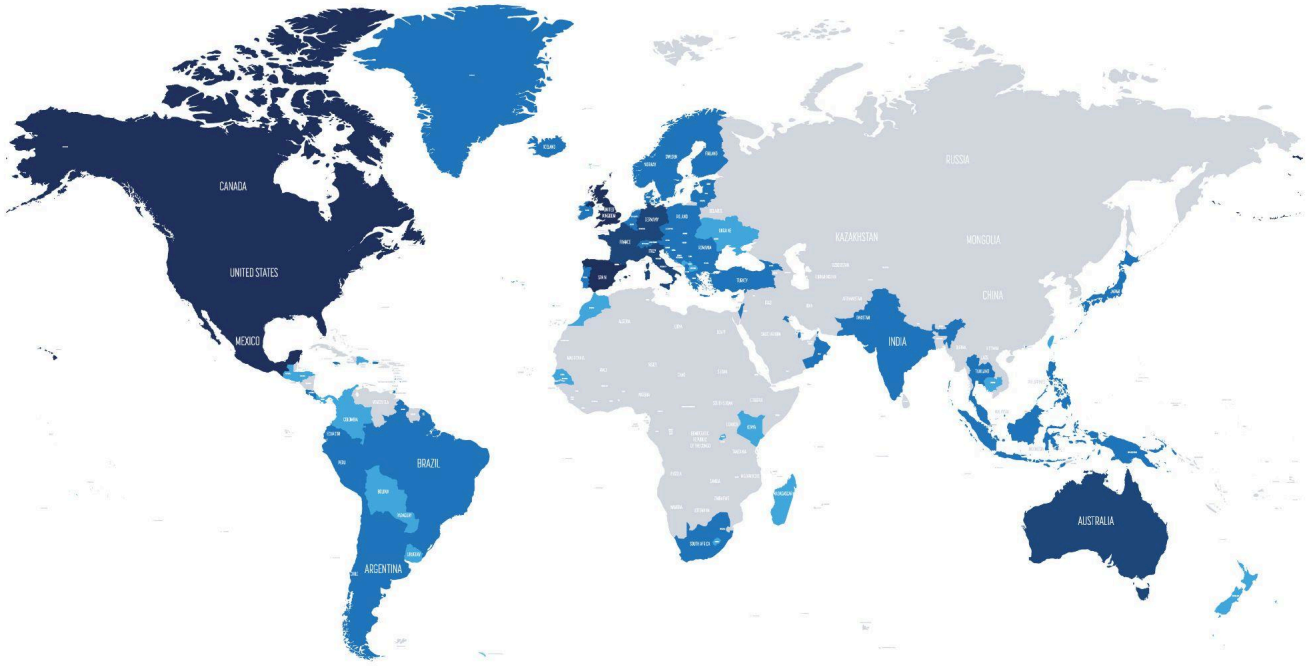


Geotab is a global leader in connected transportation solutions. Its Customers include many Fortune 500 companies in addition to North America's largest government fleets. With more than 50,000 global Customers, Geotab connects over 4 million vehicles, collecting and processing more than 75 billion uncompressed raw data points every day – making it the largest organically grown vehicle data set in the world.

As the world-leading commercial telematics platform for connected vehicles and assets, Geotab has a unique focus on rich, high-quality data and applying the necessary analytics to transform this data into actionable intelligence that helps its Customers minimize the total cost of ownership and maximize operating efficiency, safety, and environmental sustainability.

Distribute globally, support locally

Geotab is connected and operating in over 160 countries across all regions of the world and growing. It currently has offices in the U.S., Canada, Mexico, Brazil, the U.K., Spain, Germany, France, Italy, Singapore, and Australia. Geotab's workforce of over 2,200 employees continues to grow as Geotab enters new markets and expands its global presence to further support growing service providers, its Partners, its Customers' business needs, and the growing focus on data-driven decisions.



Geotab by the Numbers

75+ billion data points processed daily	**200+ million** miles driven daily	**150+** Data scientists working to benefit you	**700+** Authorized Geotab Partners
250+ solutions on the Geotab Marketplace	**34** patents	**2,200+** employees worldwide	**15** offices located around the world

Geotab Achievements

- **Trusted in the industry** – Over 4 million connected vehicles with over 50,000 Customers.
- **Driven by data** – Over 150 data scientists working to support Customers with their data-driven decisions.
- **A leader in cybersecurity** – Certified in ISO 27001 and Cyber Essentials, and the first telematics provider to be certified in FIPS 140-2 and FedRAMP.
- **Innovation-driven –** Geotab has been ranked the #1 telematics provider in the world three years in a row by ABI Research in 2019, 2020, and 2021, and as the number one video telematics provider by ABI research in 2023, highlighting the company's commitment to innovation and high-quality, actionable data for fleet safety, performance and optimization.
- **Committed to sustainability** – Geotab is the recipient of multiple awards to recognize our commitment to environmental sustainability and was named as one of the top 10 Environmental Leaders on the Canadian Business New Innovators List 2022, received a Google Cloud Customer Award for Sustainability and an EcoVadis Bronze medal in 2022, and joined the UN Global Compact in 2023. Geotab was the first dedicated telematics company to have its emissions reduction targets validated and approved by the Science Based Targets Initiative (SBTi), confirming that they meet the criteria required to keep global temperature rise limited to 1.5°C.
- Received the following awards and recognition in human resources:
    - Canada's Greenest Employers 2023
    - Financial Times America's Fastest Growing Companies 2022
    - Best Workplaces in Technology 2022

- Best Workplaces in Canada 2022
- Canada's Best Managed Companies (2020 - 2022)
- Canada's Top Growing Companies 2022, Fourth year in a row
- Best Workplaces for Women by Great Place to Work® 2022
- Best Workplaces for Today's Youth by Great Place to Work® 2022

Geotab's Sustainability Pledge

Sustainability is at the core of everything at Geotab, from striving to minimize the environmental footprint of internal operations to developing innovative technologies that optimize the ability of fleets to go green. Geotab received EcoVadis' Bronze sustainability rating (2022), became the first dedicated telematics company to receive SBTi validation for its emissions reduction targets (2022), and won Google's Cloud Cross Industry and Sustainability 2021 Customer Awards.

Geotab's mission is to work with our partners globally towards a decarbonized and thriving future with a collective vision of net-zero emissions. Geotab has signed the Climate Pledge, committing to go carbon neutral by 2040. In addition, as a signatory of The Climate Pledge, Geotab will:

- Measure and report greenhouse gas emissions on a regular basis - view our latest sustainability report.
- Implement decarbonization strategies in line with the Paris Agreement through real business change and innovations, including efficiency improvements, renewable energy, materials reductions, and other carbon emission elimination strategies.
- Take actions to neutralize any remaining emissions with additional, quantifiable, real, permanent, and socially-beneficial offsets to achieve net zero annual carbon emissions by 2040.

By joining The Climate Pledge, Geotab is reinforcing our commitment to sustainability and are excited to join a community that will share knowledge, ideas and best practices.

In 2024, Geotab also announced the Sustainability Alliance it is taking part in alongside 28 other partners, providing solutions and data insights to help fleets address sustainability challenges. The Geotab Sustainability Alliance is helping scale EV adoption and sustainable transformation by empowering companies with innovative solutions and data insights to make informed decisions, measure progress and take action, in order to achieve their goals.

Core Pillars

Six core pillars drive Geotab's ongoing innovation and success, which help businesses make impactful operational improvements and minimize operating costs: productivity, optimization, safety, sustainability, compliance, and expandability.

Productivity

- Customer service times
- Identify unexpected stops
- Accurate arrival and departure times
- Optimized routes
- Reduce time waste and inefficiencies
- Automated billing

Operations

- Manage vehicle maintenance
- Proactively detect electrical and other issues
- Advanced diagnostic data
- Integrate into ERPs and other systems

Safety

- Collision alerts and reconstruction
- Driver risk management
- In-vehicle coaching
- Track speeding
- Seat belt use
- Risks from reverse driving

Sustainability

- Increase fuel efficiency
- Decrease idling
- Track CO2 emissions
- Fleet electrification
- EV performance monitoring and reporting

Compliance

- Electronic driver logs
- Tax reporting assistance
- Vehicle inspection reports DVIR

Expandability

- Hardware Add-Ons and Software Add-Ins
- System integration (Software Development Kit)
- Ecosystem
- Marketplace

The Geotab Solution Overview

Geotab's agnostic, AI-driven telematics platform offers a range of advanced fleet management solutions, including vehicle tracking, driver behavior monitoring, environmental impact analysis, safety enhancements, and integration capabilities through Geotab's free Software Development Kit (SDK) and industry-standard APIs. Geotab's telematics solution empowers businesses to optimize their fleets, improve safety, reduce costs, and achieve environmental sustainability.

With a focus on simplicity and efficiency, Geotab provides easy installation, expandable solutions, and a user-friendly interface that allows fleet managers to securely consolidate data from multiple sources into one platform. Geotab prioritizes security and compliance — the company holds the ISO 27001 certification, and adheres to rigorous industry security standards.

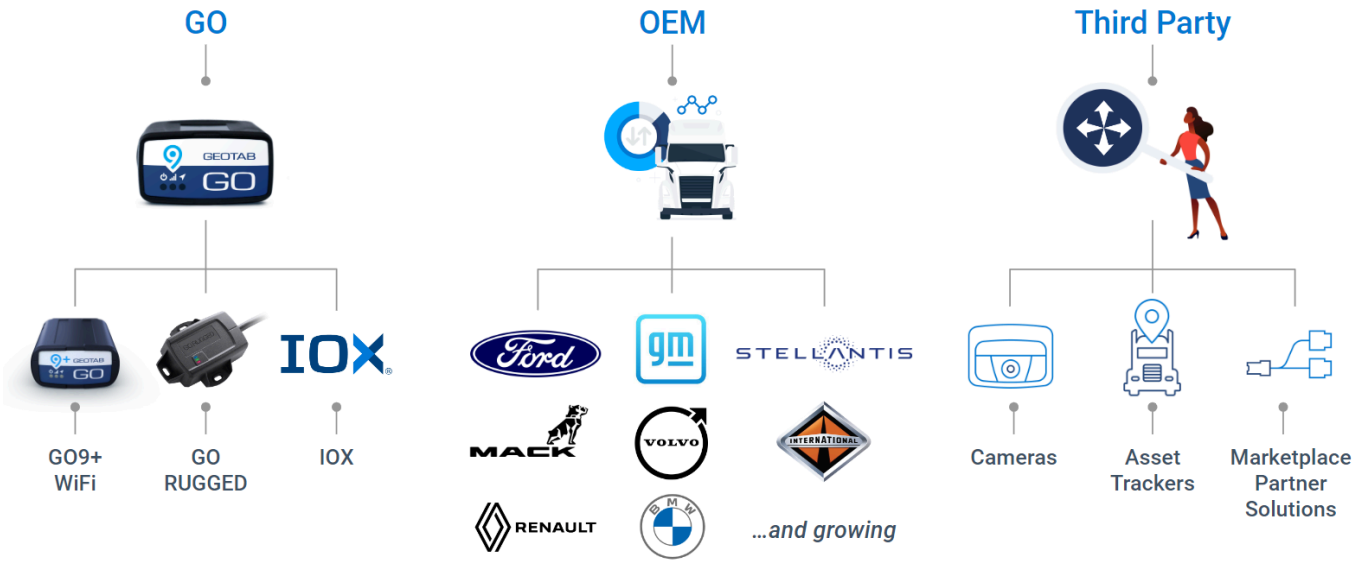
What can the Geotab Platform do for fleets?

- **Connect your assets your way with Geotab's open API and expandability approach**: Connect assets via the Geotab GO device, OEM connected vehicle, and third-party devices, sensors, or data streams.
- **Provides the tools and support to visualize, report and retain your data**: Transform your fleet activities into operational improvements and fleet savings, driver safety and retention, all the while improving Customer satisfaction. Geotab assists with the complex task of capturing, normalizing, and analyzing all of your fleet and asset data, and turning that data into actionable insights.
- **Compliance** Geotab's certified and approved mobile solution for ELD compliance is Geotab Drive. The Geotab Drive solution is an intuitive mobile solution for Hours of Service (HOS) and Driver Vehicle Inspection Reporting (DVIR). In Europe, Geotab's Tachograph Module Solution eliminates manual management of driver and vehicle tachograph legal files. Administrators can monitor the expiry of company

cards and driver's cards, as well as manage the downloading periods to be in compliance with European regulations and more.

- **Geotab Marketplace**: Geotab Marketplace is a one stop shop for third-party mobile workforce solutions. Many industry leading solution providers have integrated with Geotab, offering additional features such as workflow, invoicing, dispatch, SAP, sensor monitoring, and road-facing and/or driver-facing camera solutions.

Device Agnostic - Flexible Connectivity Options



The Geotab platform can be fed with rich data from GO devices including the GO, GO9+, GO RUGGED, and IOX integrations. For certain vehicles it can also leverage robust OEM integrations for data directly from the vehicle. A vehicle's data can be built upon with complementary inputs from cameras and other devices to provide fleet managers with a full view of their fleet.

Regardless of the source, all data can be fed into the MyGeotab platform, providing fleet managers with a detailed, comprehensive snapshot of their fleet all in one convenient, easy-to-use location.

Data Intelligence

Any Data Source

Connect the things that matter most to your business.

Get rich data from a GO device, asset trackers, third-party devices, or directly from select vehicles.

Data Quality

Efficient transfer of vehicle data using a curve-based algorithm for the most accurate and quality data.

Geotab Platform

AI-enabled, proactive insights for smart decision-making and informed action. All with critical speed, scale and accuracy.

Insights

Visibility, flexibility and operational control to minimize pain points and maximize bottom line benefits.

Geotab is a clear market leader in the field of telematics and has access to the data of over 4 million connected vehicles. The depth of data intelligence derived from the scale of the ecosystem – in addition to other supporting datasets from channel Partners and Customers – is an advantage unique to Geotab, and one that competitors cannot imitate at Geotab's scale.

Access to a large amount of data is not necessarily helpful on its own, which is where Geotab's unique data intelligence comes into play. Geotab excels at data intelligence using advanced analytical and AI techniques such as machine learning, computer vision and optimization, leveraged by extensive industry expertise, to turn collected telematics data into a new, meaningful, and relevant understanding of a Customer's fleet's performance.

This shift in understanding – known as an insight – can then be used to identify patterns and make better-informed decisions that can lead to increased efficiency, safety, sustainability and cost savings.

Insights can provide benefits in the following areas:

- **Reporting**

- Out-of-the-box reporting on safety, risk management, and more
- Customizable reports
- Integration with BI tools

- **Productivity + Behaviors**
  - Monitor dwell times, yard movements, entry and exit times
  - Measure jobs completed per vehicle/shift
  - Enhanced reporting for safety, on-time performance, and vehicle maintenance
- **Fleet + Asset Tracking**
  - Real-time visibility into asset location, usage, and availability
  - Create geofenced zones
  - Track beyond the vehicle with asset tracker solutions
  - Partner solutions for specialized used cases and fleet insights
- **Driver Management**
  - Optimize driver productivity, utilization, and satisfaction
  - Driver scorecards and trend reports
  - In-vehicle driver feedback
  - Advanced collision avoidance systems
  - Driver fatigue monitoring
  - Video-based safety
- **Routing and Dispatching**
  - Create efficient stops and waypoints for delivery and pickup orders
  - Dispatch drivers in real-time
  - Enable custom zones
  - Compare planned vs. actual arrival times and stop durations

Emphasis on Security

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Key implementations include:

- GO device and network interfaces use authentication, encryption, and message integrity verification.
- GO devices are individualized — each device uses a unique ID and non-static security key making it difficult to fake a device's identity.
- Over-the-air updates use digitally-signed firmware to verify that updates come from a trusted source.
- Independent third-party experts validate the platform from end-to-end.
- FIPS 140-2 validated by NIST (certificate #3371)
- Geotab achieved full FedRAMP PMO Authority To Operate (ATO) certification in 2020, in addition to ISO 27001 certification

To protect its Customers' critical data, Geotab has a dedicated Chief Security Officer (CSO) and security team focused on developing industry-leading cybersecurity technology. Geotab continuously reviews, improves, and validates its security processes, so its systems remain resilient to intrusions.

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Geotab's Hardware

GO Telematics Device

Geotab's GO telematics device offers a 32-bit processor, 64 MB of non-volatile flash memory that can hold up to 80,000 logs in offline mode (when out of service coverage), and accident data memory that can record over 100 minutes of second-by-second data (8,000 logs) for accident detection and reconstruction. The GO also provides state-of-the-art GPS technology, g-force monitoring, Geotab IOX (input-output expander) expandability, and engine and battery health assessments.

Using Geotab's patented curve logging algorithm, the GO accurately recreates vehicle trips. As opposed to collecting data on a scheduled basis (better known as "ping rates"), the Geotab GO telematics device uses intelligent and patented logging algorithms to identify when to record speed, position, and other engine diagnostics. This is critical to ensuring that all data elements are collected in a manner that allows for downstream analytics.

The device continuously monitors various inputs, including second-by-second GPS data, intra-second accelerometer readings, available engine diagnostics, and auxiliary inputs/outputs where applicable. The device monitors the data and determines the appropriate values to transfer to Geotab servers and store. This patented curve-based algorithm is applied to all Geotab Customer telematics data collected by the GO device, and is what distinguishes Geotab's solution from every other vendor solution on the market. The product of this algorithm are the industry's most granular and actionable datasets.

The GO also offers a customizable in-vehicle audible alert to instantly notify drivers of deviations from company policies related to driver behavior and vehicle operation, including speeding, idling, and aggressive driving.

Top features of the GO9 device include:

- Simple installation and can easily transfer to new vehicles
- Patented curve logic
- LTE connectivity (select regions)
- Small form factor device
- Intelligent in-vehicle driver coaching
- Breakthrough accident detection and notification
- External device expandability via IOX (input-output expander) technology
- Built-in auto-calibrating accelerometer and gyrometer
- Near real-time vehicle data
- Support for GPS+GLONASS connectivity
- Leading engine protocol support
- End-to-end encryption between the GO device and secured Geotab Gateway server
- Fast GPS acquisition time using Almanac OTA support

Further details on the technical specifications and features can be found in the GO9 Support Document.

GO9+ Telematics Device

Geotab's GO9+ telematics device builds on the class-leading GO9 with the added benefit of an onboard Wi-Fi hotspot. Similar to the GO9, the GO9+ offers state-of-the-art GPS technology, g-force monitoring, IOX expandability, engine and battery health assessments, and communication on the LTE network (in select regions).

Geotab's GO9+ telematics device delivers an in-vehicle Wi-Fi hotspot to connect tablets, phones, and other Wi-Fi-capable devices. The GO9+ also offers intelligent in-vehicle driver coaching and breakthrough collision detection notification.

Further details on the technical specifications and features can be found in the GO9+ Support Document.

GO9 RUGGED Telematics Device

The GO9 RUGGED is a ruggedized telematics device that offers state-of-the-art GPS technology, g-force monitoring, Geotab IOX expandability, and engine and battery health assessment. The GO RUGGED is ideal for heavy equipment, “yellow iron”, agricultural machinery, oil field equipment, the tracking of powered trailers and assets, and installations where the Geotab GO device is exposed to the elements.

The GO RUGGED device operates within -40 and +85 C and meets SAE J1455 environment specifications, including thermal shock, mechanical vibration, operational shock, and humidity, with an IP68 and IP69 rating.

The GO RUGGED device connects to the following engine interfaces: Legacy OBD (SAE J1850 PWM/VPW, ISO 9141-2, and ISO 14230 (KWP2000)); ISO 15765 CAN (including WWH-OBD, GMLAN, VW TP2.0) @ 125/250/500 kbps; and has 2- or 3-wire install support (for older vehicles/asset tracking). It supports 12V and 24V systems, operates using vehicle power and has a sleep mode when the vehicle is not in use to reduce battery consumption. The device will communicate at regular intervals while “asleep” and will “wake up” upon vehicle ignition. The GO RUGGED uses curve-based voltage logging to detect weak batteries, failing alternators and failing starters. It also accommodates momentary drops in voltage during engine start and is protected from voltage spikes.

Top features of the GO RUGGED include:

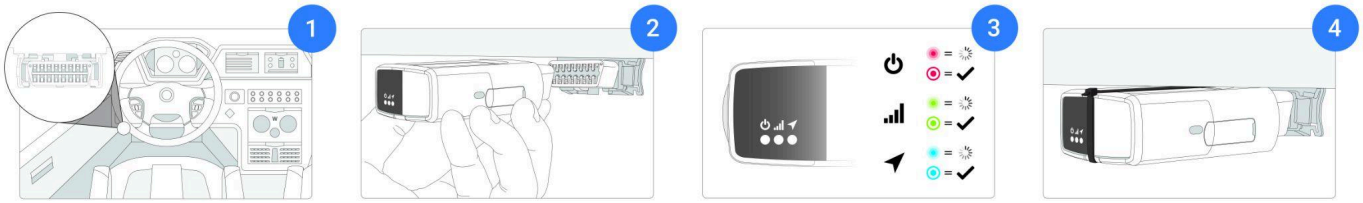
- Support for most major engine protocols
- IP68 & IP69K rated for water, dust ingress, and pressure spray protection standards for protection against dust and water
- Additional cable length on the GO RUGGED device allows for external installation away from the diagnostic port
- Connects to the OBD port or existing harnesses via HRN-RS12S2 (sold separately)
- Supports all current IOX via HRN-RX06S4 (sold separately)
- Intelligent in-vehicle driver coaching via IOX-BUZZ or IOX-GOTALK
- Breakthrough collision detection and notification
- Accurate engine diagnostics, DTC, and proprietary engine data
- Near real-time vehicle data
- Fast GPS acquisition time using Almanac OTA support

- Built-in accelerometer

For more information on the GO9 RUGGED, please see the GO9 RUGGED Support Document.

Simple Installation

Geotab's GO device can be self-installed by following the steps below.



1. Locate the vehicle's engine diagnostic port, typically found in the driver's area at or below knee level. Note: Heavy-duty vehicles use a different connector system. For heavy-duty connector applications or installations requiring installation away from the engine diagnostic port location, users should contact an installation expert.
2. Align the receiver end of the device with the engine diagnostic port and push it in place. Please ensure the device is well connected to the diagnostic port. Once connected, the device emits six quick beeps.
3. Once the device is connected and receives power, the LEDs on the front of the device start blinking and then turns solid once completing the actions below:
    - Red LED: device configuration
    - Green LED: cellular network connectivity
    - Blue LED: GPS network connectivity

    Note: The device should be in good cellular coverage during the installation process.
4. The device emits two quick beeps every 60 seconds during set-up. An initial startup may take several minutes to complete. Once all three LEDs turn solid and the device emits ten quick beeps, secure the device using the provided cable tie. **Although the device can be self-installed and secured using a cable tie, it is advisable to use a T-harness cable for covert installation (device is hidden behind the dashboard) to mitigate device tampering.**

    Note: The device starts updating when the green and blue LEDs turn solid.

Harnesses

For professional installation of the GO device, various harnesses are available for different vehicle cases, makes, and models, including when there is no OBD port available. The most common harness is Geotab's Universal T-Harness (HRN-GS16K2). This harness enables users to hide the device and leave an OBD port available.

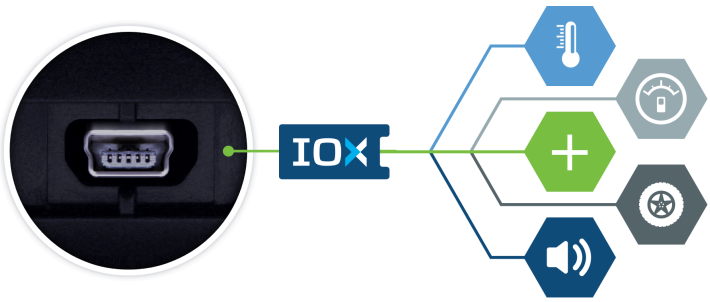
IOX Expansion

IOXs are Marketplace hardware add-ons from Geotab or third parties that add functionality to the GO device. IOX Expansion Technology makes it possible to connect additional hardware to the Geotab device via a small expansion port on the side of the device. There is a whole range of hardware add-ons ready for integration by this method, such as Driver ID and connecting to onboard CANBUS, serial sensors, and more. A daisy chain allows up to five IOXs in a row with the current firmware. This functionality can be used for driver identification with third-party sensors as well as Android and IOS devices.

Using IOX technology allows fleet managers to pick and choose only the capabilities that are required by and pertain to their unique business needs. Advantages include:

- Reduced costs: Customers only need to pay for what they need.
- Reduced in-vehicle hardware space: There is no need to place another device right next to the Geotab GO device, which ensures that drivers are not restricted by space.
- Allows for future expandability: As new IOX harnesses are introduced by Geotab – which help satisfy Customer demand for new technologies – future expandability is increased.
- Easy installation: When new capabilities are added, the devices only need to be connected to the GO device or to the last IOX expander in the chain, eliminating the need to remove the existing device and its connections.

For more information on IOX Expansion, please visit www.geotab.com/blog/iox-expansion.



Geotab's Software

MyGeotab Fleet Management Application

MyGeotab is an AI-enabled fleet management platform that harvests rich vehicle data and provides complete insight into the health and performance of all the vehicles in a fleet. MyGeotab provides fleet managers and drivers with powerful visibility into their vehicles, including service interval alerts, automated odometer mileage for business vs. personal usage reports, and vehicle fault diagnostics. MyGeotab takes the complexity out of collecting data and transforms it into useful, actionable insights; by reviewing and analyzing the captured data through Geotab's user-friendly dashboards, companies can avoid costly vehicle downtime, improve employee safety, productivity, and increase revenue.

Geotab's system allows Customers unfiltered access to the data generated by their vehicles. This information can be viewed via Geotab's web-based software, MyGeotab, and via free and open Application Programming Interfaces (APIs), which can integrate with a Customer's back-end systems and third-party applications. Geotab is an open-platform fleet management solution and does not place roadblocks to providing clients with access to their data. Customers' data belongs to them, and Geotab understands that they can share or utilize it as they see fit.

MyGeotab is available in 10 different languages: English, French, German, Japanese, Italian, Dutch, Polish, Spanish, Brazilian Portuguese, and Simplified Chinese, and is available as an app for iOS and Android.

Advantages of MyGeotab

- **Advanced reporting:** Geotab offers robust, easy-to-use, and advanced reporting features. Users can start with one of MyGeotab's many standard reports and customize them into more meaningful information that suits any fleet's information requirements.

  MyGeotab uses Microsoft Excel as its report writer, and also provides enhanced reporting capabilities through the Geotab Data Connector. Fleet managers can consolidate fleet, financial and HR data into one stream for instant trending and long-term analysis within the most popular BI tools, such as Tableau or PowerBI. Data Connector securely integrates fleet and business data in order to discover areas for operational and bottom line improvements now and for the future. Reports and features include, but are not limited to:

  - 90 built-in reports
  - Customizable dashboards and reports
  - Trending dashboards and reports
  - Report scheduling
  - Private vs. business mileage
  - Driver scoring reports
  - Customer stops by zone report
  - Driver congregation report
  - Accident reconstruction report
  - Customizable work hours
  - Time-off and timecard reports
  - Speeding
  - After-hours usage
  - Back-up when leaving
  - Engine diagnostics and issues
  - Seatbelt usage
  - Accident reporting
  - Low battery warning
  - Engine misuse (over-revving)
  - Risk management reports (insurance use case)
  - Productivity (idling, arrival/departure times, etc.)
  - Finding the nearest vehicle to the location, including the distance to the location
  - Dangerous driving (acceleration, braking, cornering)
  - Maintenance reminders scheduled by time or distance, or engine data parameters
  - Color-coding to signify the status of Garmin-equipped drivers on a map]
  - International Fuel Tax Agreement fuel tax reports

  - MyGeotab reporting offers users the ability to build ad-hoc dashboard reporting. Dashboards are customizable for all Geotab plans (Base, Pro, and Pro-Plus.) These reports have rich reporting functionality — they are editable, customizable, trends, etc.

- Alerts: The MyGeotab system can be configured with driver and supervisor email addresses for alert purposes. When exception rules are broken, users can send automatic notifications to the relevant parties. A notification can be sent out in the following ways:
  - An email to one or more recipients
  - An alert that is displayed inside the application to a specified user
  - An audible in-vehicle alert from the telematics device
  - Additional alerts — such as SMS — that are made possible by third-party systems

Note: There may be a minor delay between when data is sent from the vehicle to when the server sends a notification depending on the type of notification and exception being handled. Alerts can be sent for speeding, unauthorized or after-hours usage, and productivity (idling, arrival/departure times, etc.).

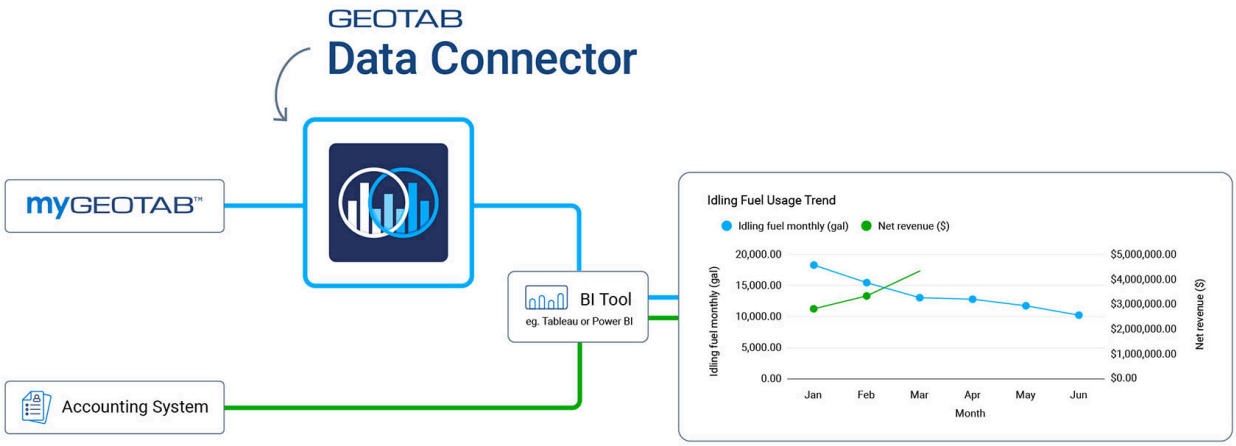
- Driver behavior management: Fleet managers can influence safe driving behavior with in-vehicle driver feedback and coaching tools. Driver behavior reports include speed, idling, harsh cornering, harsh braking, harsh acceleration, and excessive RPM usage.
- Maintenance reminders: Geotab offers a reliable maintenance reminder platform that can be used to track maintenance events for any and all kinds of vehicles. This feature can be set up to automatically remind fleet managers of all individual maintenance events for the entire fleet, regardless of their make, model, and size. The main component of any maintenance event is the frequency with which it needs to be performed - the frequency determines the rule's conditions for each maintenance reminder. Users can also use MyGeotab to record maintenance completed, which may be important if company policy requires the documentation and verification of maintenance activities.
- Robust engine data reporting: Geotab collects and responds to common status information in vehicles, including engine RPM, engine light, seatbelt, odometer, engine hours, emissions, VIN, and vehicle battery voltage. Note that the robustness of the information collected is dependent on the make, model, and year of the vehicle.
- GPS vehicle tracking: MyGeotab allows fleet managers to view the current location of their vehicles in near real-time, or provide a past date and re-trace their fleet vehicles' location on that date. Geotab's Pro Plus Active Tracking allows for increased data logging frequency and visual animations in MyGeotab. The animation feature displays estimates of the vehicle's near real-time location on the live map, and users are able to watch a simulated icon of the vehicle as it is moving. This new feature provides dispatchers and fleet managers with a highly accurate depiction of where a vehicle, enabled with this technology, is at any given time.
- Zone coverage: Geotab offers a reliable solution for instances when a vehicle is out of cell coverage. When a vehicle is out of cell coverage, the GO device will store telematics data in its internal flash memory. The flash memory is capable of storing up to 80,000 logs, which is roughly comparable to a month's worth of data. Once the vehicle returns to cell coverage, all stored logs are automatically uploaded to the MyGeotab server.

  To determine potential "dead zones", Geotab uses big data analytics to identify areas where GO devices have experienced past issues communicating over the cellular network. This analysis will help fleet managers determine where certain vehicles may experience intermittent outages. If vehicles are ever out of coverage for long periods of time (greater than a month), Geotab provides an Iridium satellite failover for periodic location data and "panic button" communications.
- Route optimization: Fleet managers can reduce vehicle mileage and fuel consumption by creating zones and routes for drivers, and by comparing actual versus planned routes.
- Engine health and maintenance: Fleet managers can be alerted to potential critical engine health issues and easily prioritize the repairs for their vehicles. A focus can be placed on proactive vehicle maintenance by detecting issues early on and setting up vehicle maintenance reminders. The onboard diagnostics (OBD) of every vehicle are a valuable tool for repair technicians, vehicle owners, and fleet managers, as it monitors the health and performance of the vehicle engine and emissions system.

- Group hierarchy: Geotab has customizable group hierarchies flexible enough to suit the needs of any business. Groups can be created, modified, and removed at will and can be used as filters. Vehicles and users can be categorized into groups. These groups can be used to structure the user interface as required, allowing the user to easily target specific service areas, teams, or individual drivers.
- Custom mapping: Fleet managers can design their business's relevant maps that automatically combine with the application's vehicle information. Flexibility in map views, legends, zone shapes, and sizes allows for further customization. The application supports custom map implementations based on OpenLayers, such as ArcGIS 9.3 REST servers, MapQuest, CloudMade, and Tilemill.
- Geofencing: MyGeotab refers to "geo-fences" as zones. A zone is a virtual perimeter around a real-world area of interest. Users can use zones to denote locations such as offices, Customers, workplaces, airports, gas stations, entire states, homes, or even road/highway networks, etc. When combined with rules and reporting, zones become a critical component for analyzing the behavior of a user's fleet. The resulting exceptions, generated from zone-based rules, provide deep insight into time spent and distance traveled in and out of any MyGeotab zone.
- Telemetry feedback: Audible in-vehicle alerts can improve the on-road driving behavior of drivers by notifying them of unsafe or potentially risky driving events. Fleet managers can configure alerts to sound for several events, including unbuckled seat belts or speeding. If an event is triggered, the driver must correct their on-road behavior for the alert to cease.
- Scalability: Geotab has clients with fleets of all sizes, ranging from one vehicle to over 200,000 vehicles, leveraging the same GO device and software foundation. Geotab's solution is capable of both vertical and horizontal scalability with respect to accommodating all fleet sizes and rapid fleet size growth.
- Track speed readings: Geotab also has the capability of obtaining engine-based road speed from certain vehicle types (when it is reported from the engine computer) as well as deriving it from GPS data when an engine computer is not present. This vehicle speed data can be compared to posted road speed values obtained (and included free of charge) from publicly available sources like Open Street Maps. Idle time is also a default logic built into the MyGeotab software. In addition to default logic, users also have the ability to create custom rules and reports for measuring idling and speeding based on their organization's specific definition of this action.

For further details please refer to the next sections and the Product Guide available online.

Data Connector



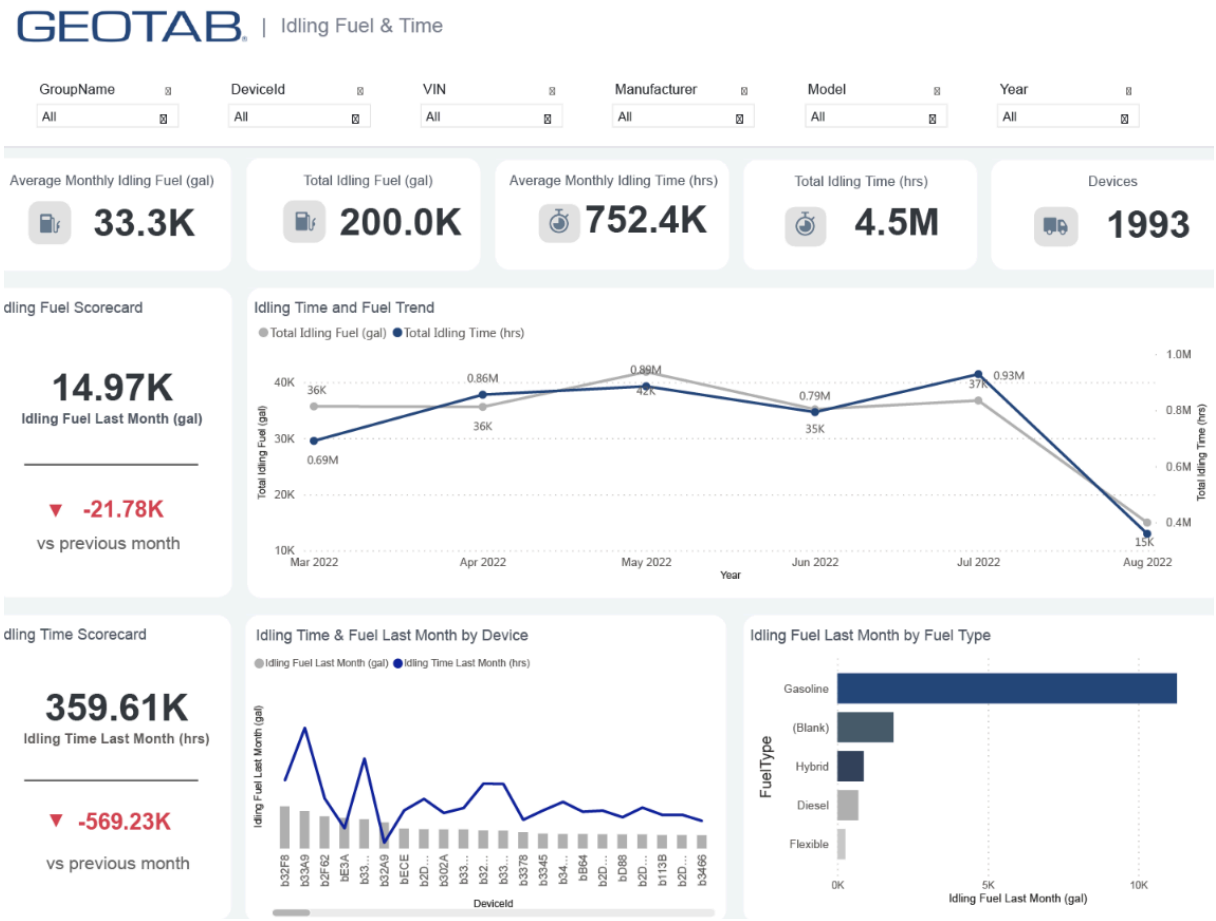
The Geotab Data Connector holds the power to seamlessly integrate data from various sources into the Geotab platform, enhancing its functionality and insights. This data integration capability allows users to consolidate information from different systems and third-party sources together onto one screen with the most popular BI tools, such as Tableau and Power BI.

By having the ability to access a growing library of Geotab pre-built templates, users have the ability to combine fleet data with other data sources such as financial data, human resource data, and other business information. The combined data allows users to make better informed decisions for their business and operations.

Key features of Data Connector include:

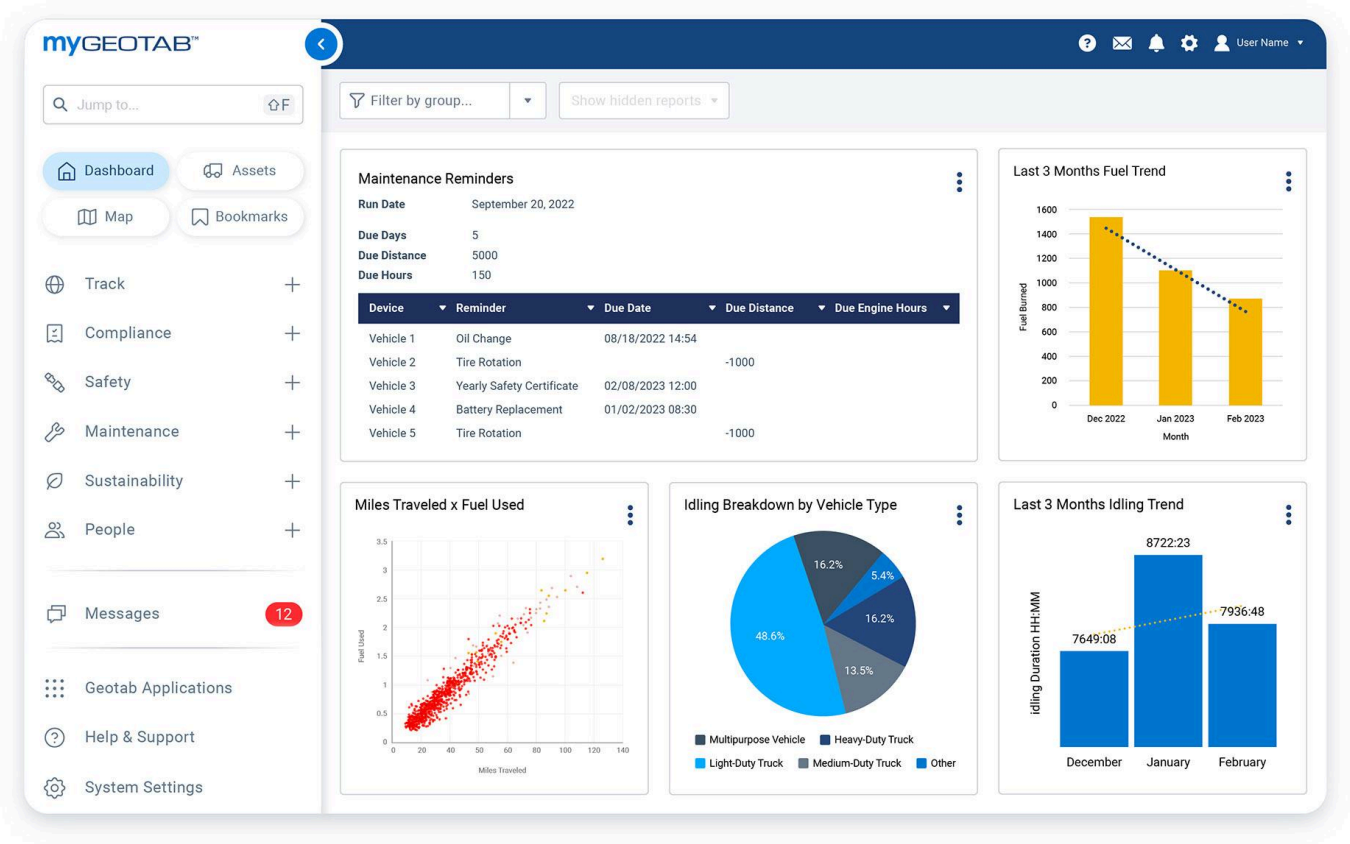
- **Blisteringly fast analysis:** Instant long-term trend analysis means deeper insights. Fleet managers can simply choose a time frame and watch reports become instantly more insightful.
- **One view, added visibility:** Data Connects collects all data on one screen and allows users to easily share views for visibility that stretches across their company.
- **A broader picture of performance:** Fleet managers can view telematics, financial and HR data together to identify patterns and variations for a complete view of operations and assets.
- **One clean data stream:** Users can streamline and present aggregated data in one view. Data Connector makes data ready to use, ready to share.
- **Efficient, secure collaboration:** Easily integrate data from various sources into existing BI software.
- **Easy-to-use templates:** Access an ever-evolving library of pre-built templates to help tell powerful stories with collected data.
- **No coding required:** All data is aggregated and curated for vehicle and safety KPIs, and can be used with pre-made dashboards using a one-time login with Geotab credentials.

For more information, view Geotab's Data Connector website.



Predictive Maintenance

Geotab is actively investing in predictive maintenance capabilities that use vehicle data to determine when a failure is imminent, or a maintenance interval is required. Fleets can save time and money by preemptively addressing maintenance concerns, in addition to saving on the costs of unscheduled downtime.



Geotab's vehicle maintenance software helps to increase the lifespan of fleets by catching small problems before they become large, expensive ones. With MyGeotab, fleet managers can forecast and schedule their fleet's regular service tasks and inspections, and keep accurate records of vehicle issues, maintenance schedules, and parts inventories to ensure the maintenance scheduling process always runs smoothly. Fleet managers can also coordinate use with the MyGeotab Driver Scorecard and proactive coaching to help minimize wear and tear.

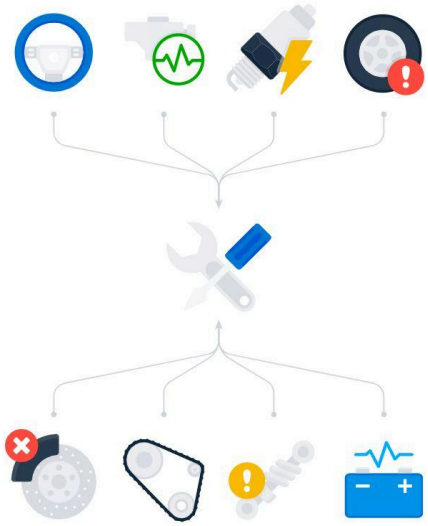
Using MyGeotab's engine diagnostics solutions, fleet managers can keep their drivers safe, maximize vehicle uptime, and flag potential problem areas so they can plan fleet operations effectively.

Geotab's fleet maintenance tools include:

- Remote diagnostics to identify small problems before they become large, expensive ones.
- Inventory management to streamline the maintenance scheduling process and ensure that important parts are on hand when they are needed.

- Predictive maintenance to reduce vehicle downtime and costly breakdowns on the road by anticipating future maintenance requirements.
- Maintenance scheduling and reminders to keep on top of the fleet's preventative maintenance program and ensure no inspections, services or faults slip through the cracks.
- Work order management to easily log defects from anywhere and track their resolution.
- Maintenance cost reports to track work completed and report on costs and trends, helping fleet managers target areas where they can improve their bottom line.

Maintenance Center



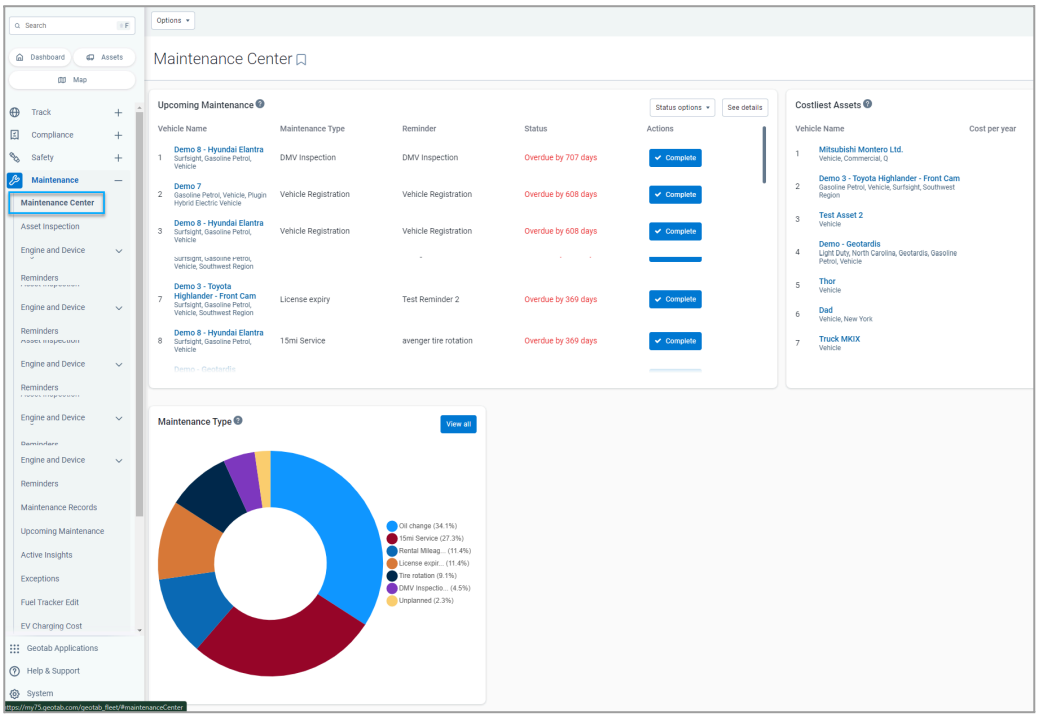
A healthy, well maintained fleet is paramount to a business' success.

Avoiding unnecessary costly repairs or business downtime is a top priority that impacts business reputation, driver safety, and bottom line; however, the information fleet managers need often resides in disparate places.

Geotab's Maintenance Center is a centralized location in the MyGeotab platform that provides fleet managers with a holistic view to keep assets running, identify maintenance status or trends, identify issues, and review maintenance records. It provides an understanding of the costs of maintenance per asset.

The benefits of Maintenance Center include:

- Track maintenance schedules and fault events from all your vehicles in one place
- Easily understand maintenance costs and compare across a diverse range of vehicles
- Preventative maintenance insights minimize downtime and repair costs



Software Development Kit / API

The Geotab Software Development Kit (SDK) is a powerful set of tools for automating tasks and working with data in MyGeotab. Geotab's open, device-agnostic solution provides fleet managers with unprecedented flexibility to tailor their telematics systems to their unique business and operational requirements. No longer will Customers need to conform to a rigid, off-the-shelf solution, or settle for a less than ideal, pre-set functions using specific, proprietary devices. With Geotab's flexible and open solution and through the use of a robust variety of integration tools, fleet managers can receive the exact telematics data they require for their business — all accessible in one place through MyGeotab.

Geotab's solution allows for integration with most third-party systems through the use of Application Programming Interfaces (APIs), and offers a variety of integration options through its free SDK. These integrations include:

- **Data Feed:** The data feed is the primary method for synchronizing data from the telematics system to another system using the API. The data feed's GetFeed method can be polled at intervals to get new and updated data from the system. The feed API works with a token passed on every request and sent back with the payload on every response. This process allows Geotab to track up to which point in time the receiver has been sent data. It also allows the receiver to stop and seamlessly resume the data feed.
- **Embedded version of MyGeotab:** Each of the MyGeotab pages has a URL (Uniform Resource Locator) associated with a page allowing the page to be embedded in a company application or linked elsewhere. This is a great way to integrate MyGeotab into a company's workflow.
- **Integration of third-party devices:** MyGeotab accepts data logging from telematics devices not manufactured by Geotab ("third-party devices"). MyGeotab provides a unified interface for all fleet information, enabling users to manage their vehicles regardless of their installed telematics hardware. A

MyGeotab database can store information from Geotab GO devices and third-party devices at the same time — allowing for a single point of coordination across a fleet consisting of a variety of devices. More than 25 third-party devices have already been integrated and are compatible with MyGeotab.

- **Add-Ins in MyGeotab:** Add-Ins are used to extend the functionality provided by MyGeotab and Geotab Drive. Add-Ins including JavaScript, HTML, and CSS are loaded into the MyGeotab or Geotab Drive portal and reside directly inside the user interface. This allows third-parties to create a seamless user experience and provide solutions that would otherwise require the user to visit a different website altogether.

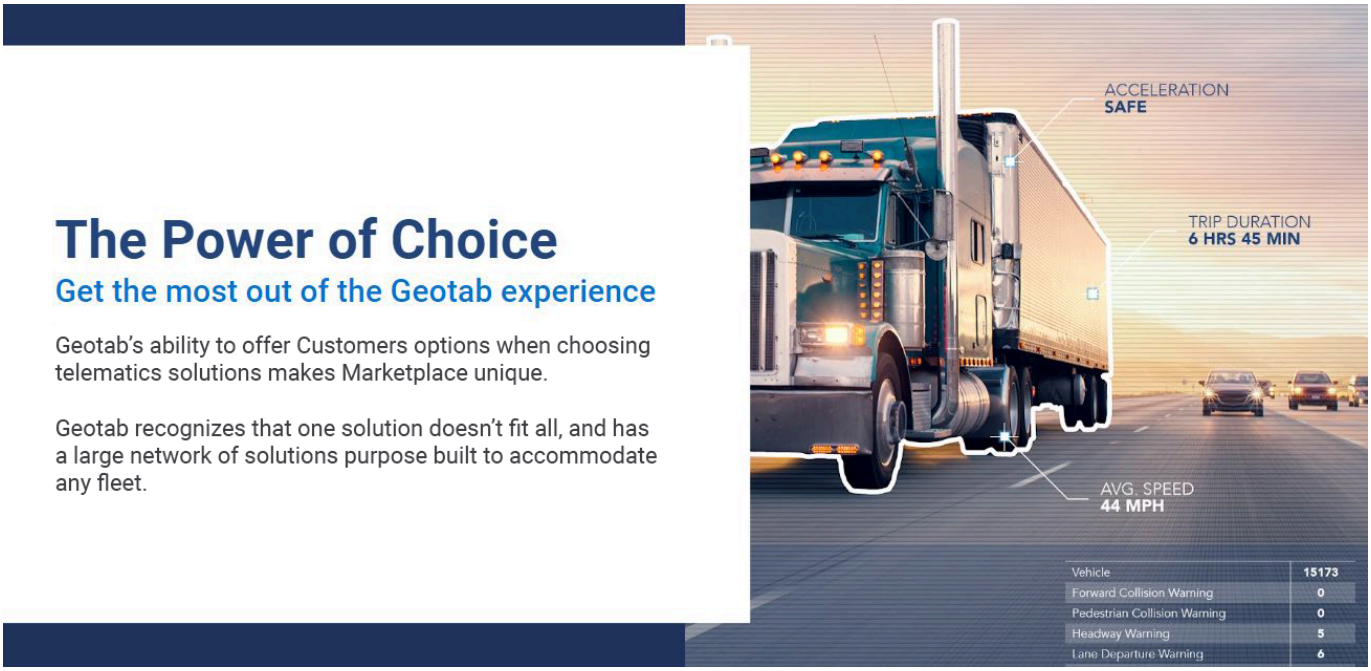
Geotab provides help libraries for C# and JavaScript; however, any language or application capable of making HTTP (HyperText Transfer Protocol) requests can access its full functionality. Specifically, requests made to the Geotab API are executed with HTTPS.

The minimum SSL/TLS version supported by the MyGeotab API is TLS v1.2. API request parameters and the results are transported in the lightweight JSON format, which works better with data and offers faster parsing. Requests to the API can be invoked using HTTP GET or POST. HTTP POST requests use the JSON-RPC standard.

Geotab is committed to understanding the unique and varied needs of its Customers and providing the flexibility and reliability required to meet those needs. With the Geotab solution, fleet managers can tailor their telematics to their business — and not the other way around.

Marketplace

The Geotab Marketplace is the ultimate online solutions center for managing vehicles and fleets.



Geotab's Marketplace offers many third party integration options, via Marketplace Partners, that are compatible with the Geotab telematics platform. Fleet managers can choose from a powerful suite of mobile apps, MyGeotab software add-ins, hardware accessories and add-ons, general software solutions, and free custom reports.

From in-vehicle cameras and Bluetooth asset tracking to solutions for managing maintenance and fuel tracking, fleet managers can find a wide range of options that help both small and large businesses automate operations. Other solution areas include ELD and compliance, driver ID and training, temperature tracking and more.

The Marketplace Advantage:

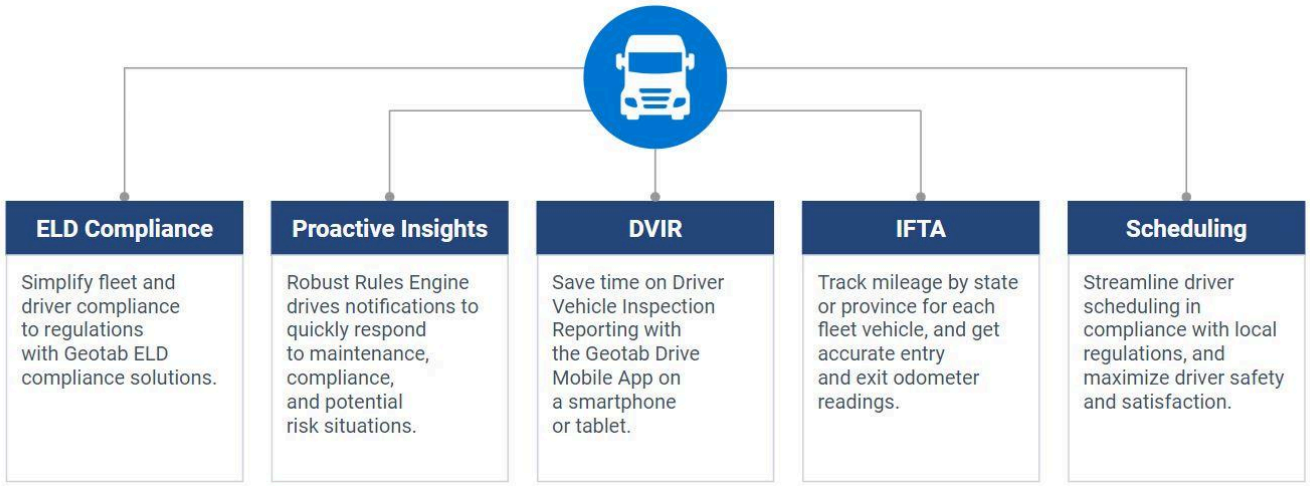
- **Vetted and secure:** Marketplace Standard, Premier, and Order Now solutions undergo business analysis, legal, security, and technical vetting to meet Geotab's high reliability standards.
- **Purpose built solutions:** Marketplace solutions meet unique fleet business needs, providing tailored options rather than a one-size-fits-all approach.
- **Extending telematics data**: Marketplace solutions are fully integrated with Geotab, allowing fleets to extend the value of their telematics solution.

Marketplace provides access to the largest telematics ecosystem of more than 300 integrated, fleet-focused hardware and software solutions from Geotab and its Partners, including:

Compliance Solutions

Geotab Drive

Geotab Drive is a mobile app for drivers that integrates electronic logging device (ELD) compliance, Driver Vehicle Inspection Reporting (DVIR), driver identification, messaging, and more.



Using the Drive app, drivers can record their Hours of Service (HOS) and complete vehicle inspections from their tablet or smartphone. Fleet managers can stay up-to-date on fleet compliance with near real-time access to information in MyGeotab, including violation alerts and detailed reports on driver logs and remaining hours.

This smart mobile app works with the Geotab GO telematics device to help meet compliance regulations, improve fleet productivity, and provide the ability to add additional functionality to meet the needs of fleets.

Geotab Drive provides several useful services to fleet drivers, including:

- Hours of Service (HOS)
- Driver Vehicle Inspection Reporting (DVIR)
- Driver identification
- Messaging
- Add-Ins

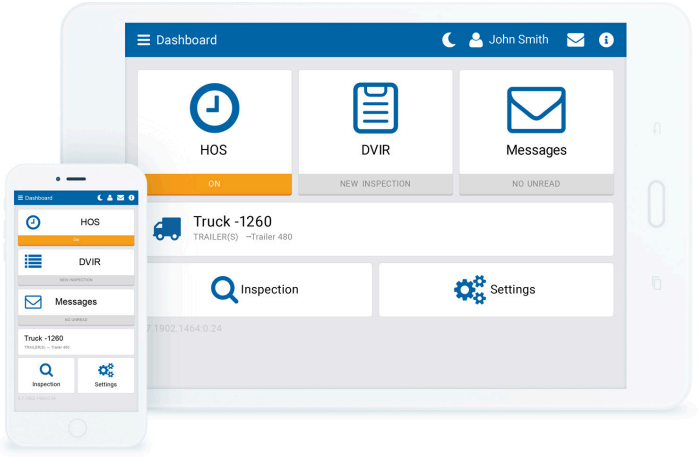
Geotab Drive features include:

- Fuel usage and efficiency monitoring
- Integration with several major Transportation Management Systems (TMS) and platforms

- Engine fault reporting for proactive vehicle maintenance
- Accurate insights for International Fuel Tax Agreement (IFTA) and International Registration Plan (IRP) mileage reporting with actual trip miles
- Paperless forms and electronic signature capture
- Add-on Marketplace solutions for trucking, such as refrigerated trailer temperature monitoring, tire pressure monitoring, in-cab cameras, and more

Geotab Drive benefits include:

- Simplifying compliance
- Increasing productivity and efficiency
- Improving driver safety
- Reducing admin time and costs
- Tracking arrival and departure times and delivery status
- Increasing accuracy of records
- Improving communication with drivers
- Increasing vehicle up time with engine fault reporting for proactive vehicle maintenance



Geotab Public Works

Geotab Public Works helps government agencies manage vehicles such as salt spreaders, snow plows, street sweepers, and waste management vehicles. Our solution helps departments meet infrastructure service levels while controlling costs, tracking material usage, and more. Plowing and salting roads and highways, street sweeping, and waste collection are critical services delivered by local governments and municipalities. Optimizing these maintenance operations maximizes mobility and sanitation in the community while minimizing collisions due to traveling conditions.

Geotab's Public Works solution allows fleet managers to manage public works operations in near real-time – from winter maintenance fleet's salt usage and activity to street sweepers' and waste management vehicles' route completion – in order to build smart, efficient cities.

With Geotab Public Works, fleet managers can:

- Automate time-consuming workflows: Fleet managers can deliver a high level of service by measuring the activity of the fleet with simplified near real-time reporting into which roads have been serviced.
- Optimize performance: The Geotab Public Works solution provides data on fuel usage and idling that can cut fuel consumption and assess electric vehicle suitability, while improving driver behavior with near real-time visibility into seat belt usage, speeding, harsh cornering, and braking.

- Manage operating costs: Fleet managers can monitor how much salt is being used to avoid overusing materials, improve routing for optimal uptime and reduced mileage, and support vehicle sharing and motorpools for cost savings and efficiency.

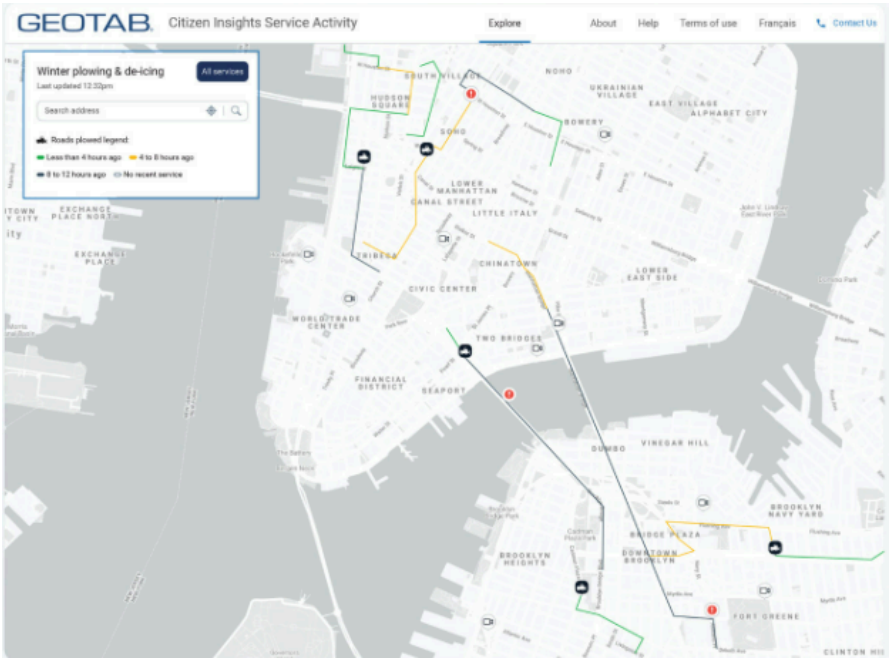
The Geotab Public Works advantage for government fleets provides:

- Automated reporting for regulatory compliance and billing
- Active tracking for winter maintenance and waste management activity
- Accident detection with near real-time notifications
- Accurate measurements of winter equipment usage
- Route completion for reduced mileage
- Idling and fuel consumption trend reports
- Preventive maintenance
- Near real-time reporting on:
    - Salt usage and plow time for winter vehicles
    - Broom and water time for street sweepers
    - Mechanical arm count for waste collection trucks

Citizen Insights

Citizen Insights gives the public access to relevant, up-to-date information for safe and efficient travel within their community. Similar to checking the weather, Citizen Insights can become part of a commuter's daily routine. Citizen Insights allows citizens to travel on clear, serviced roads whenever they are moving through their neighborhoods.

Citizen Insights provides up-to-date access to the status and location of operational fleet vehicles such as snowplows, salt spreaders, and waste management vehicles to improve safety, communication, and transparency. This information can help citizens to better plan their routes by identifying and avoiding areas which have not yet been serviced.



With Citizen Insights, government agencies can maintain an open line of communication with their citizens while holding themselves accountable to reach operational targets. Citizen Insights can also reduce the number of incoming citizen inquiries by directing them to Citizen Insights using the delivery type that fits best for each jurisdiction, including:

1. A hosted website customized with individual agency branding.
2. Geotab's Citizen Insights embedded as an iframe directly into an agency website.

NOTE: This solution is not available for federal government entities (FedRAMP).

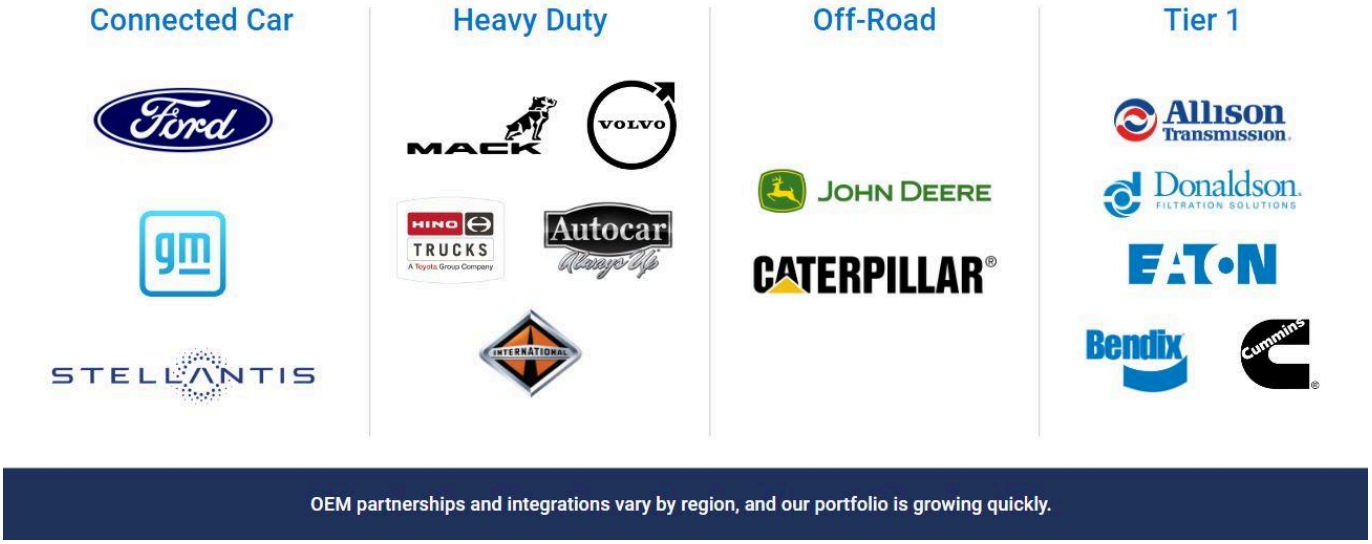
Key highlights:

- Allows fleet managers to share timely and consistent operation status updates.
- Allows representatives to post information as needed, including which areas have been serviced and others that still need attention.

- Users can customize the data shared to the public, and exclude service groups or vehicles from public view as needed.
- Citizen Insights provides a configurable Add-In to MyGeotab, allowing clients to set up, publish, and update their public site on-demand without having to involve Geotab support.

OEM Integration

Geotab has numerous partnerships with OEM manufacturers that help Geotab integrate different vehicle data and stay on the cutting edge of telematics.



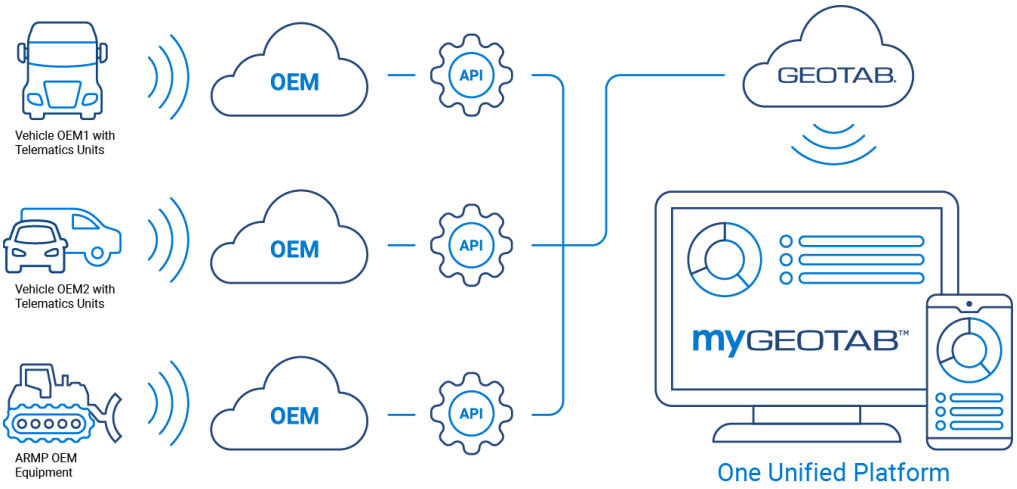
Geotab is focused on strategic OEM partnerships and connecting commercial vehicles, actively engaging with OEMS — globally — and continuing to announce new partnerships and enhancements. Geotab has integrations in certain territories with Ford, GM, Stellantis, Hino Motors, BMW, Mercedes-Benz Connectivity Services, Volvo, Mack, Renault, Navistar, PSA Group, Bendix, Donaldson and Autocar. Many other partnerships and projects are in-progress.

Geotab values the relationships built with its OEM Partners and continually invests resources to establish itself as a strategic business partner as the connected vehicle market grows and evolves. Fleet managers can leverage and benefit from Geotab's existing OEM integrations and experience, accessing more vehicles as Geotab's partnerships expand.

Geotab OEM Data Platform

Geotab has always believed in an open platform approach to enable Customers to get more value from its products. To this end, Geotab developed the OEM Data Platform. This solution leverages the emerging trend of OEMs adding an embedded telematics device into vehicles.

Geotab's OEM platform provides the capability to integrate telematics data from the manufacturer and make it available on MyGeotab.



The Geotab OEM Data Platform leverages the building blocks available to all its integration partners. The functionality allows partners to send telematics data from their devices via Geotab APIs defined in the SDK.

The OEM platform goes a step further by developing the integration capability internally. This not only standardizes the user experience but relieves the partner from spending effort to build and maintain the integration software. The platform is hosted by Geotab within a secured, highly available production environment which undergoes regular maintenance release cycles. This ensures that high quality and reliable service is available to Geotab's users, so they can focus on what matters most to them — managing safe, productive, and efficient fleet operations.

Benefits of using Geotab's OEM Data Platform include:

- Cost advantage: There are no device hardware or installation costs.
- Ease of use: Customers can use the same MyGeotab portal and UI for tracking. Fleet managers use the existing database to view devices from several pre-integrated OEMs alongside GO devices.
- Faster time to market: There are no delays related to device shipment or installation for OEM devices.
- Access to additional data: OEM and sensor data, such as tire pressure, is sent directly by the embedded OEM device.

For more information on Geotab's OEM Platform, please refer to the following blog post.

Collision Reconstruction Add-In

Geotab's Collision Reconstruction Add-In is an all-in-one solution for viewing, analyzing, and interpreting collision data from Geotab tracking devices. The Collision Reconstruction Add-In finds and analyzes known collisions for a given time period and displays all relevant information in a single, easy to read document.

This tool is helpful for fleet managers and administrators who wish to view the position and the point of impact of any collision in their fleet. It provides customized links to view the speed profile, RPM, and accelerometer data before, during, and after a collision.

Features of the Collision Reconstruction Add-In include:

- Add-In allows for reconstruction based on an extended time period.
- Add-In provides an all-in-one view of a collision without having to sort through and analyze separate sections of MyGeotab.
- Point of impact is calculated based on the acceleration values received.
- Simple customized links to go straight into the speed profile, RPM graph, and accelerometer graph without need for further analysis or configuration.

Benefits of the Collision Reconstruction Add-In include:

- Fast and easy to use solution for analyzing collision data
- Optimizes and simplifies complex accelerometer data
- Provides critical data to improve logistics and decision-making
- Point of impact can provide a better understanding of the overall accident as it occurred
- Increases overall fleet safety by reducing potential recurring behavior in drivers
- Reduces potential accidents

Driving Behavior - Risk and Safety Reporting

Geotab's fleet safety reports provide advanced insight into drivers' on-road activities. With Geotab's robust driving behavior reports, risk and safety scores are assigned to individual drivers based on various factors, including: speeding, seatbelt usage, braking habits, corner turn degrees, acceleration, and after-hours vehicle usage. Geotab reports also illustrate daily, weekly, or monthly driving trends so fleet managers can develop performance benchmarks.

Features and benefits of Geotab's Driving Behavior reports include:

- In-vehicle driver coaching: Geotab develops interactive alerts to help drivers identify and improve their on-road driving behavior. Near real-time buzzer notifications support company safety policies and help drivers take corrective actions.
- Improve driver seat belt habits: Geotab's driver and passenger seat belt detection feature, available for most vehicles, reminds drivers to buckle up while on the road. Greater seatbelt usage reduces driver injuries and improves compliance with the law and internal fleet safety rules.
- Help prevent collisions: Reversing is one of the leading causes of parking lot collisions. Geotab's patented technology identifies reverse motions and reminds drivers to be cautious.
- Reinforce company safety policies: Geotab's risk management report shows how many rules were broken and the total miles driven for the time frame chosen. This critical metric shows how many rules were broken over a standard amount of miles across the organization. This reporting places all drivers on an even playing field and allows organizations to enforce fair practices. A driver safety scorecard report, fully configurable, is freely available at Geotab Marketplace.

GO TALK

Geotab GO TALK enhances driver and fleet safety by providing spoken word alerts to drivers while on the road in near real time. Spoken instructions from inside the vehicle inform and empower drivers. Using advanced text-to-speech technology, GO TALK warns drivers of violations so they can immediately correct their behavior.

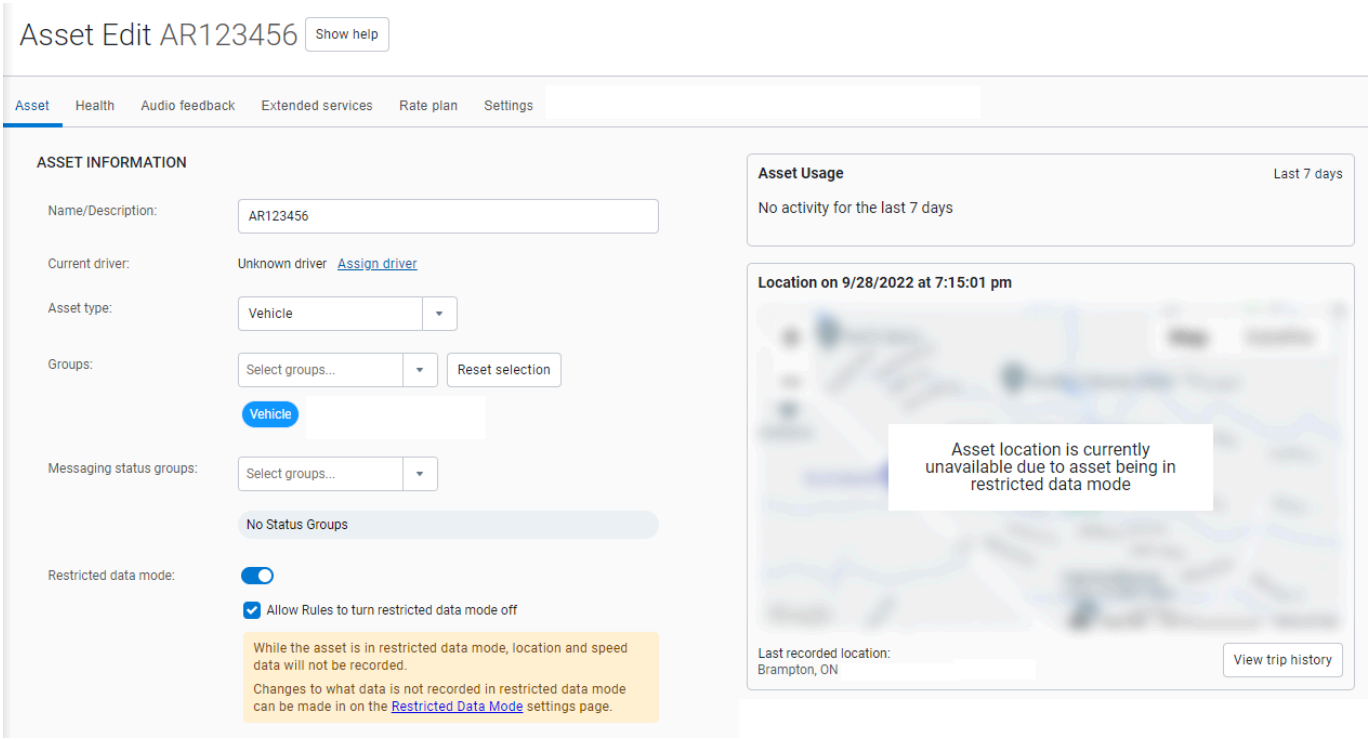
Restricted Data Mode

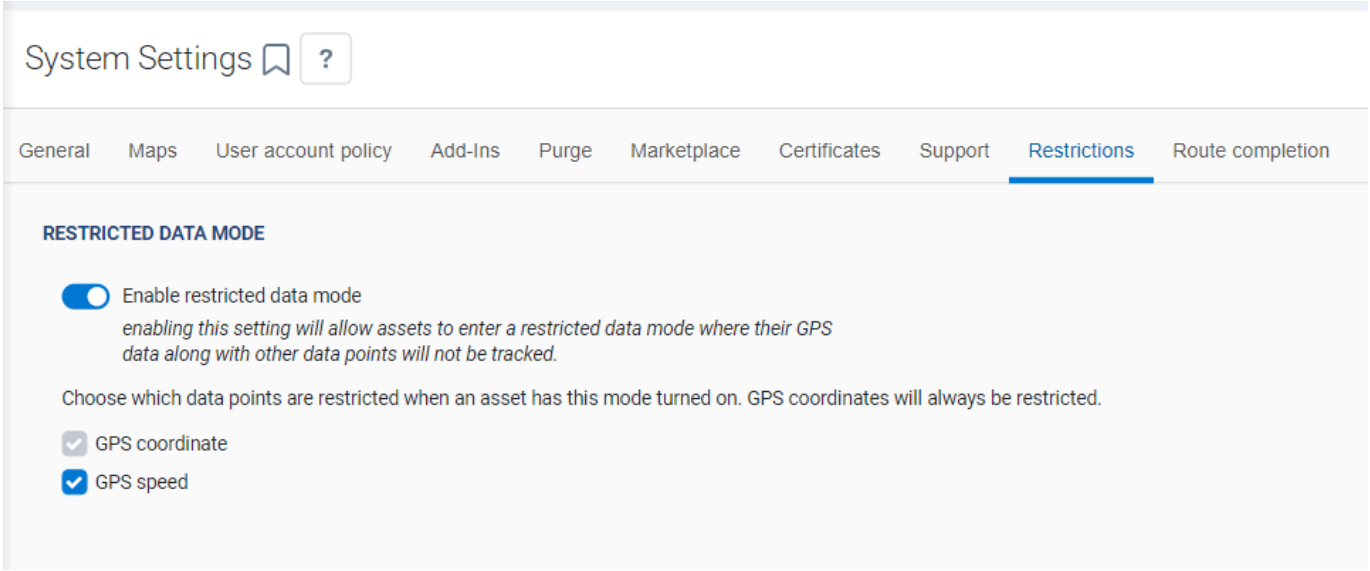
Restricted Data Mode allows drivers and fleet managers to temporarily forego recording GPS coordinates and/or GPS speed on their vehicles. When Restricted Data Mode is enabled, location features in MyGeotab that use GPS such as position, trips, speed profiles, and GPS based exceptions, are not available. The key difference between the previous Personal Mode and the new Restricted Data Mode is that the GPS record is not stored in the database during that time period.

Features that do not use GPS and other restricted data points will continue to be available without any interruptions and displayed as normal. Since GPS data is not accessible in Restricted Data Mode, other features such as reports or Add-Ins will function differently when Restricted Data Mode is enabled.

Restricted Data Mode is intended for Customer use cases including:

- Leasing companies: This function is useful for situations where the leasing company does not need to see the vehicle's location, but requires maintenance data to automate vehicle maintenance. For example, data can be shared with the Customer database, where full access to GPS data is maintained.
- Employee perks: This function can be useful to allow drivers to drive company vehicles outside of work hours for personal use and do not require vehicle tracking during these hours.
- Contractor vehicle use: Contractors who drive their personal vehicle for business use and require vehicle tracking for business use but not personal use can use this function to keep their personal vehicle use private.
- Law enforcement: Some operations may require location-based services to be disabled.





Electric Vehicles

Fleet electrification is on the rise across the globe. With government targets aimed at reducing carbon emissions, the continued push to lower fleet costs and the expanding electric vehicle (EV) market, this trend is just beginning.

Geotab is the global leader in telematics and provides solutions powered by one of the world's largest EV performance datasets to help fleets adopt and operate EVs.

Unlike conventional internal combustion engine (ICE) vehicles, EVs are not mandated to follow telematics data standards, since they do not have tailpipe emissions. This makes data access extremely challenging.

With 10+ years of experience working with EV OEMs, Geotab supports over 300 EV makes and models, with a commitment to support new and in-demand models. With Geotab, fleet managers can electrify their fleet with confidence.

Benefits and features of Geotab's EV integrations include:

- Fleet managers can identify the location, state-of-charge and charging status of fleet EVs at a glance.
- Fleet managers can stay on top of charging with near real-time notifications and customizable alerts.
- Charging reports allow users to fully understand charging behavior.
- Rich data allows fleet managers to ensure EVs are paying off by comparing fuel, battery electric and plug-in hybrid electric vehicle use.

Electric Vehicle Suitability Assessment (EVSA)

Specifically designed to help fleets transition to electric efficiently, Geotab introduced the EVSA, a free tool in the Geotab Marketplace. Given the increasing amount of choice and affordability of EVs, Geotab believes that this trend will only continue.

Built on one of the largest datasets of real-world EV performance, the Geotab EV Suitability Assessment (EVSA) provides an accurate view of a fleet's electrification potential. Users will receive EV make and model recommendations that best fit each vehicle's driving profile and meet performance requirements specific to their fleet. Fleet managers can also access a personalized fleet electrification blueprint which includes the potential cost-savings and avoided carbon emissions from integrating EVs into their fleet.

The EVSA provides in-depth and localized analysis that takes into account real-world performance. This ensures that the tool only recommends EVs that are range-capable and can perform the necessary duty cycles under the worst weather conditions. The interactive Add-In allows for complete customization to run multiple electrification scenarios in a quick and convenient do-it-yourself tool.

Geotab's EV Charge Assurance

Effective charging can boost fleet productivity and prevent costly charging delays. Geotab's free EV Charge Assurance Add-In provides a comprehensive overview of the charging status of a fleet's electric vehicles.

The EV Charge Assurance dashboard Add-In provides a comprehensive overview of the charging status for a fleet's electric vehicles. Fleet managers will be able to monitor the charging status of vehicles by groups and charging zones. Fleet managers can also display warnings for any EV that may have a charging issue and won't reach the specified battery level required, allowing for quick corrective action. The Add-In can help prevent costly charging delays and ensure all the EVs in a fleet are ready to go and can complete the day's workload