Georgia Department of Transportation

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EXECUTIVE SUMMARY

The state of Georgia is "the gateway to the Southeast," thanks to its transportation system, which includes the world's busiest airport, the country's second busiest container terminal, and an outstanding network of interstate highways and state roads.

Substantial investments in the state's transportation infrastructure are among Governor Nathan Deal's top priorities, and the support of the Georgia Department of Transportation (GDOT) is reflected in its vision of "Enhancing Georgia's competitiveness through leadership in transportation."

The innovative use of leading-edge technologies is the foundation of GDOT's transportation leadership. GDOT relies on a range of technology tools and solutions to keep traffic of all kinds moving throughout the state, especially in its densely populated urban areas.

GDOT's WebEOC (Emergency Operations Center) application provides real-time information to support daily operations and enable fast and effective responses to emergencies, including accidents and extreme weather. Its SouthernLINC Wireless iDEN (Integrated Digital Enhanced Network) radio system ensures connectivity and facilitates collaboration among government agencies at all levels. An array of transportation telematics identify and assess various road hazards, including road temperatures, to help determine whether snow or ice is present.

But these are only three examples of information-gathering and monitoring technologies to support day-to-day decision-making and response along with long-term planning. Other technologies make it possible to manage resources – such as personnel, trucks, and supplies – more effectively, and much of the information from these tools is fed into public-facing communication channels like a website with interactive GIS mapping and message boards on interstates and major roads.

Taken together, GDOT's technology tools and solutions ensure situational awareness, and they connect with and complement other state information systems, thereby strengthening communications, information sharing, and response coordination across all involved state, local, and federal agencies.

The importance of GDOT's technologies to public safety and the state's economic competitiveness may sometimes be difficult to quantify, but when the information they gather is broadly shared, they become indispensable to a coordinated and comprehensive response to any situation affecting Georgians' mobility.

Wrecks. Road closures. Highway construction and repair projects. Severe weather.

They can all lead to traffic gridlock and transportation nightmares with serious implications for personal safety and significant economic impacts.

Transportation problems certainly aren't limited to emergencies. The quality of life in traffic-choked communities is degraded, and economic vitality may suffer because of the reluctance of companies to establish offices, distribution centers, or manufacturing facilities in places with long, painful commutes and other transportation challenges.

Efficient transportation networks and effective traffic management are essential to safety, high living standards, and economic development. Innovative technology is at the center of the Georgia Department of Transportation's (GDOT) strategy to keep traffic moving smoothly throughout the state – and especially in densely populated metropolitan areas – regardless of whatever situation arises.

GDOT has deployed an array of impressive technologies that enable its teams to:

✔ Quickly identify and respond to routine, daily problems and life-threatening emergencies.

✔ Prepare for and respond to weather emergencies, such as snow, ice storms, and hurricanes.

✔ Easily share real-time information with other responders at the state, local, and federal levels, and even news media.

✔ Pro-actively collect and analyze data to support decisions for improving daily operations and strategic planning for future enhancements.

The **WebEOC (Emergency Operations Center) application** provides real-time information to support daily operations and emergency management, and it's become GDOT's cornerstone during inclement weather. The application makes it quick and easy to share documents, as well as upload photographs and view maps and other GIS information. The result is comprehensive, up-to-the-minute situational awareness.

GDOT coupled WebEOC with the **SouthernLINC Wireless iDEN (Integrated Digital Enhanced Network) radio system** to add statewide voice communications capabilities between multiple state agencies and to connect state agencies with federal and local agencies when necessary. In addition, the establishment of talk groups enables all appropriate personnel to easily connect and seamlessly take part in discussions about specific situations. The result is a coordinated response across teams and agencies.

Transportation telematics is a third component of GDOT's technological response to transportation management. A suite of tools helps identify and assess road hazards and determine appropriate responses. For example, the **Road Weather Information System** monitors road temperatures to detect the presence of rain, snow, ice, and wind. In addition, all GDOT emergency-response vehicles are equipped with GPS tracking software, which allows managers to dispatch the closest and most appropriate vehicle to the scene of an incident.

Taken together, GDOT's technology solutions ensure a level of situational awareness that was previously unattainable. Its solutions connect with and complement other state information systems to facilitate communications, information sharing, and response coordination across all involved state, local, and federal agencies.

Anyone in Georgia can dial 511 on his or her mobile phone to report a serious accident, road closure, or other incident to GDOT's Traffic Management Center. GDOT dispatches a responder to the scene, and the WebEOC application on the responder's smartphone begins automatically populating geolocation information so it's instantly available to the Traffic Management Center, GDOT's District Office EOCs, any GDOT personnel with WebEOC access, the Georgia Emergency Management Agency/Department of Homeland Security (GEMA/HS), and others. The geolocation information is taken from the smartphone's GPS application and GDOT's data warehouse and includes the name and the number of the road or the number of the interstate highway and more precise measures of the incident's location based on highway mileposts. A responder is not distracted by having to manually enter information.
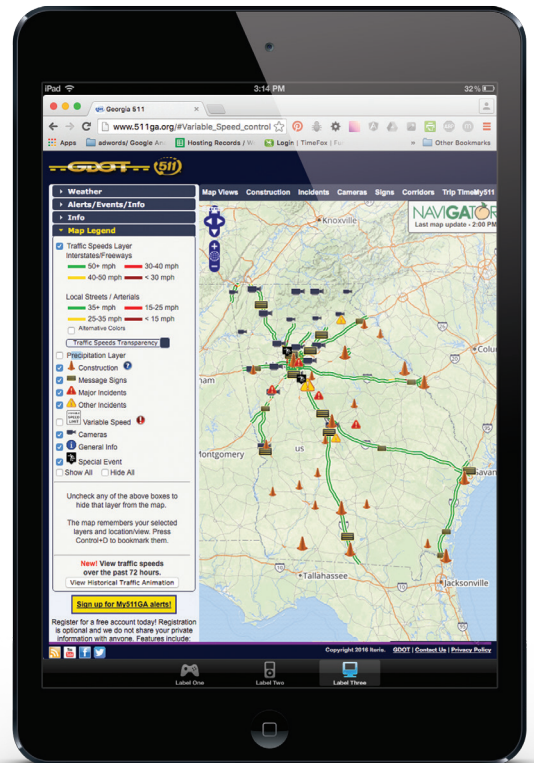
The location of an incident is identified by a small icon on a GIS map of the state, which can be viewed on a smartphone, tablet, or desktop computer. A responder updates the status of the incident as the situation changes. By clicking on the incident icon on a GIS map, traffic managers and others can view a responder's updated status reports.

Similarly, and for the first time in the state's history, maintenance and construction workers can submit status reports from the site of normal daily operations using their mobile device and IMX Connect, an application connecting to WebEOC. Once again, the geolocation information is automatically captured.

While these capabilities and others are used every day as part of GDOT's routine operations, they are most prominently on display when managing the state's response to a weather-related emergency, which demands the resources of multiple state and local agencies and calls for activating the State Operations Center at GEMA/HS.

GDOT's WebEOC environment is fused with the GEMA/HS WebEOC environment, which gives GEMA/HS the ability to see all GDOT incidents statewide 24 hours a day, seven days a week. It also gives GDOT the ability to see all GEMA/HS incidents and those of other agencies and partners utilizing the GEMA/HS WebEOC environment. The resulting real-time, inter-agency situational awareness is a major asset for the state. Sharing situational awareness among agencies and response partners enables rapid support to incident commanders in the field and the efficient deployment of appropriate resources.

When they need to redeploy resources from one part of the state to another, GDOT managers depend on WebEOC, which also includes resource-management capabilities. Each response vehicle is represented by an icon on a GIS map, and by clicking on the vehicle icon, managers know the names of personnel in the vehicle and the types and volumes of supplies onboard. They can watch in real time on a GIS map as the vehicle travels across Georgia. Personnel and resource information available through WebEOC makes it easier for GDOT managers to plan more accurately for such logistics as hotel accommodations and meals for responders and to ensure appropriate levels of additional supplies once they are in place.

Affected counties are colored red on GDOT's GIS map, and clicking on the county displays details about conditions in the county. The map also identifies the location of important buildings and services, including government buildings, hospitals, nursing homes, pharmacies, day care centers, state salt barns, and hurricane evacuation routes.

SouthernLINC Wireless radios on responding vehicles along with the use of designated talk groups enable crews to easily communicate with each other and GDOT's Atlanta operations center. A remote speaker and microphone are also installed in each vehicle to enable hands-free operation. GDOT-created talk groups often include personnel from agencies other than GDOT, such as GEMA/HS, the Department of Natural Resources, and the Georgia State Patrol. Strike teams comprised of personnel from different agencies and stationed in different locations previously could not seamlessly talk with each other.

During an ice or snow storm, GDOT's Road Weather Information System provides critically important information about the temperature of road surfaces that guides decisions about deploying resources, such as plows and brine trucks. GDOT shares the information with the news media so they can help alert the public about icy road conditions.

Other technology solutions play a central role in monitoring brine trucks as they leave salt barns and treat roads in affected areas. A tracking device and a sensor on each brine truck connect to GDOT's web-based GIS mapping application, and each truck can be viewed in real time on a GIS map on any web-enabled device. The truck is represented by an icon that starts green but turns yellow when the truck is dispensing brine. By following the icon, GDOT managers know the truck's exact location, and by clicking on the icon, GDOT managers know the rate at which brine is being dispensed and the amount of brine remaining on the truck. Sensors on a truck's plow let managers know the height of the blade.

Tools for making traffic information readily available to the general public are yet another component of GDOT's technology solutions. As previously mentioned, **dialing 511 on a mobile phone enables callers to report traffic problems**, but they can also access real-time information to help plan their driving routes.

GDOT's 511 Navigator website at www.511ga.org features a GIS map of the state with icons for traffic cameras and message signs over interstate highways and major roads. Before leaving home for your morning commute into downtown Atlanta, for example, you can click on camera icons to see live video feeds from specific locations. Hundreds of cameras are strategically placed throughout Georgia with the densest concentration in metropolitan Atlanta. Website users can create personal accounts and designate favorite cameras for quick access.

Hundreds of message signs display information to drivers about travel times, road closures, congestion, accidents, travel delays, and other traffic-related issues. Users of the 511 Navigator website can click on icons for specific message signs to read the message currently displayed on the sign.

The color-coding of roads on the website's GIS map indicates traffic speeds: green for 50 mph and higher, yellow for 40-50 mph, red for 30-40 mph, and purple for less than 15 mph.

Additional icons identify construction sites and traffic incidents. Users can also easily access weather information, links to Twitter feeds for traffic alerts, and alerts about special events, such as a major league baseball game, that might impact traffic.

GDOT's public-facing, information-rich resources mean drivers – whether a Georgia resident, a vacationer, or someone passing through on the way to a destination in another state – can easily know about traffic conditions anywhere in the state before leaving home.

GDOT seeks to objectively measure the operational efficiencies and cost savings resulting from its technology solutions. At the same time, the information gathered through GDOT's technology solutions provides "a window on the state" whose importance to public safety is difficult to quantify. When shared with other local, state, and federal agencies, it becomes indispensable to a coordinated and comprehensive response to any kind of emergency.

GDOT's technology solutions clearly accrue numerous benefits:

- Better management of resources, including personnel and equipment
- Improved communications between teams and partner agencies
- Precise real-time vehicle tracking
- Timelier road maintenance

- Faster assistance when responding to weather events
- More effective planning for weather events based on historical information
- Real-time, easily accessible information for drivers

Before implementing WebEOC, 30 workers were assigned to maintain paper records and spreadsheets. Those workers have since been reassigned to other duties, demonstrating that WebEOC has enabled GDOT to function more efficiently without increasing its workforce.

WebEOC's ability to automatically populate geolocation information and make it immediately available statewide significantly enhances the personal safety of responders on the scene of an emergency since they are not distracted by manually entering data and can focus all their attention on the situation before them.

Because GDOT's Traffic Management Center and District Office EOC's can also access WebEOC and enter updates, the volume of telephone calls and the potential for reporting errors are reduced while situational awareness and resource preparedness are enhanced in real time.

WebEOC users can log on from any location and with any device connected to the Internet. They do not need to be physically present in the Traffic Management Center or an EOC.

The SouthernLINC Wireless iDEN radio system enhances operational efficiencies and the ability to rapidly and effectively respond to any situation, but translating those enhancements into measureable reductions in response times, lives saved, accidents avoided, and similar factors proves difficult. However, implementing the radio system allowed GDOT to reduce its cellular costs from $48 to $18 per device.

In addition, the best available cost-benefit analysis for the Road Weather Information System estimates savings approaching $1 million over 50 years.

GDOT's people and technology investments are ensuring a safer and more efficient transportation network that supports the state's dynamic and growing economy and helps enhance the quality of life for its residents.