

## Traffic Signal Priority Control for emergency vehicle preemption



### Opticom™ Traffic Signal Priority Control

- Emergency Vehicle Preemption (EVP) and Transit Signal Priority (TSP) solution
- Precise activation based on estimated time of arrival
- Reduce intersection crash rates up to 70%
- Decrease costs related to crash liability and vehicle replacement
- Cut response times up to 25%

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- Steve Henry, traffic engineer

**Municipality:** The city of Savannah Traffic Engineering Department, The Metropolitan Planning Organization (MPO), the Savannah fire department and two private ambulance companies in Savannah, Ga.

**Challenge:** Resolve persistent traffic problems for emergency vehicles traveling through a particularly busy corridor. Preemption was necessary at incredible distances to ensure the intersection was clear when emergency vehicles arrived.

**Solution:** Savannah deployed a GTT Opticom™ traffic signal priority control system that uses GPS technology to avoid line-of-sight requirements. Oncoming vehicles entering the intersection’s radio range gain precise, safe and efficient movement.

**Performance:** The GPS solution delivered immediate results. Average emergency response time was reduced by several minutes and traffic congestion queues in the corridor were minimized.

### Resolve a seemingly impossible traffic problem

Too often, emergency response vehicles waited with other vehicles in traffic jams along the busy DeRenne Avenue corridor in Savannah. Precious minutes ticked away as drivers waited for lights to change and traffic queues to clear. The need for an emergency vehicle preemption (EVP) system was obvious. But the extended signal range required for preemption rendered traditional IR-based (i.e., line of sight) and audible systems ineffective.

“Our department was asked to investigate the situation and determine the best solution,” said Steve Henry, traffic engineer with the City of Savannah. “We recommended a radio-based GPS system because we believed it would be the best platform for expansion throughout the city.”

After the DeRenne Avenue preemption system was put out to bid, the city’s traffic engineering department performed field testing of both GPS and audible solutions. The goal of the testing was two-fold — to determine the signal range required to trigger the signal at the first intersection and to evaluate system performance through possible obstructions, including tree coverage, for future expansion.

“The test results were conclusive,” Henry said. “The GPS system worked extremely well. In fact, preemption occurred when the vehicle was more than one mile away. With the audible system, however, distances ranged from 400 ft. to 600 ft. before the signal was triggered.”

### Part of a larger traffic plan

The Metropolitan Planning Organization (MPO) first considered preemption to mitigate traffic queue congestion along DeRenne Avenue as part of a long-range transportation improvement plan called “Connecting Savannah.” Other possible solutions included re-timing the traffic lights or constructing an elevated section of I-516 to bypass DeRenne Avenue.

The plan introduced a series of east-west improvements to alleviate bottleneck congestion — which was pinched between a rail yard to the north and a large Army base to the south — for traffic approaching Savannah from the west.

Although the population of the Savannah metro area ranked 149th in the 2000 U.S. Census, it has increased 17 percent over the past nine years. In addition, growth in Savannah’s seaport activity is straining the surrounding transportation infrastructure. Every day, up to 9,000 semi trucks serve the port, which is the second busiest on the East Coast and the fourth busiest in the nation. Key city decision-makers realized that a scalable GPS management system would be necessary to effectively manage the city’s expanding traffic demands.



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## EMERGING APPLICATIONS



*Building critical traffic connections<sup>sm</sup>*

*Global Traffic Technologies, LLC (GTT), formed in 2007 from 3M's pioneering Intelligent Transportation Systems business, is the manufacturer of Opticom™ priority control systems and Canoga™ traffic sensing systems.*

After the city's testing confirmed the Opticom™ GPS system was superior, funding was requested and subsequently approved for seven signalized intersections along DeRenne Avenue. Installation took place in November 2007, as one element of the east-west improvements.

### **Faster, safer trips to the hospital**

As part of the DeRenne Avenue implementation, the two private ambulance services authorized to serve the Savannah area (Chatham County) outfitted their ambulances with Opticom™ GPS radio units. The results were impressive.

"This preemption system significantly cut our response time, easily saving five to seven minutes each way along this corridor," said Bengie Cowart, operations chief for MedStarOne, a subsidiary of Memorial University Medical Center that operates 19 ambulances.

Cowart believes ambulances also benefit from a safer journey, because drivers in cars ahead of the ambulance now have an option to get out of the way. "This reduces accidents," he said. "It was just a stalemate before because other drivers had nowhere to go."

### **Reduce traffic queues throughout the city**

The city of Savannah took a forward-thinking, community-focused approach to streamline emergency response and alleviate traffic congestion queues. A liaison was assigned to ensure collaboration between key stakeholders and constituents to ensure successful implementation of the transportation improvement plan. As a result, the entire community reveled in its success.

"Following the success of the DeRenne Avenue corridor project, many people wanted the preemption system expanded," said Heather Fish, citizen's specialist with the City of Savannah. Fire/emergency responders and police, specifically traffic responders, asked to outfit their vehicles so they could activate the system.

To map out the expansion, a committee met and eventually selected 73 intersections to be included — a mix of east-west and north-south corridors. Deciding factors included the existing signal equipment, communications infrastructure and ease of installation.

As of December 2010, the preemption system has been deployed at the additional intersections. Along with the 41 ambulances outfitted in 2007, the city is in the process of equipping 147 police and fire emergency vehicles with the GPS radio units.



Opticom™ GPS radio units triggered traffic signal preemption at about 5,600 feet to significantly mitigate traffic queues in one of Savannah's most problematic bottlenecked corridors.

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