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Traffic Signal Tech Improves Rescue Response Time

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Palm Beach County, Fla., is installing an emergency vehicle priority system that adjusts traffic signal times to help improve traffic flow for fire and rescue teams.

Traffic congestion could soon be a distant memory for fire and rescue personnel in Palm Beach County, Fla. An intelligent traffic signal system is being installed that will adjust traffic light cycles to favor the routes being driven by first responders.

Called Emergency.now, the technology connects Palm Beach County Fire Rescue's computer-aided dispatch (CAD) system with the county's traffic control system. When an emergency call is placed, a route is generated and transmitted to each responding vehicle. The software then adjusts the traffic lights along the route to stay green for longer stretches of time.

The major difference between Emergency.now and other emergency traffic signal systems is that it doesn't pre-empt traffic flow by setting up blinking yellow lights or completely stop one direction of traffic. The software adjusts the existing traffic cycle to meet an emergency responder's needs and goes back to its normal timing quickly thereafter.

The extended green lights help "flush" traffic through a particular road and intersection, delaying additional congestion that may come from motorists on side streets.

For example, if a normal green light lasts for 30 seconds, the priority system can be set so a green light is extended for a longer period of time. It still cycles the lights so that motorists on

side streets are able to go through, but gives a longer green light to the corridor that will be taken by a responder.

According to Evan Bestland, division chief of Palm Beach County Fire Rescue, the county plans to add the technology to approximately 600 of its 1,000 intersections. Currently only about 50 intersections are connected to the priority traffic signal system.

For the system to work efficiently, however, firefighters and other responders need to stick to the main roadways. Although drivers likely know all the shortcuts through side streets, now they don't need to cut through neighborhoods to reach their destinations quickly.

The CAD system was also programmed so that stop signs, speed bumps, guard gates, etc., are all assigned a negative time rating when the shortest route to an emergency is being plotted. So by default, the route sent to a responder likely won't include cuts through heavy residential areas unless the emergency is located in one of them.

"When the call gets generated and the major thoroughfares don't have the penalties and the side streets do, it should route them to take advantage of that," Bestland said. "I can't help it if someone wants to take a shortcut. But they're not going to get the full advantage of the system by doing that."

The technology is completely automated. Responders simply follow the route they're given and the green lights automatically adjust their timing according to the ETA of the emergency vehicle. Speed is initially calculated using the speed limit of the road the responder is first on, or the road the vehicle is parked on.

Project History

The full rollout of Emergency.now in Palm Beach County was approved earlier this year after years of testing and development. Initial work on the technology began in approximately 2005 after a new CAD system was purchased.

Trafficware -- then under the name Naztec -- was approached with the concept and agreed that they could design software to sync the CAD system with the county's traffic control system for $2.1 million. The catch, however, was that if Trafficware couldn't get the software to work, Palm Beach County Fire Rescue wouldn't have to pay.

Bestland explained that since it was bleeding-edge technology, the county didn't want to sacrifice taxpayer dollars for something that hadn't been fully vetted. It took eight years to perfect the system, but the county paid up and is satisfied with the results.

There were a few hiccups along the way, however. When Palm Beach Fire Rescue first tested the system, the first few intersections weren't working accurately. They discovered the software was basing the vehicle's ETA at an intersection by the actual speed of the truck or ambulance, which at the start would be around 5 mph. The system was quickly adjusted to instead use the speed limit of the first road the vehicle would be on, which corrected the problem.

Another discovery was that the system works better when emergency vehicles travel in packs. The extended green lights eventually time out and go red. So if one responder gets out the door right away and another is behind by a couple of minutes, the latter vehicle might get stuck with red lights.

There's no real fix to that issue, other than to travel in a group, or to have a responder who is running later fall further back to catch the next extended green light cycle. So emergency personnel are encouraged to travel in packs.

"Because we're flushing traffic out, if the traffic is lighter to begin with, that in itself is a big benefit," Bestland said. "So even if we don't have the green light, just because we moved traffic out of the way, that's going to improve our response times."

Additional intersections will be added to the priority system network over the next several years. But while Palm Beach County Fire Rescue believes the system will help save lives, there are a few different upgrades in the works.

One of the major enhancements the agency would like to see is the ability to reconfigure traffic light cycles once a victim has been picked up at a scene and is being transported to a hospital. The technology isn't dependent on a vehicle starting at a fire station, so adjusting the system to work from different starting locations is on the agency's agenda.

Palm Beach County also has a number of drawbridges that emergency personnel would like to see added to Emergency.now and the county's traffic control computer. Right now the priority traffic signal software and CAD establish a route using shortest physical distance. But if a bridge is up, a fire station further away might be the right one to send to a fire or accident scene.

By adding the bridges and whether they are up or down, the CAD system could do the calculations to determine the right station to assign to a particular call, while the traffic signal technology does its job by extending green lights and flushing congested traffic out of the area.

Right now, however, the priority for Palm Beach County Rescue is getting the system fully deployed.

"My philosophy on technology is crawl, walk, run and fly," Bestland said. "You really need to get the foundation right."