Traffic Control

GPS allows firefighters to respond quicker to emergency

Imagine, for a moment, that you have just received word of a fire 10 blocks from your current location, and your truck is closest to the emergency site.

Instantly, you hit your siren and head in the direction of the emergency. You start to dash towards the emergency, but you hit a couple of road blocks on the way.

At the third block, cars are whizzing past you, doing their best to make the yellow light before it turns red. At the fifth block, a mother and daughter are in the middle of the road, walking across with their dog in tow. At the eighth block, just as you can start to see smoke blowing out of a third-floor window, you meet gridlock; nothing but bumper-to-bumper cars as far as you can see.

Unfortunately, in high-traffic areas of urban centers across Canada, the above scenario isn't that far-fetched. As much as it is a pressing need for you to get to an emergency situation, there are the inevitable temporary barriers that can waste away the precious seconds that can determine whether rescue efforts will be successful. Thankfully, recent technological advances have lessened the potential for such an incident to occur.

The new equipment emanates from the global positioning system (GPS). GPS is a mapping and navigation method that employs satellite projections communicated to computers to track distances and routes. The devices have been used in a wide variety of settings, ranging from transportation vehicles, such as taxis and airplanes, to more individual usage in Personal Digital Assistants, (a.k.a. PDA's).

For fire services, this takes system has two parts—one on the vehicle itself and the other placed at an intersection. The GPS in the fire engine, comprised of a control unit, a radio/GPS antenna and a radio unit, calculates its speed, direction, longitude and latitude, while the intersection equipment has an approach map that defines the priority control. This module includes a GPS receiver/radio, placed atop at a traffic light and a phase selector that is housed in a controller cabinet.

The two devices, as noted in a brochure for 3M's Opticom™ GPS Priority Control System, interact to help control traffic lights and allow emergency vehicles to move through streets with little to no interruption. This occurs as follows:

- As an emergency vehicle proceeds towards an intersection, information is sent from its GPS to the receiver at a traffic light every second. Along with the aforementioned categories, this also includes class, agency ID information and turn signal status.
- Once this information is received, the receiver/radio alerts the phase selector of the priority control request.
- If the turn signal status changes, the vehicle control unit alerts the intersection's GPS device is alerted of the priority control.

The result of this system has been a sizeable decrease in time for an emergency vehicle to arrive at its destination. According to cumulative data from 3M, based on studies in Houston, Denver and St. Paul, response time has been improved by an average of 20 per cent.

CHANGE OVER TIME

Of course, setting up this system can't just happen overnight. As Bruce Bunce, traffic signal technician with the Traffic Engineering department of the City of Kelowna explains, to set up the GPS components, including programming and testing, took approximately five hours for each intersection and three to five hours per fire truck.

For this reason, installing the priority control system has been done on a

staggered level. The first of two phases, as City of Kelowna Transit Technologist Fred Wollin explains, involved outfitting 10 fire trucks with the GPS equipment and a total of 26 intersections (7 city-controlled, 19 operated by the BC Ministry of Transportation). The second phase, which is being implemented over the next three years, will see more than 20 additional intersections equipped with priority control systems, as well as 4 buses, which would use the system, on a lower priority level than fire engines, for purposes such as adhering to schedules.

As Bunce notes, the initial phase involved specific areas, with a main traffic artery being worked on in the on-going second stage. "Presently we have set up the corridor directly in front of the main fire hall and a few isolated intersections," he says. "The second stage is to set up the main highway through town and [that] is 50 per cent complete."

Of course, one would expect that with this traffic change that motorists would sit up and take notice. After all, a commuter who has been using the same route week in and week out for 10 years would likely be thrown off a bit if the stoplight patterns all the sudden changed.

This, however, has not been the case. Bunce points out that he has not seen any major back-ups in traffic flow since the GPS system was first installed, something he attributes to the fact that once a fire truck passes through an intersection, light patterns return to normal.

The response in Kelowna is similar to what has been the case in other areas. "We've done studies and they indicate that there is very minimal interruption with traffic flow," says Andrew Lane, sales and marketing manager in 3M Canada's Intelligent Transportation Systems department. "People are unaware of what is actually taking place, just because of the complexity of how it is programmed."

Rather than general traffic going through any changes, interestingly, fire trucks have made adjustments as a result of the GPS system. Bunce notes that driver routes have changed from one popular roadway to another. "They used to go down the highway and now they say they use the Enterprise a lot more because it's a lot quicker," he says.

FLUCTUATING COSTS

While one might expect there to be a simple rate to determining how much it would cost to install a GPS System, the total price will vary.

While some factors would seem obvious, such as the number of trucks and intersections would need to be outfitted, price will also vary depending on systems currently in place in a given city. Lane notes that this includes the format of the controller cabinets and adjustments that would have to be made to the city's central computer and traffic pattern coordination with engineering departments.

Whatever the cost may be to install a priority control system, in the long run it will be well worth it. After all, increasing the potential to save a life is far more valuable than any dollar amount.