First-Response Signal Priority

System Capabilities

Emergency Vehicle Preemption (EVP)

The EMTRAC system utilizes reliable GPS technology and secure frequency-hopping spread spectrum (FHSS) radio to enable first-response vehicles to request priority through signalized intersections.

Vehicles with the EMTRAC system transmit a priority request to equipped intersections when passing through detection zones. The traffic cabinet at the intersection contains an EMTRAC Priority Detector, which relays the priority request call to the traffic controller. The EMTRAC system is completely automatic and requires no driver interaction.

Vehicle Computer Unit and GPS/UHF Antenna

Priority Detector (connects to omni-directional antenna)
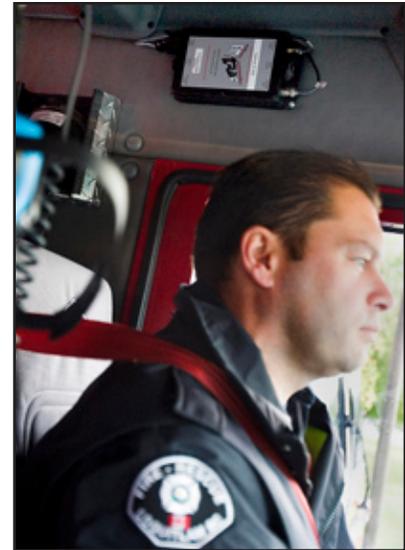
Coquitlam Fire & Rescue using EMTRAC, Coquitlam, British Columbia

EMTRAC priority control has produced the following results:

- **Sunnyvale, California**: After installing the EMTRAC system, the average emergency vehicle travel time decreased 20 percent in one fire district and 25 percent in another.

- **Coquitlam, British Columbia**: Emergency vehicle response times decreased by 20 to 25 percent.

- **Novato, California**: After installing the EMTRAC system on all fire engines and ambulances, response times improved 45 percent.

## Dual-System Detection (GPS/Optical)

The EMTRAC system can detect both optical systems and the EMTRAC GPS system, enabling cities to upgrade selected optical components while leaving other components in place until budgets allow for expanded upgrades.

EMTRAC Priority Detectors support up to 16 inputs, allowing for priority calls to be received for multiple phases from both systems. They also plug into the same input files as optical phase selectors (or may be housed in shelf-mount enclosures in NEMA cabinets). EMTRAC Priority Detectors are capable of connecting to optical sensors/detectors while simultaneously connecting to omnidirectional antennas for the GPS-based EMTRAC system.

Central Monitoring

The EMTRAC Central Monitor software enables first-response dispatch and department personnel to remotely monitor vehicle activity in real time.

In addition to EVP capability, EMTRAC-equipped vehicles automatically transmit location and activity data to network-connected detectors in nearby signal-control cabinets. This data is displayed on central workstations, showing vehicle movement on a map—as it occurs. It is also recorded in detailed logs, which may be saved for later review.
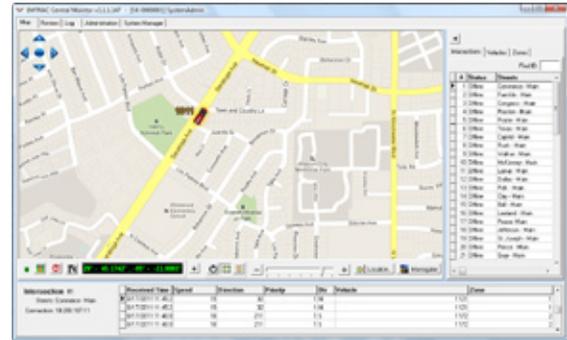
EMTRAC Central Monitor Software

Vehicle Interrogator

Vehicle Interrogator Kit

As EMTRAC-equipped vehicles return to station, the Vehicle Interrogator utilizes secure wireless communications to automatically download vehicle activity logs. This data is forwarded to a server running the Central Monitor software, where the data may be viewed by monitoring personnel. The EMTRAC software may also be set to automatically email periodic activity logs to specified personnel.

Additionally, the Vehicle Interrogator is capable of uploading database and firmware updates to vehicles as needed.

Onboard Control Head

The Control Head is a dash-mounted interface screen that connects to the Vehicle Computer Unit. The Control Head enables responding personnel to monitor system activity and progress in real time. In addition to other features, drivers may be alerted when priority requests have timed out and when there is immediate potential for collision.

EMTRAC Control Head

Other EMTRAC Applications

Transit Signal Priority (TSP)
Buses and trains equipped with the EMTRAC system employ the same technology as first-response vehicles when requesting signal priority.

Features for transit applications include:

- **Estimated Time of Arrival (ETA)**: Vehicles communicate their ETA to signal controllers to help maintain signal coordination.

- **Headway Maintenance**: Signal Priority may be granted or denied based on the vehicle's adherence to the schedule.

- **Conditional Priority**: Any number of factors (such as passenger load or exit requests) can be set to enable or disable priority requests.

Municipal Vehicles
The safety and reliability offered by the EMTRAC system may also be used for snowplows, waste-mangement vehicles, and maintenenace vehicles.

Municipal-vehicle benefits include:

- **Reliability**: Wireless communication is not hampered by adverse weather, and the range is typically no less than 3,000 feet.

- **Timeliness**: Improve schedule adherence by enabling designated vehicles to request priority through signalized intersections.

- **Awareness**: Monitor diagnostics (such as salt/brine levels or load amounts) to better plan for needed stops.