# EMTRAC

# Train Monitoring & Safety Controls

## About EMTRAC

The EMTRAC system combines precise satellite and inertial technology with secure FHSS radio communication to incorporate Positive Train Control (PTC) elements on transit rail lines. The EMTRAC system includes *over-speed protection* and *collision avoidance*—while also offering the ability to accurately monitor train locations on a map display in real time.

As EMTRAC-equipped rail vehicles pass through pre-defined "virtual" blocks, they transmit data to detectors units at wayside locations. This data is sent through the transit network to report precise vehicle location and activity, as well as to broadcast and display safety alerts. The EMTRAC system can also receive multiple fault detection inputs (such as train or track integrity faults) and respond accordingly.

The EMTRAC system requires no costly circuits or switches to install or maintain, and it accurately reports vehicle positions even in adverse weather conditions and urban-canyon environments.

## How EMTRAC PTC Works

When an equipped train exceeds defined safety thresholds, train operators and central monitors are alerted. If additional thresholds are reached, the trains can be set up to automatically slow or stop while an alert is sent to all other trains.

## Over-Speed Protection

The EMTRAC system uses "Virtual Fixed Blocks" to designate allowable speeds for specific segments of track. These blocks can be customized on the fly to allow for special events or temporary speed restrictions.

## Collision Avoidance

"Virtual Moving Blocks" are used to ensure that trains adhere to agency-defined block spacing. These moving blocks travel with their assigned rail vehicles, and the block lengths adjust based on train speed (or as calculated by braking algorithms).

When the EMTRAC system determines that two equipped trains are within the same block, train operators and central personnel are immediately notified—and further actions may be taken.
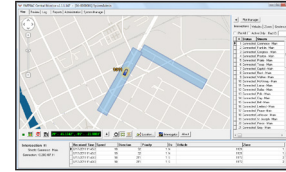
## EMTRAC System Components

**Vehicle Computer
Unit & Antenna**

**In-Cab
Control Head**

CAUTION !!!
WORK ZONE
AHEAD

Worksite: 2,500 ft.
ETA: 35 sec.

**Detector Unit**

**Central Monitor
Software**

## EMTRAC System Features

- Central computers display real-time status and locations for all equipped vehicles.

- Detailed status and activity logs, which are periodically emailed to assigned personnel.

- Trains are equipped with monitors to visually and audibly alert operators of exceeded safety thresholds.

- Automatically alert train operators when there is potential for collision.

- Software displays locations in either map or aerial-photo view, and it enables the user to automatically locate specific trains and blocks with the click of a mouse.

- EMTRAC Vehicle Computer Units can be set to perform periodic diagnostic checks to ensure proper performance.

- Trains are equipped with a minimum two-hour battery backup for continued use during outages.

- EMTRAC software enables monitoring personnel to record and save train activity for later review of key events.

## Benefits of EMTRAC PTC

- **Safety**: Alert drivers, transit personnel, and wayside works of potentially unsafe conditions early enough for them to take corrective action.

- **Flexibility**: Speed and distance thresholds are easily configured to allow for special events or temporary speed restrictions. Thresholds may include maximum authorized speeds, minimum allowed distances betweem trains, and switch confirmation.

- **Reliability**: Wireless communication is not hampered by adverse conditions, and radio-range capability allows for relatively few detector units.

- **Precision**: Determine which tracks a particular train is on with position accuracy of 24-inches or less.

- **Low Maintenance**: Interface with existing switches and circuits without requiring costly installations.