



EMTRAC

Transit Signal Priority (TSP) for Rail

Transit agencies are faced with a combination of challenges, including the task of increasing operating speeds and reliability in urban areas with ever-increasing traffic volumes. One proven approach to achieving operational performance goals is through Transit Signal Priority (TSP), and the EMTRAC system has been the technological leader in TSP.

About the EMTRAC System

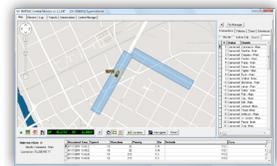
The EMTRAC system utilizes precise vehicle positioning and secure frequency-hopping spread spectrum radio to enable transit rail vehicles to request priority through signalized intersections.

Trains with the EMTRAC system transmit a priority request to equipped intersections when passing through pre-defined detection zones. The traffic cabinet at the intersection contains an EMTRAC Priority Detector, which relays the priority-request call to the traffic controller.

EMTRAC is completely automatic and requires no driver interaction. In addition, EMTRAC can be configured to allow priority control based on time of day, route-schedule adherence, passenger load, direction traveled, or other factors.



EMTRAC System Components



Vehicle Computer Unit	Onboard Control Head	Stationary Detector Unit	Central Monitor Software
Onboard unit determines train position, transmits location and activity data, and triggers alerts to operators and central personnel when specified conditions occur.	Cab-mounted unit displays activity data in real time and alerts train operators of potentially unsafe conditions, such as excessive speed or insufficient block spacing.	Network-connected unit receives signal-priority requests and transfers train-activity data for display on Central Monitor software. This unit is typically installed in wayside cabinets.	Displays real-time train positions and activity, while also displaying (and recording) detailed activity logs. Alerts may also be set to notify central personnel about specific events.

Adaptive TSP

Adaptive priority is a strategy for adjusting signal control based on real-time traffic conditions. As stated by ITS America: “Its application to TSP continuously optimizes the effective timing plan based on real-time, observed data, including transit vehicle location.”

The EMTRAC system enables equipped trains to report real-time vehicle position and speed when requesting signal priority—eliminating the need for less effective methods such as scheduled priority based on historical timing.

This system is unique to North America and takes advantage of features built into many signal controllers and TSP firmware. It reacts to changes in rail-line volume and train-approach speeds in real time. As train speeds fluctuate, so do the positions of ETA time-points.

Conditional Priority

Conditional priority utilizes real-time scenarios to determine if signal priority should be requested—and it is often the best way to achieve optimized performance with minimal traffic disruption.

According to ITS America, “Conditional priority means that a smaller percentage of transit vehicles are requesting priority, but may be viewed as preferable if the emphasis is more on improving service reliability than on decreasing absolute travel time.”

In addition to many other possible conditions, TSP may be based on the following:

- Time Behind Schedule
- Time Since Last TSP Request
- Door Status (open or closed)
- Stop-Request Status
- Passenger Load (Total or Percentage)



Features of EMTRAC TSP

- Conditional Signal Priority enables equipped trains to request priority only when agency-specified conditions are met.
- Enables traffic agencies to implement Adaptive Signal Control for intersections, including those not equipped with adaptive-capable controllers or other third-party inputs.
- Easy customization for individual trains or intersections. For example, intersections along a special-event route may hold priority requests for longer-than-usual time periods.
- Detailed logs show vehicle and intersection activity by date and time and may be automatically emailed on a periodic basis.
- Priority-request start points may be based on time-of-day to allow for earlier controller requests during peak-period rush hours.

Benefits of EMTRAC TSP

- EMTRAC-system features reduce traffic disruption and unsynchronized signals
- Installation and maintenance time is significantly less than with any other system.
- Offers the most advanced TSP features without requiring significant upgrades to the latest signal-controller equipment.
- Improves schedule adherence and headway times by enabling rail vehicles to request priority only when behind schedule.
- Interfaces with Central Monitor software to enable transit personnel to track vehicle progress and activity.
- The Systems Manager software enables administrators to easily customize the system for individual trains and intersections.