Harvey Transportation Center Transit Signal Priority Project

Project Update
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Pace

pace

What is Transit Signal Priority?

Transit Signal Priority (TSP) facilitates the movement of transit vehicles through

traffic signal controlled intersections.

Typically, a transit vehicle sends a signal to

a traffic signal controller, which will give the transit vehicle priority by extending the green phase, shortening the red phase, and/or providing for a queue jump.

TSP Project Phase 1 -Milestones

- **Preliminary Engineering** - Completed
- **Proof of Concept-** Completed
- **Full TSP Deployment** - Completed
- **System Acceptance Testing –** Ongoing
- **7 Day & 90 Test** - August 2010 Completion Date

Scope of the Project

Phase 1

- Deployment of TSP at 20 signalized intersections along 159th, Sibley Blvd, Halsted St, & Park Ave and 55 Buses from Pace South Division

Phase 2

- Deployment of TSP at 8 to 10 signalized intersections along Halsted Street

System Architecture

Wayside

**Fixed
Wireless Router**

PRS

**Traffic
Signal
Controller**

Onboard

**Mobile
Wireless
Router**

PRG

PDS

Central

CEMS

TSP System Major Components

- **Priority Request Generator (PRG)**

  The PRG is located in the bus and includes a positioning system, embedded computer, 802.11b/g mobile Node, GPS antenna, and communication antennae. It generates priority request based on conditional priority.

- **Priority Request Server (PRS)**

  The PRS is located at the signalized intersection and includes an embedded computer, 802.11b/g node, and communication antennae. The PRS receives requests from PRG equipped buses and communicates back to intersection signal controller.

TSP Equipment

**Priority Request
Generator /Server**

Wireless Node & Antennae

Antennae on Bus

pace

In Vehicle TSP Equipment

Priority Request Generator,   Position Determination System,
Mobile Wireless Router installed inside Pace bus

Wayside TSP Equipment

Wireless Node Antennae Installation

Wireless Node Installation along 159ᵗʰ St & Wausau

Priority Request Server (PRS) Installation Inside a Traffic Signal Controller Cabinet

STATUS

DC

PORT?

TERMINALS C-1
POWER INPUT / OUTPUT

OD™ PRG/PRS-E   NOVAX

ETHERNET
PORT 1

ETHERNET
PORT 2
EXT POWER

SERIAL RS232/485
EXT POWER
COUNTER INPUT

ECONOLITE
CONTROL PRODUCTS, INC.

162nd @ 3

MAIN
MENU

SUB
MENU

DISPLAY
ADJUST

STATUS
DISPLAY

F1

F3

F5

F7

1 2 3

4 5 6

7 8 9

TOGGLE

SPEC
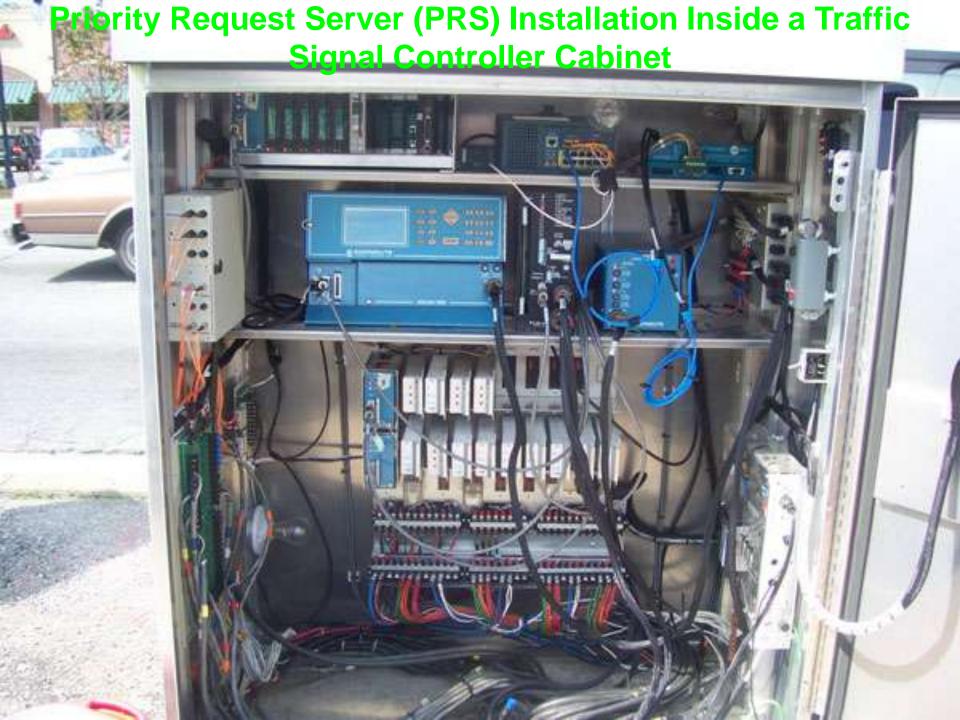FUNC   0   CLEAR

PORT 3   PORT 1   PORT 2

SDLC   TERM

ASC/
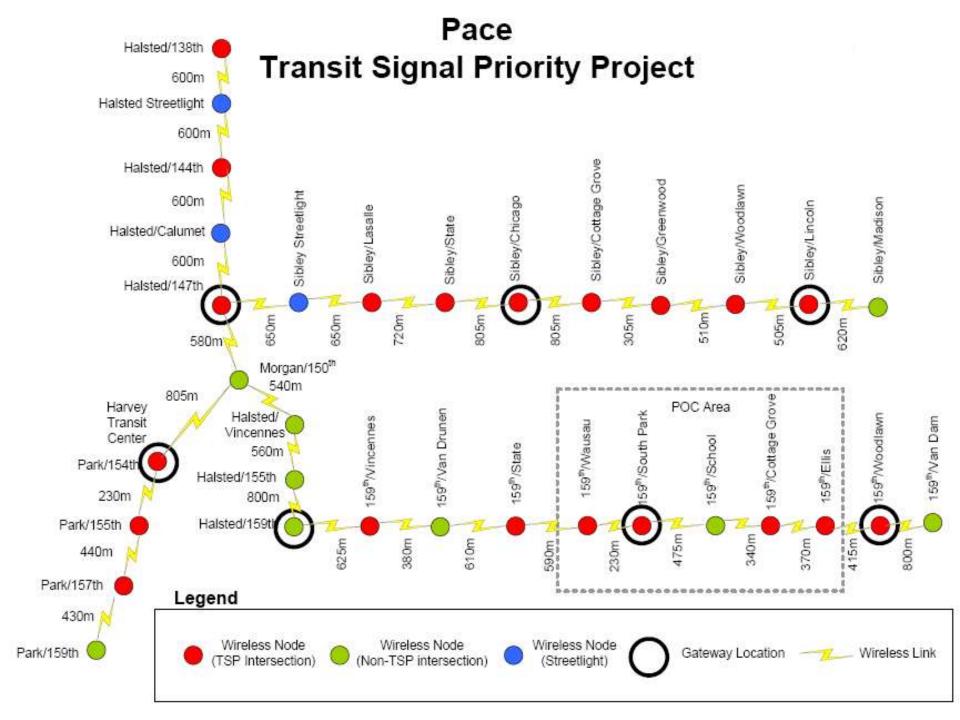
MODEM

TSP System Major Components

- **Wireless Mesh Network**

  The wayside network communication devices establish the wireless network and facilitate communication between intersections and buses. The wireless Wifi 802.11 b/g nodes are laid in point to point fashion to create a continuous mesh.
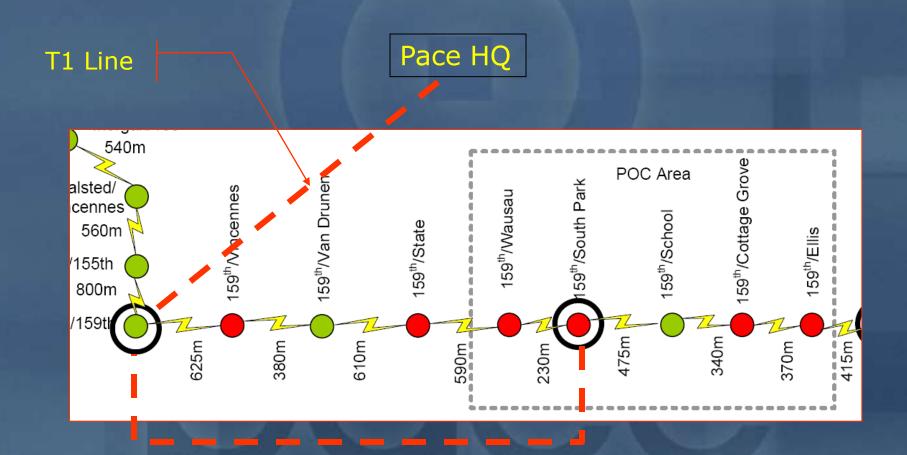
- **Communications Elements Management Server (CEMS):**

  CEMS is a remote configuration and management tool for the wireless mesh network..
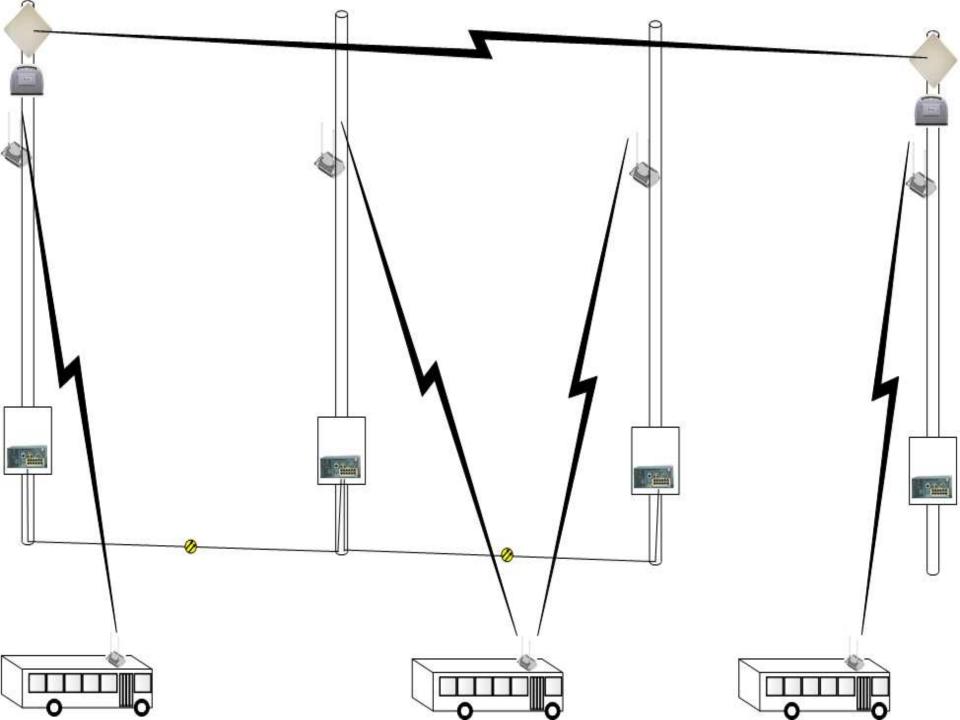
Pace
Transit Signal Priority Project

Halsted/138th
600m
Halsted Streetlight
600m
Halsted/144th
600m
Halsted/Calumet
600m
Halsted/147th
580m

Sibley Streetlight
Sibley/Lasalle
Sibley/State
Sibley/Chicago
Sibley/Cottage Grove
Sibley/Greenwood
Sibley/Woodlawn
Sibley/Lincoln
Sibley/Madison

650m 650m 720m 805m 805m 305m 510m 505m 620m

Morgan/150th
540m

Harvey Transit Center
805m

Halsted/Vincennes
560m

Park/154th
230m
Park/155th
440m
Park/157th
430m
Park/159th

Halsted/155th
800m

Halsted/159th

POC Area

159th/Vincennes
159th/Van Drunen
159th/State
159th/Wausau
159th/South Park
159th/School
159th/Cottage Grove
159th/Ellis
159th/Woodlawn
159th/Van Dam

625m 380m 610m 590m 230m 475m 340m 370m 415m 800m

Legend

- ● Wireless Node (TSP Intersection)
- ● Wireless Node (Non-TSP intersection)
- ● Wireless Node (Streetlight)
- ◯ Gateway Location
- ⚡ Wireless Link

Proof of Concept

TSP System Major Components

- **Novax Elements Management System (NEMS**):

  A NEMS is a remote configuration and management tool for the TransPOD TSP System.

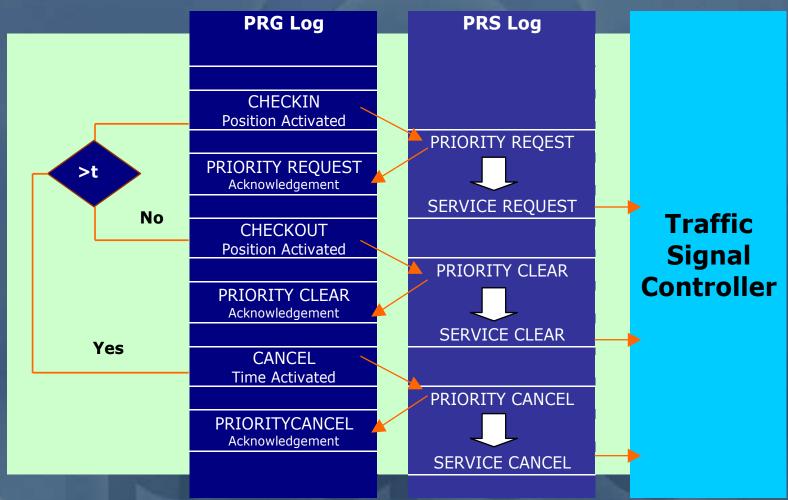- **Backhaul Communications System (BCS)**

  The BCS connects the wireless mesh network along TSP intersections within the network to NEMS and CEMS servers located at Pace HQ.

  The BCS consists of routers at gateway nodes and T1 lines.

TSP STATUS

Mode.......................... ....
Offset Speeding in Effect: H
Coord Pattern in Effect...:   1
TSP Pattern in Effect....:   61

                              6   2

TSP Input................:.........
TSP Call.................:.........
Delay Time...............:.........   6

TSP Phase Grn Time.   9:   9:
TSP Phase Extend...   2:   9:

Reservice Time....:..........