

King County Metro Transit Signal Priority

**Second Generation TSP
using
IntelliDrivesm and TCIP**

By

John Toone, MPA

Transit ITS Program Manager

King County Metro Transit

Overview

The first generation of TSP deployed by KC Metro used toll-tag technology to detect busses and read status data. Bus to roadside communication was single purpose.

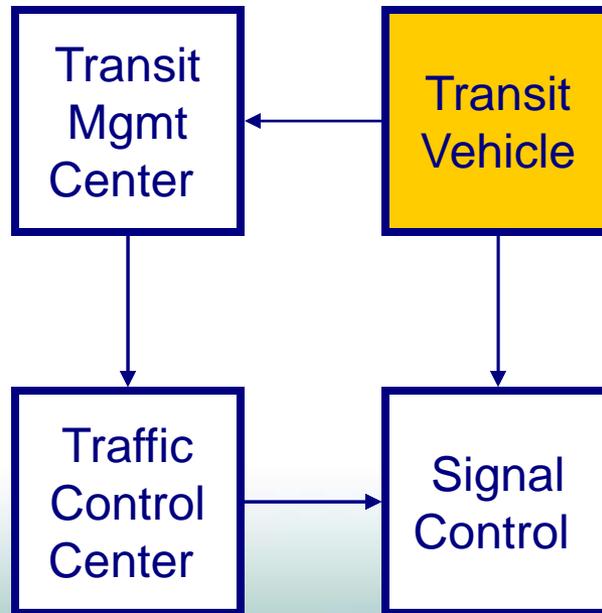
The second generation uses the IntelliDrivesm concept for communication. Communication supports multiple systems, and provides more and more accurate TSP data.

TSP Concepts

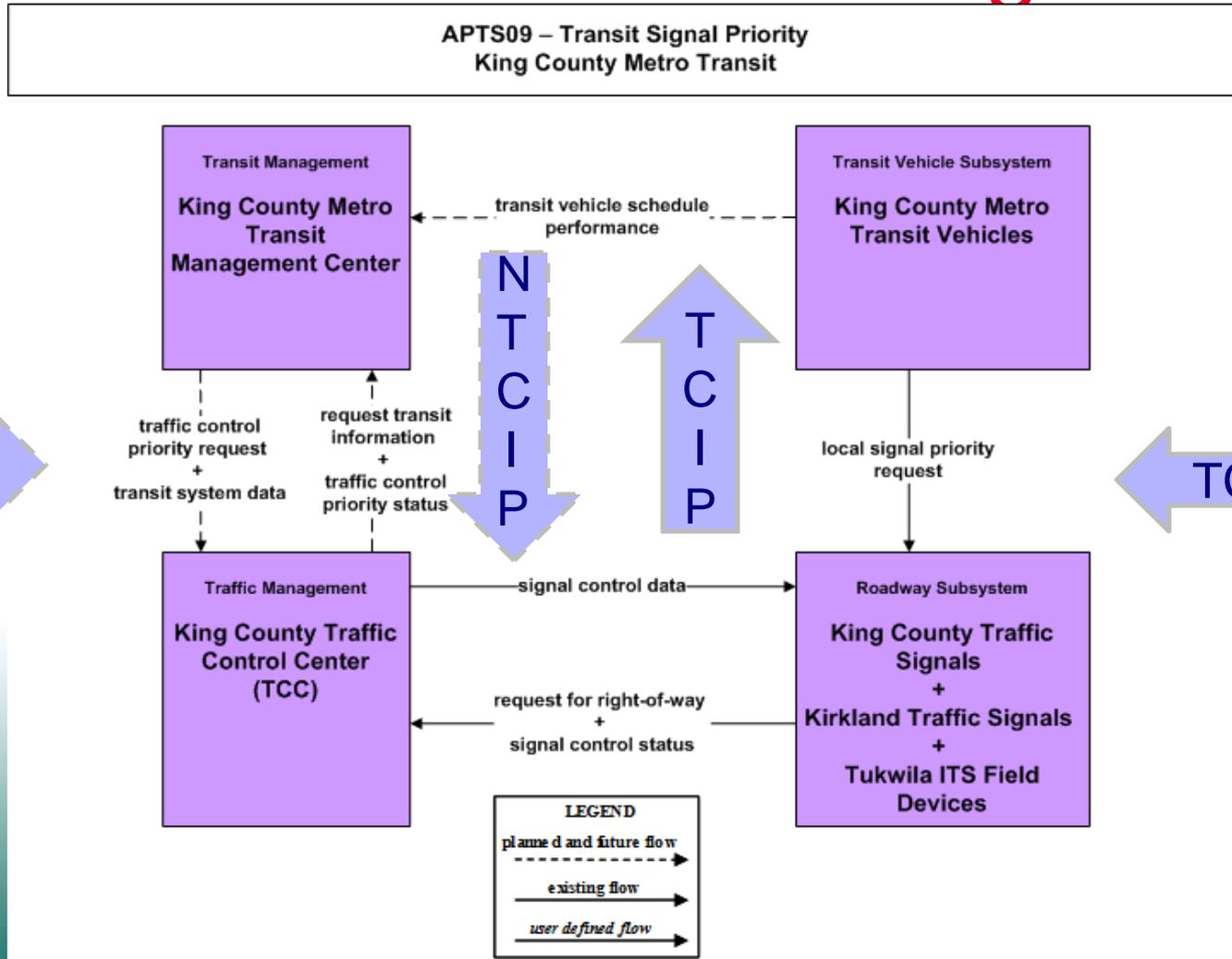
- Detect vehicle
- Communicate operational data
- Generate request
- Determine if priority is appropriate
- Serve request

Signal Priority Scenarios

Scenario 1: Generated by Vehicle Roadside



Regional ITS Architecture for TSP Market Package



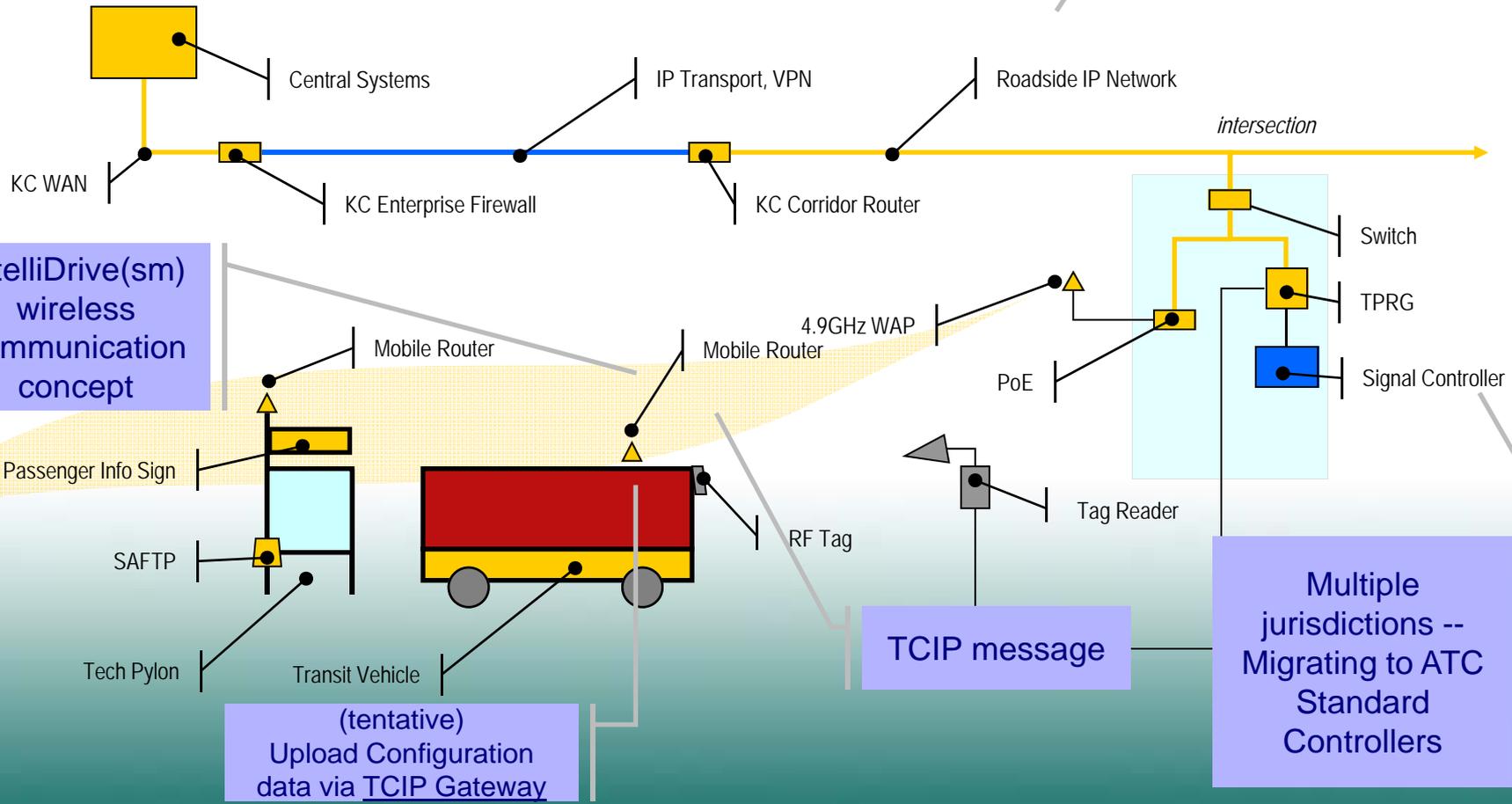
Transit ITS Architecture

First to Second Generation TSP

Transit ITS Architecture

Off the shelf
TCP/IP and
802.11a
technologies

IntelliDrive(sm)
wireless
communication
concept



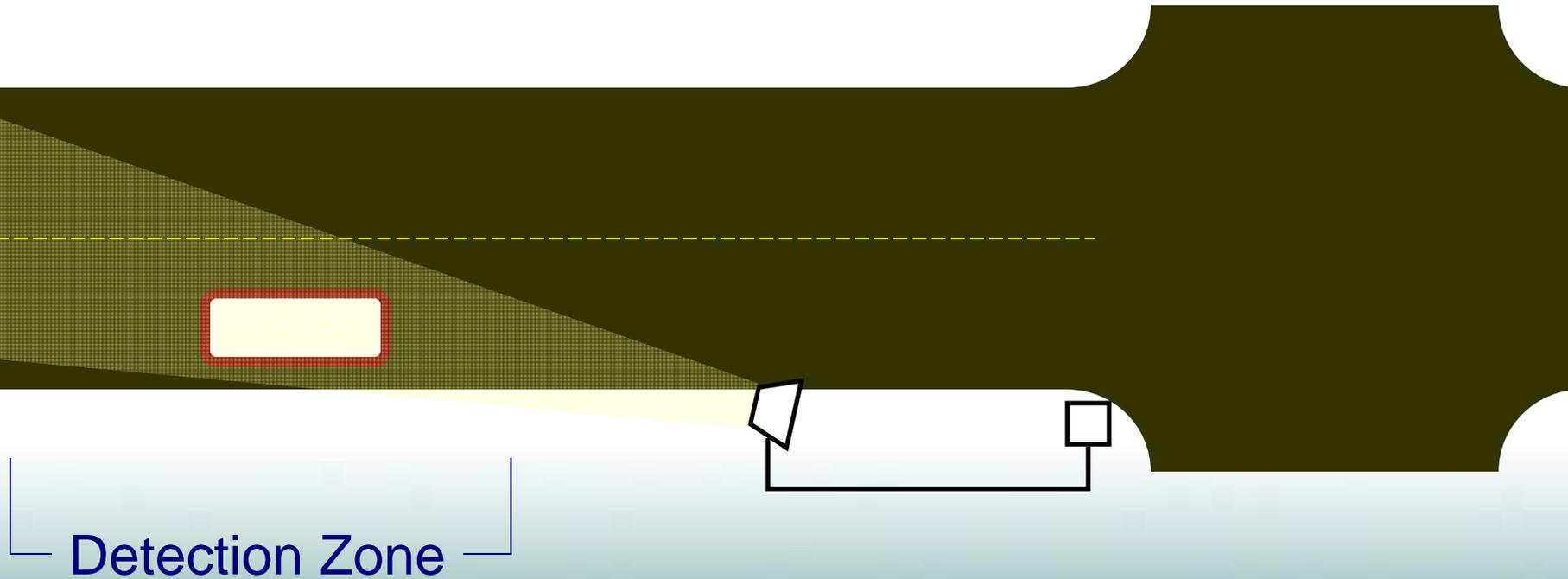
(tentative)
Upload Configuration
data via TCIP Gateway

Multiple
jurisdictions --
Migrating to ATC
Standard
Controllers

TSP Using RF Tags

- 900MHz “toll tag” vehicle detection
- Conditional priority – “Mother May I?”
- TCIP Scenario 5
- Concept of Operation developed 1995

TSP Using RF Tags



TSP Using RF Tags

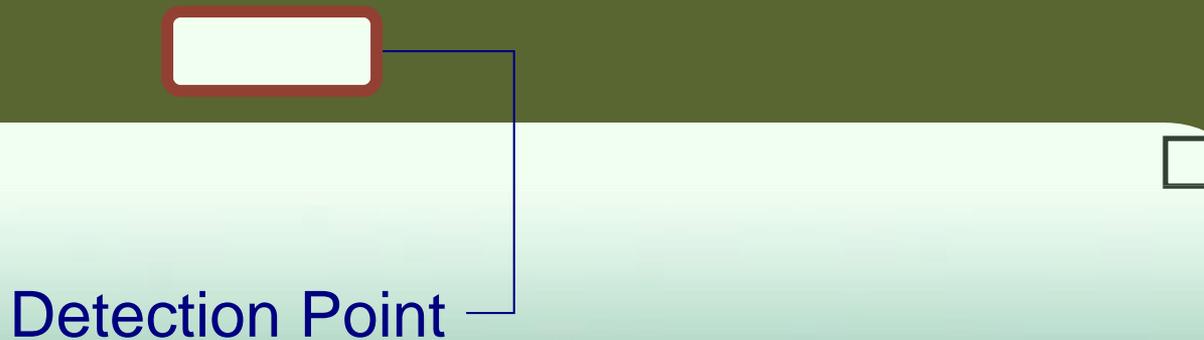
Vehicle Detection

- RF Tag reader detects vehicle
 - Fixed detection point
 - Inconsistent detection range
 - \$15k to \$20k per reader
 - 900MHz is a public frequency (interference), but requires point license
- 128 bit message
- Only TSP communication

TSP Using IntelliDrivesm

- IntelliDrivesm communication using 4.9GHz (802.11a).
- Conditional priority, full TCIP dataset
- TCIP scenario 4/5
- TCIP scenario 1 & 2 capable
- Concept of operation developed 2006

TSP Using IntelliDrivesm



TSP Vehicle Detection

Second Generation

- Bus communicates directly to TPRG
 - Flexible and consistent detection point
 - \$15k* for all approaches and exits
 - Restricted frequency (no interference), area license
- Full TCIP dataset can be transmitted
- Multipurpose ITS communication
- Can evolve into two-way communication

TSP Using IntelliDrivesm

Key Technologies

- Standard TCP/IP Ethernet networking
- GPS location
- Fiber Optics
- 4.9GHz public safety band 802.11 wireless communication.
- Mobile Access Router
- Integrated On-Board Systems
- Interagency network connections

TSP Using IntelliDrivesm

Key Technologies

- Standard TCP/IP Ethernet networking
- GPS location
- Fiber Optics
- IntelliDrivesm wireless communication
 - 4.9GHz band 802.11.
- Mobile Access Router
- Integrated On-Board Systems
- Interagency network connections

IntelliDrivesm Communications

Key Benefits

- TSP detection by configuration, not by physical location.
- True Commercial Off The Shelf (COTS) equipment.
- Standards based.
- Network infrastructure supported and maintained by traditional IT staff, not specialists.
- Very high bandwidth (up to 54mbps wireless)
- Managed frequency, no interference
- General purpose communication network supports many Intelligent Transportation Systems: TSP, AVL, passenger information, fare collection, security video.

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