



## **TransPort Technical Advisory Committee**

Wednesday, May 9, 2011

1:00 p.m. – 2:30 p.m.

ODOT Region 1

\*\*\*\*\*

### **Meeting Notes**

#### **In Attendance**

Steve Callas (TriMet), Mike Clance (Kimley-Horn), Jim Gelhar (Gresham), Doug Gettman (Kimley-Horn), Scott Harmon (DEA), Jabra Khasho (Beaverton), Peter Koonce (Portland), Galen McGill (ODOT), Tina Nguyen (Beaverton), Pam O'Brien (DKS), Jim Peters (DKS), Deena Platman (Metro), Shaun Quayle (Kittelson), Willie Rotich (Portland), John Toone (King County)

#### **Announcements**

Deena Platman (Metro) announced that June will be the final TransPort meeting that Metro is coordinating due to streamlining of resources and redeployment of staff. Metro will establish a single ad hoc committee of TPAC to advise on policy and funding sub allocations related to TSM and TDM. Deena will send out a memo describing the new committee and future meeting dates. TransPort members will discuss the future management of the committee at their June meeting.

#### **ITS Beyond Portland Region**

Doug Gettman with Kimley-Horn shared his firm's experiences with implementing ITS management systems. He shared information about technology and features that can enhance device management capabilities. A copy of the presentation is attached.

Questions/comments from TransPort members included:

Q. Can K-H demonstrate its KITS ITS device management software? A. K-H would be willing to set up a webinar demonstration for TransPort.

Q. What is the average life cycle of a traffic control system? A. It is about 10 years before technology advances make it obsolete.

Q. What are the maintenance contract costs for KITS? A. Basic support for smaller agencies is \$10,000/year. The price is scalable to agencies depending on size and usage.

#### **King County ITS for Transit**

John Toone with King County Transit agency gave an overview of King County's ITS architecture for transit. Their key architecture concepts are: 1. Open architecture; 2. Standards-based in order to purchase less expensive, off the shelf applications; and 3. Commoditized ITS that is: a. multipurpose – share costs across ITS devices; b. extensible – requires little engineering; and, c. expandable – new systems are easily integrated. John shared the types of ITS devices that King County has deployed for its transit system. A copy of the presentation is attached.

Questions/comments from TransPort members included:

Q. What is the budget and funding source for ITS improvements at King County? A. Overall budget is \$2 million per year, which is generated from Small Starts grant as well as other state and federal sources.

Q. Do you have electronic arrival signs for transit? A. Yes, there are between 100 – 200 signs being deployed, about 20 – 30 per transit line.

Q. Who maintains field equipment? A. It is a combination of King County (IT) and KC Transit (field devices).

Q. How long did it take to get an MOU to share a cabinet? A. Easy, as a lot of the issues had been previously worked out.

Q. What about KC fare integration efforts? A. It has been a 12 year, with three counties involved.

### **Bi-State Travel Time Project**

Deena Platman (Metro) described a project under development to add dedicated travel time signage along I-5 and I-205 from the Wilsonville and Vancouver splits. ODOT and WSDOT initially considered the project in response to a FHWA bi-state ITS grant opportunity in 2011. While the grant application did not progress, the idea took root and both agencies continued to scope the project with the help of IBI Group. VAST in SW RTC is funding the scoping effort. While the project will build on existing activities in the corridor, funding for the construction of signage has not been identified.

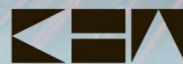
### **Agency Updates**

- TriMet – expanding Opticom to eight signals along SE Division Street, Line 4. The transit signal priority will extend from Gresham transit center to central Portland; CAD/AVL project schedule has slipped due to radio system implementation issues.
- ODOT – revamping the ATMS – undergoing software development and replacement; updating TripCheck website
- Portland – SCATS after study is underway; continuing to work on the IGA for the I-84 Active Traffic Management Corridor
- Clackamas Co – Installed first bike signal on Springwater Trail at the Johnson/Bell intersection; installing flashing yellow arrows and pedestrian countdown heads in Oregon City and Lake Oswego

Meeting adjourned at 2:30 p.m.



# **KIMLEY-HORN** INTEGRATED TRANSPORTATION SYSTEM (KITS®)



Kimley-Horn  
and Associates, Inc.

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# DISCOVER

WHAT YOU CAN DO

with



and



Kimley-Horn  
and Associates, Inc.

- KHA ITS Technology Team
- KITS ATMS/FMS
- ALPS Multi-modal Simulation
- KAPS GIS-Based Tools
- Web apps
- Mobile apps



# Kimley-Horn and Associates, Inc.

- In business since 1966
- 100% employee-owned
- 60 offices, 1500 staff
- Over 150 ITS professionals across US
- KITS system software since 1989
- 20 staff in ITS technology group
- Focus on client service

# ITS Technology Services

- KITS arterial/freeway management systems
- ALPS multi-modal simulation
- KAPS GIS tools
- Mobile apps, web tools, websites
- ITS systems and traffic engineering
- Federal, state, county, and local clients



# What is KITS?

## » ITS device management software

- » Traffic signals
- » Dynamic message signs
- » CCTV cameras
- » Ramp meters
- » Detector stations
- » RWIS
- » Video wall
- » Incident management

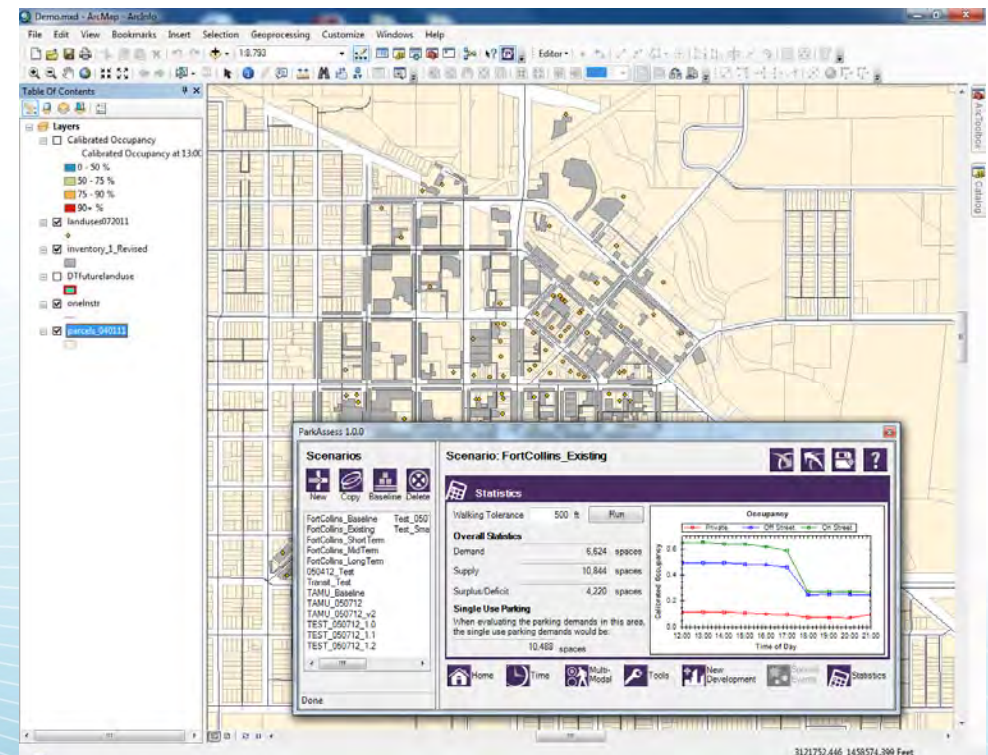




# What is KAPS?

» ArcGIS plug-in tools for mobility performance analysis

- » Parking supply & demand
- » Transit accessibility
- » Pedestrian density & mobility
- » Stadiums
- » Intermodal stations



# What is ALPS?

## » Multi-modal mobility simulation system

- » Pedestrians
- » Fixed-route transit
- » Vehicles
- » Parking facilities
- » Airports
- » Stadiums
- » Intermodal stations









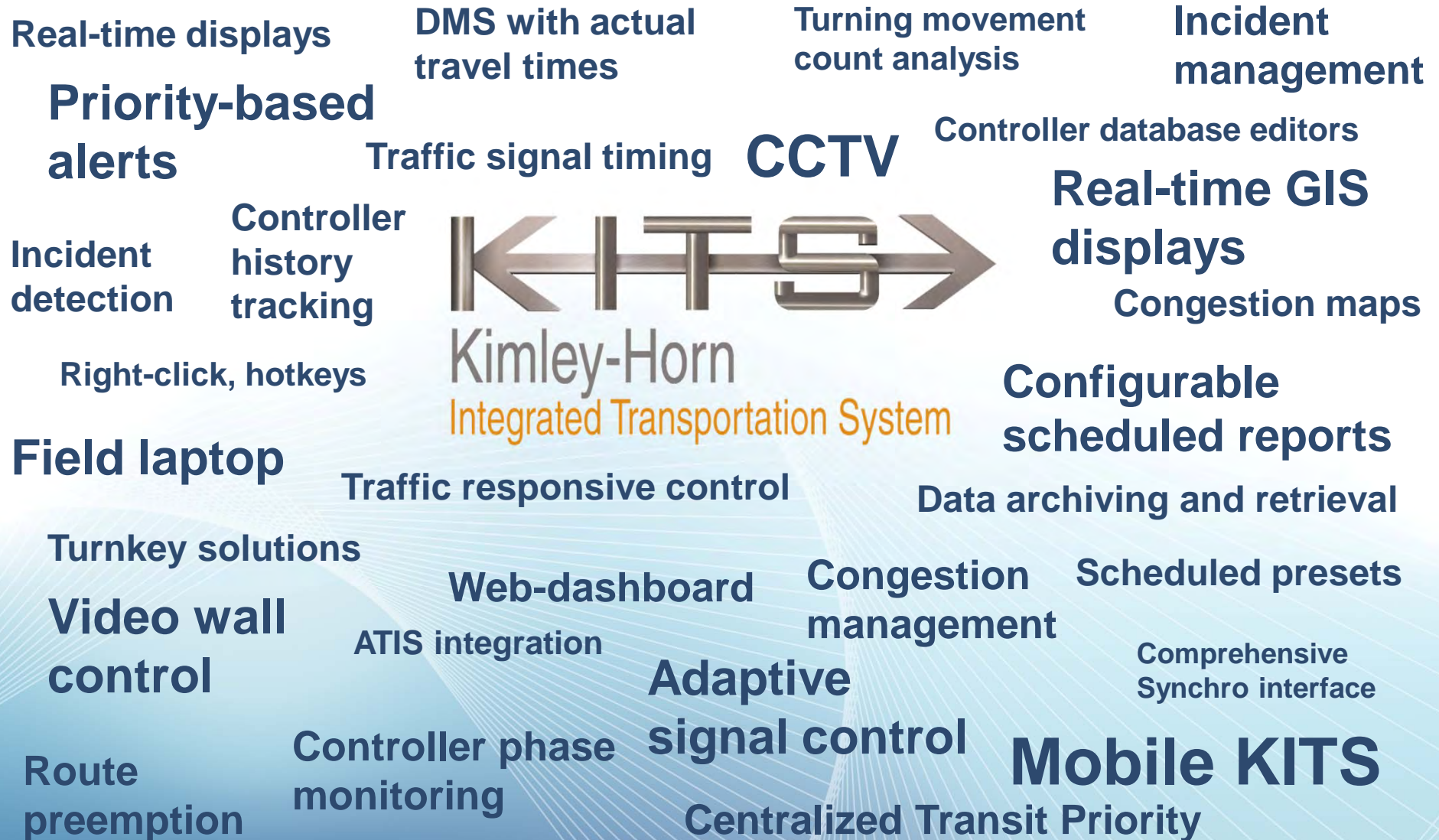


# Chincoteague Wildlife Refuge KITS





# Benefit of KITS – Extensive Features

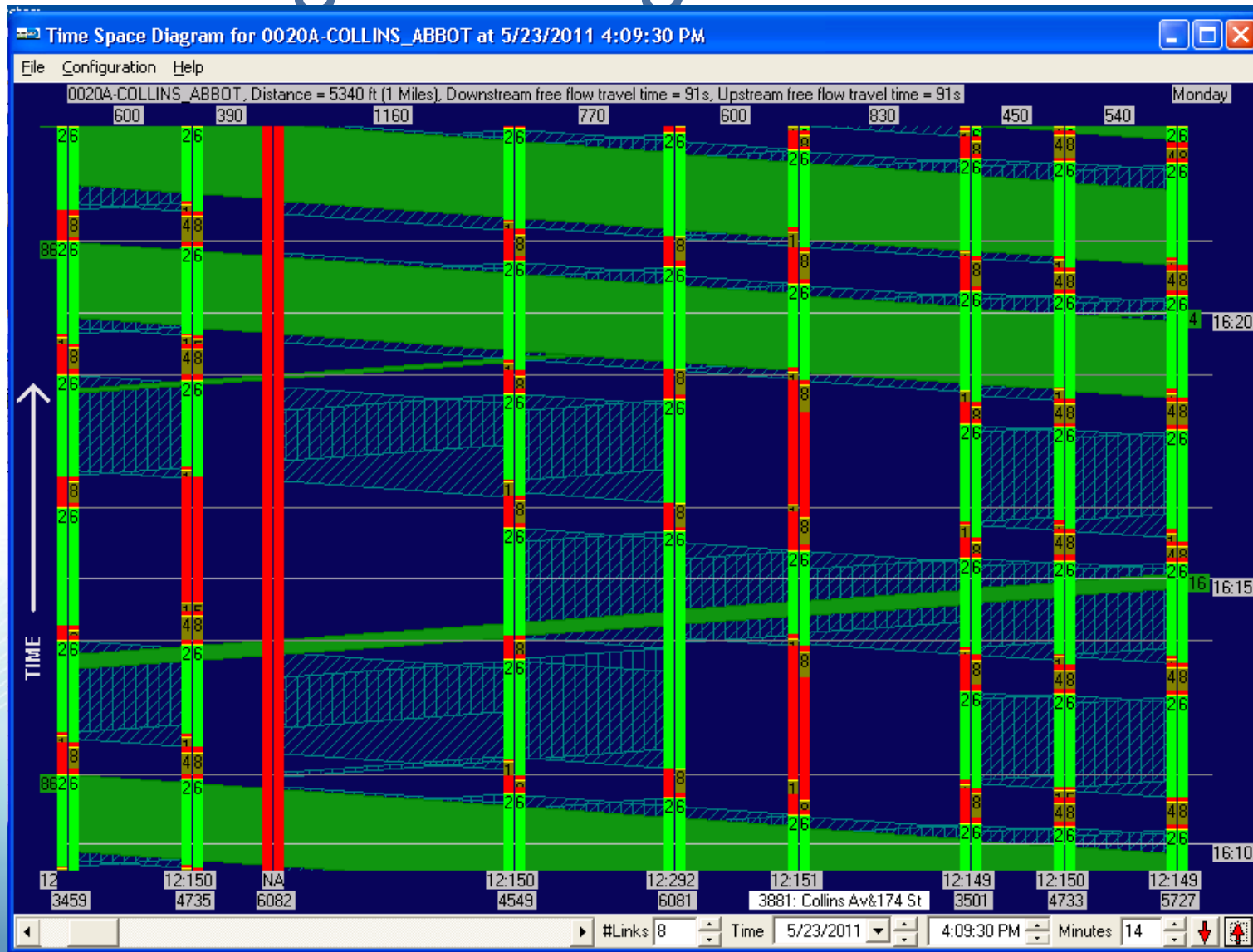




# Integrated Arterial Management

- Traffic control
- Traffic management
- Incident response
- Maintenance & diagnostics
- Alarms & alerts
- Performance reporting

# Traffic Engineering



# Traffic Management

**Yearly Schedule for Region TMC-TEST**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
November 25	26	27	28	29	30	December 1
YS	SS	SS	WS	SS	NX	XY
2	3	4	5	6	7	8
YS	SS	SS	WS	SS	NX	XY
9	10	11	12	13	14	15
YS	SS	SS	WS	SS	NX	XY
16	17	18	19	20	21	22
CHRISTMAS VACATION						
YN	NN					
23	24					
CHRISTMAS VACATION						
YN	NN					
30	31					
CHRISTMAS VACATION						
YN	NN					

**December, 2007**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

**Today: 12/26/2007**

Calendar Information

CallID: 2

Object: Region TMC-TEST

Description: SCHEDULE FOR TEST C

Status: Disabled

Day Type: NN NON-SCHOOL WEEKDAY FOLLOW BY NON-SCH						Day Type: NX NON-SCHOOL FRI FOLLOW BY NON-MJR-HOL S						Day Type: SI	
Cycle	Time	Plan	Plan Name	Op Mode	Cycle	Time	Plan	Plan Name	Op Mode	Cycle	Time	Plan	
*	00:00	15	[15][15] EVENING	TOD	*	00:00	15	[15][15] EVENING	TOD	*	00:00	15	
99*	01:00	16	[16][16] MID-NIGHT/NIGHT	TOD	99*	01:00	16	[16][16] MID-NIGHT/NIGHT	TOD	99*	01:00	17	
*	01:15	17	[17][17] LATE NIGHT	TOD	99*	01:15	17	[17][17] LATE NIGHT	TOD	99*	05:30	2	
*	05:30	2	[2][02] PRE-AM PEAK	TOD	*	05:30	2	[2][02] PRE-AM PEAK	TOD	*	06:30	4	
*	06:30	4	[4][04] HEAVY AM PEAK	TOD	160	06:30	4	[4][04] HEAVY AM PEAK	TOD	160	09:30	5	
*	09:30	5	[5][05] POST-AM PEAK	TOD	*	09:30	5	[5][05] POST-AM PEAK	TOD	*	10:00	23	
	10:00	23	[23][23] AVERAGE	TOD	*	10:00	23	[23][23] AVERAGE	TOD	*	15:30	10	
	15:30	10	[10][10] PRE-PM PEAK	TOD	*	15:30	10	[10][10] PRE-PM PEAK	TOD	*	16:30	11	
	16:30	11	[11][11] PM PEAK	TOD	*	16:30	11	[11][11] PM PEAK	TOD	*	19:30	13	
	19:30	13	[13][13] POST PM PEAK	TOD	*	19:30	13	[13][13] POST PM PEAK	TOD	*	21:00	14	
	21:00	14	[14][14] EARLY EVENING	TOD	*	21:00	14	[14][14] EARLY EVENING	TOD	*	22:00	15	

View Intersection Schedule

Edit Cycle

Delete

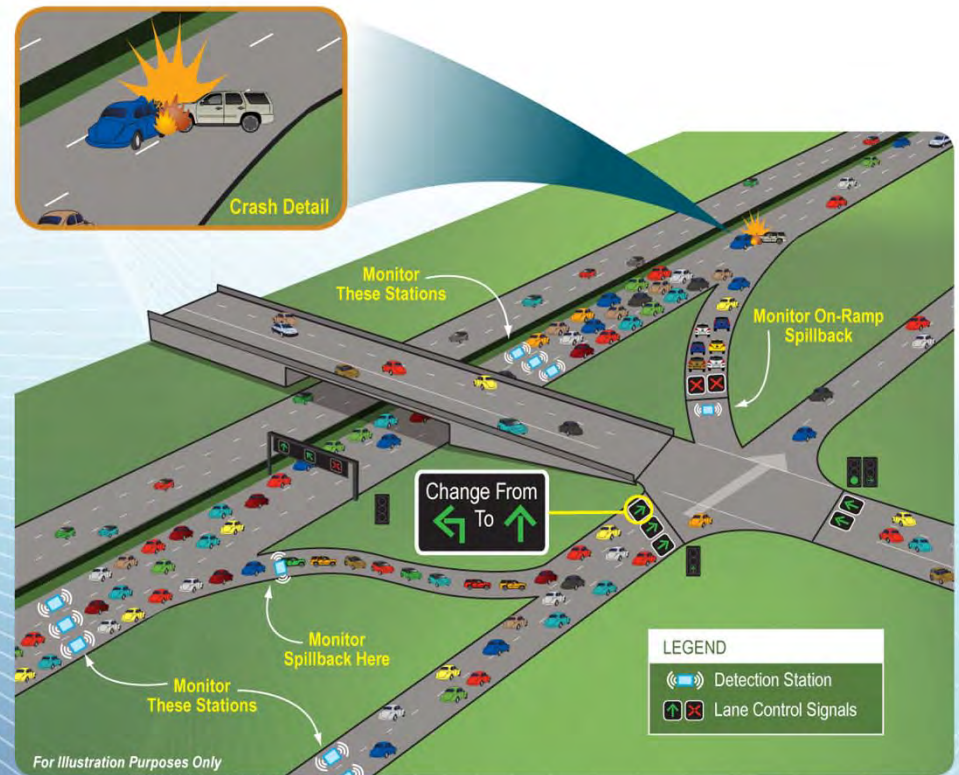


Event Enabled	Event Object	Event Name	Action	Alert	Priority	Notes	Pre-Event Type	Pre-Event Alert Value	Post-Event Alert Value
Yes	Controller	3rd/3C Full Start	Alarm	---	Medium	---	---	0	0
Yes	Controller	3rd/3C Full Start	Alarm	---	Medium	---	Medium	2	0
Yes	Controller	AntiSneakdown	Alarm	---	---	---	---	0	0
Yes	Controller	Bridge Preempt End	Page	---	Low	---	---	0	0
Yes	Controller	Bridge Preempt Start	Page	---	Low	---	---	0	0
Yes	Controller	Bridge Preempt Time	Alarm	---	Low	---	---	0	0
Yes	Controller	Full Flash Fail	Alarm	---	High	---	---	0	0
Yes	Controller	Out Flash Start	Alarm	---	---	---	---	2	2
No	Controller	Outdays Minimum	Ignore	---	Low	---	---	0	0
Yes	Controller	DRP Comm End	Alarm	---	Low	---	---	0	0
Yes	Controller	DRP Comm Start	Alarm	---	Low	---	---	0	0
Yes	Controller	Comm Fail End	Page	---	Low	---	---	0	0
Yes	Controller	Comm Fail EOC Start	Alarm	---	Low	---	---	0	0
Yes	Controller	Comm Fail Start	Page	---	High	---	---	0	0
Yes	Controller	Control Start	Page	---	High	---	---	0	0
Yes	Controller	Control Stop	Page	---	High	---	---	0	0
No	Controller	Control Fail End	Ignore	---	Low	---	---	0	0
No	Controller	Control Fail Start	Ignore	---	Low	---	---	0	0

# Integrated Corridor Management

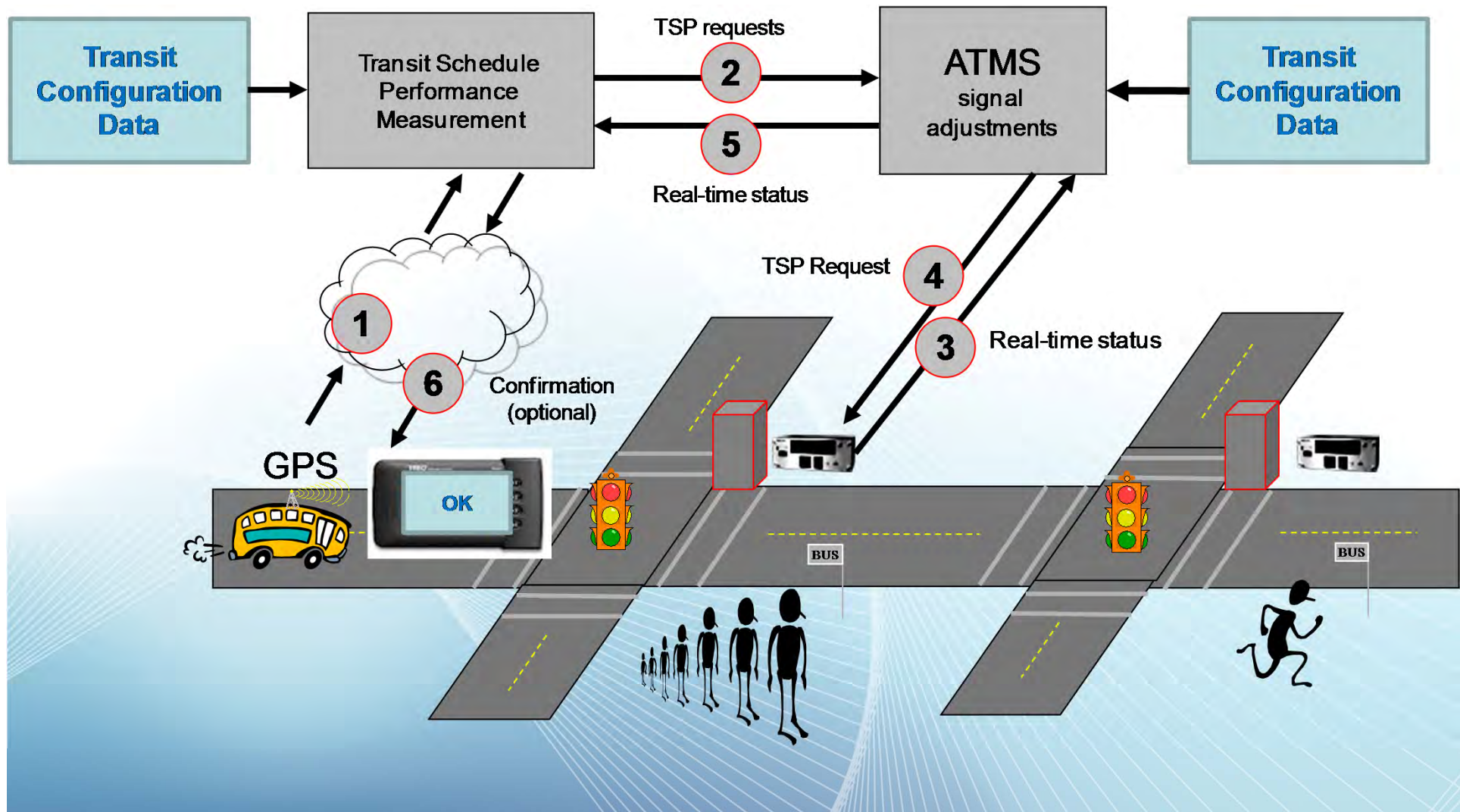
- Traffic signal plans on the incident diversion route
- DMS sign message groups
- CCTV preset groups
- Alerts
- Adaptive control
- Automated or operator-in-the-loop

					(SAMPLE)	(SAMPLE)
	OFF-RAMP	ON-RAMP	FREEWAY STATION 1	FREEWAY STATION 2	LANE CONFIGURATION ACTIONS	TIMING ACTIONS
QUEUE DETECTED?	YES	YES	YES	YES	  	Increase Cycle Time
	NO	YES	YES	NO	  	Increase Left-Turn Split
	YES	NO	YES	YES	  	Increase Through Split
	NO	NO	YES	NO	  	Increase Through Split





# Centralized Transit Priority





# Signal System Performance Tools





U.S. Department of Transportation  
Federal Highway Administration

## ASCT PERFORMANCE EVALUATION SYSTEM

Home Google Earth Google Maps Reports Contact Us Configuration Logout

### Welcome to ASCT Performance Evaluation!



#### Account Information

Username:

Password:

☐ Keep me logged in

Register if you don't have an account.

Log In

# Signal System Performance Tools

## » Validate ASCT meet objectives

- » Pipeline

- » Access equity

- » Prevent oversaturation

- » Manage queues

- » Accommodate long-term variability

- » Combination of these by TOD



# Signal System Performance Tools

➤ Hi-res phase timing/detector data

➤ Travel times from vehicle re-ID

➤ GPS probe travel times

➤ Volume counts

### Reports

Report Type:  Region:

**Before** Time Range Start:  Time Range End:

☒ Select All ☐ Select All Pages 4 selected

Time	Weekday	Group	User	Route	Pattern
04/10/2012 18:47:11	Tuesday	ADOT	Camila.weckerly@kimley-horn.com	1	0
04/10/2012 07:42:26	Tuesday	ADOT	Camila.weckerly@kimley-horn.com	1	0
04/10/2012 07:35:39	Tuesday	ADOT	Camila.weckerly@kimley-horn.com	1	0

Search Time  Search Group  Search Pattern

Go to page:  of 1 Show rows:  1 - 3 of 3

**After** Time Range Start:  Time Range End:

☒ Select All ☐ Select All Pages 6 selected

Time	Weekday	Group	User	Route	Pattern
04/06/2012 15:05:09	Friday	ADOT	Camila.weckerly@kimley-horn.com	1	0
04/06/2012 14:41:07	Friday	ADOT	Camila.weckerly@kimley-horn.com	1	0
04/06/2012 14:05:17	Friday	ADOT	Camila.weckerly@kimley-horn.com	1	0
04/06/2012 13:58:08	Friday	ADOT	Camila.weckerly@kimley-horn.com	1	0
04/13/2012 05:38:57	Friday	ADOT	Catherine.occhiline@kimley-horn.com	51	0

Search Time  Search Group  Search Pattern

Go to page:  of 1 Show rows:  1 - 5 of 5





## KITS Adaptive - Kadence

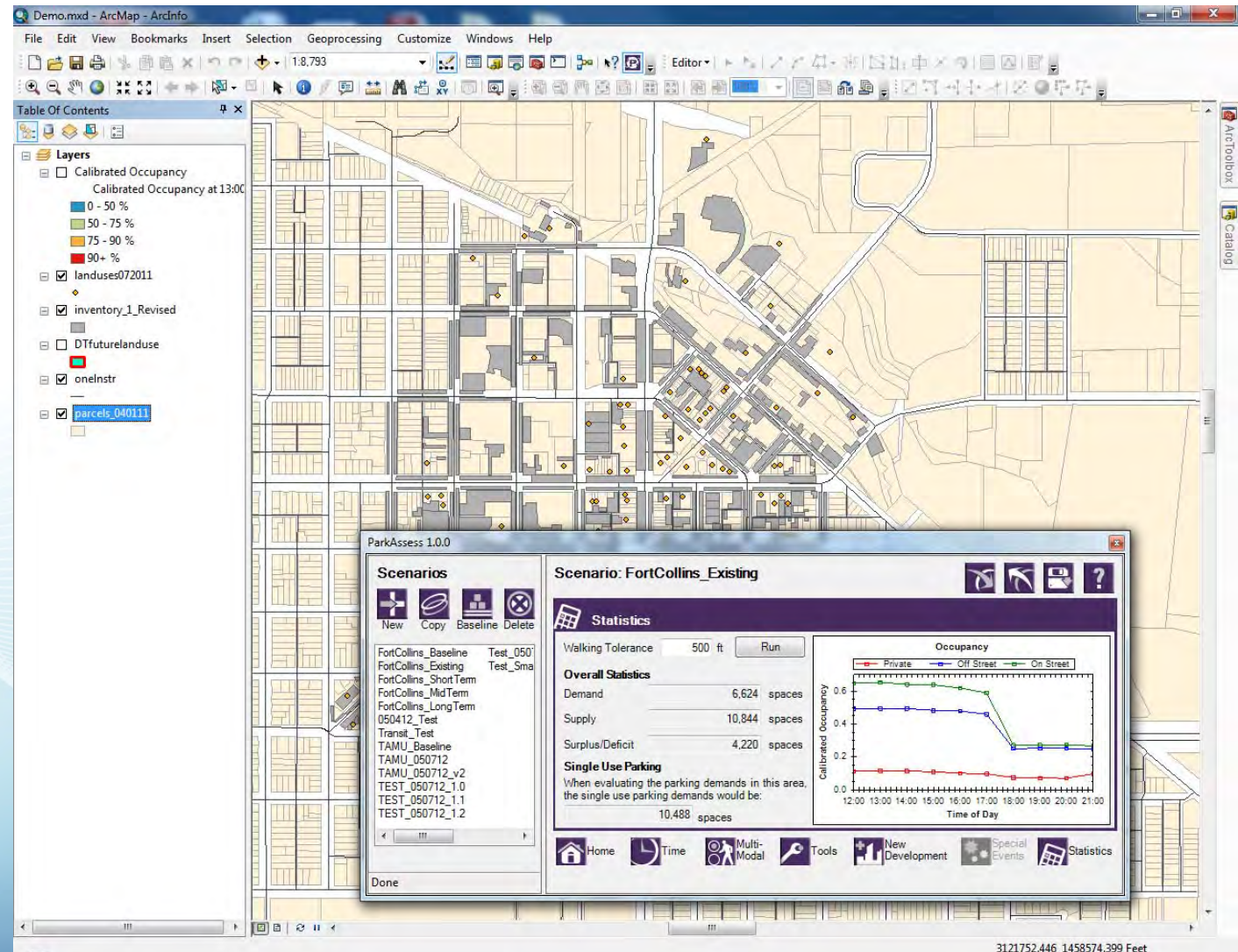
- Tune Splits, Offsets, Cycle, Sequence
- Suite of enhancements to ACSLITE
- Balance Safety and Efficiency
- FYA protected/permitted (future)
- Tune parameters, then download to field controllers
- Proven, reliable approach





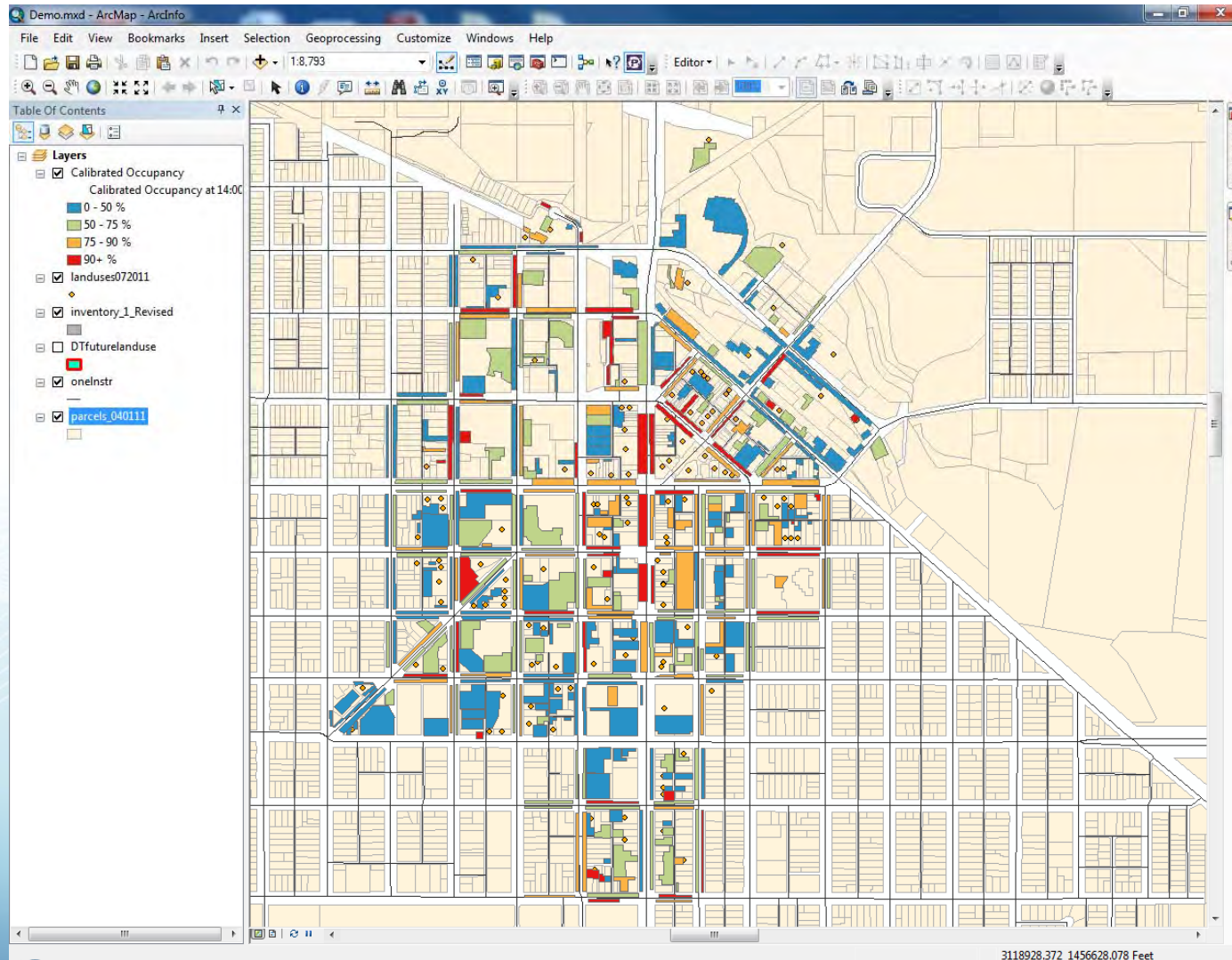
# KAPS Parking Access Modeling

- ArcGIS plugin
- Parking supply
- Parking demand
- What-if scenario analysis



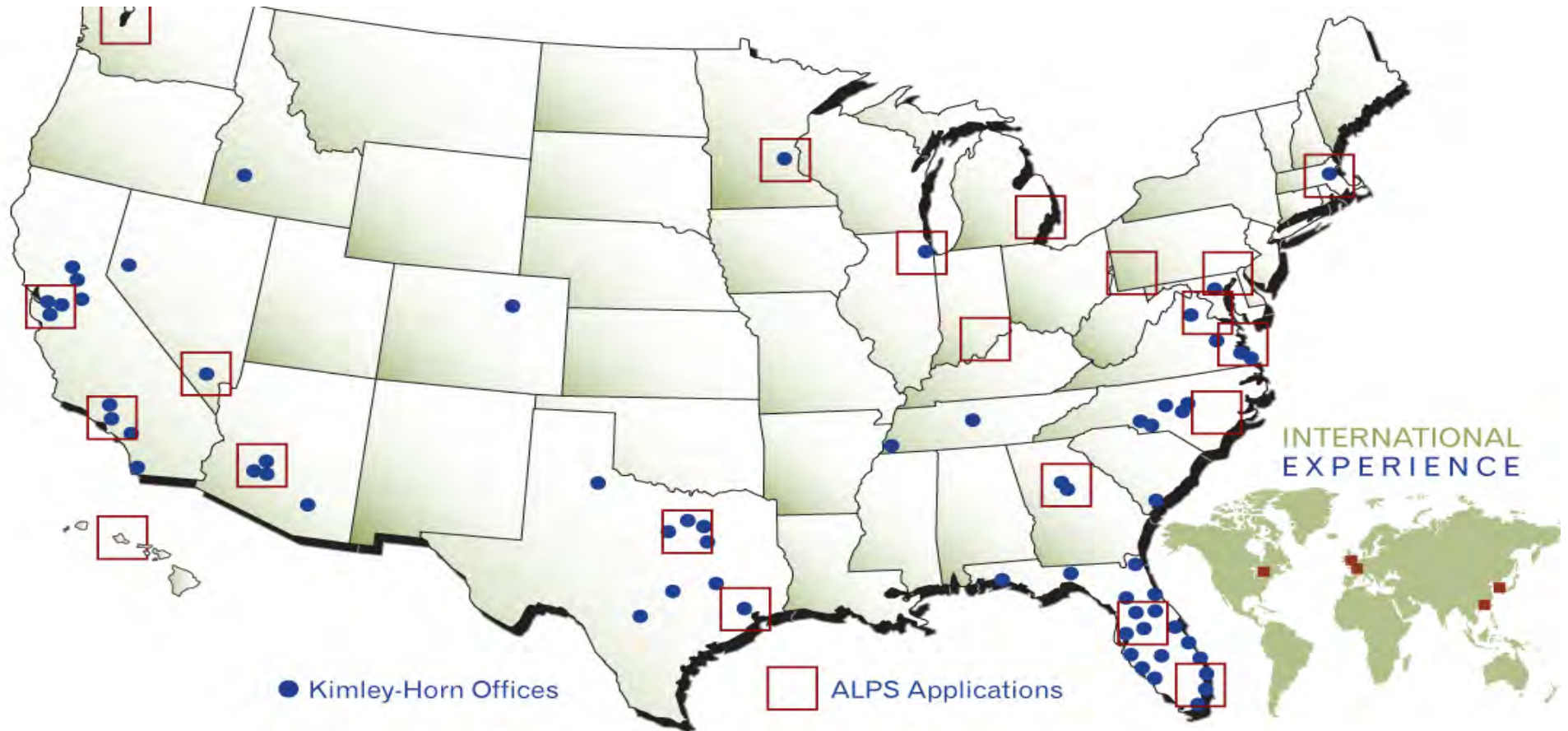


# KAPS Parking Analysis Results

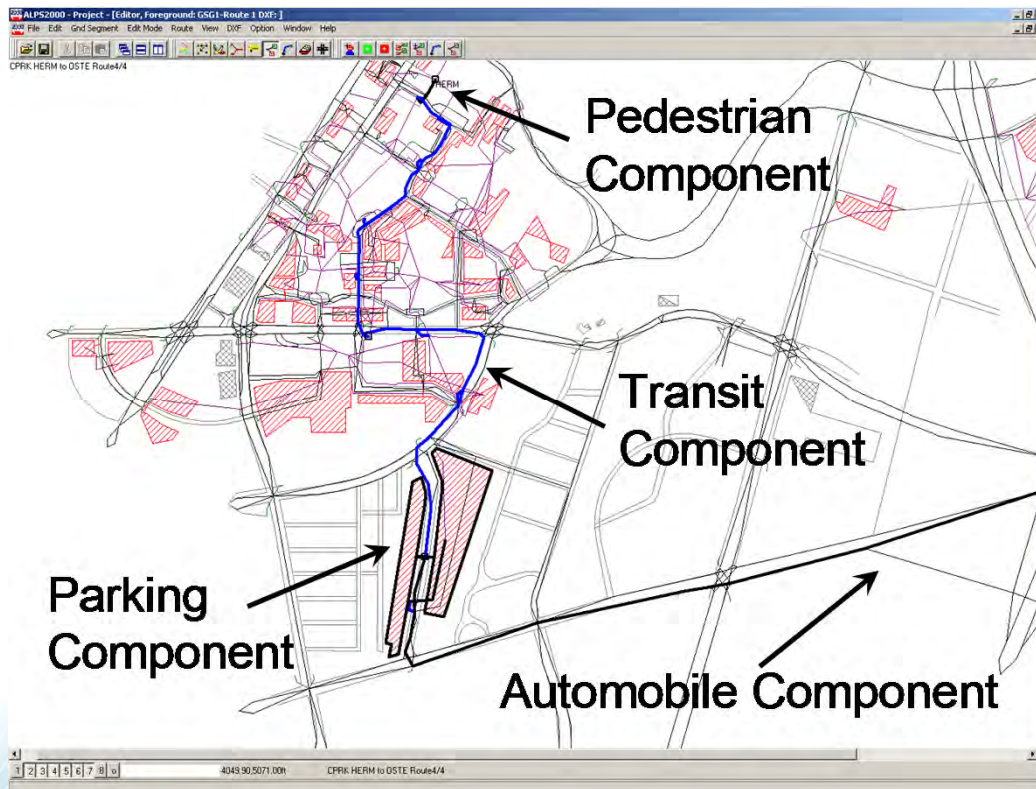




# ALPS Multi-Modal Simulation



# Multi-Modal Simulation



- ALPS provides the capability to track person trips across modes
- Allocate trips from O-D pairs to multiple multi-modal paths
- Simulate and calculate user experience metrics

***To: Drive → Park → Walk → LRT  
→ Walk → Destination***

***From: Walk → LRT → Walk →  
Drive → Origin***

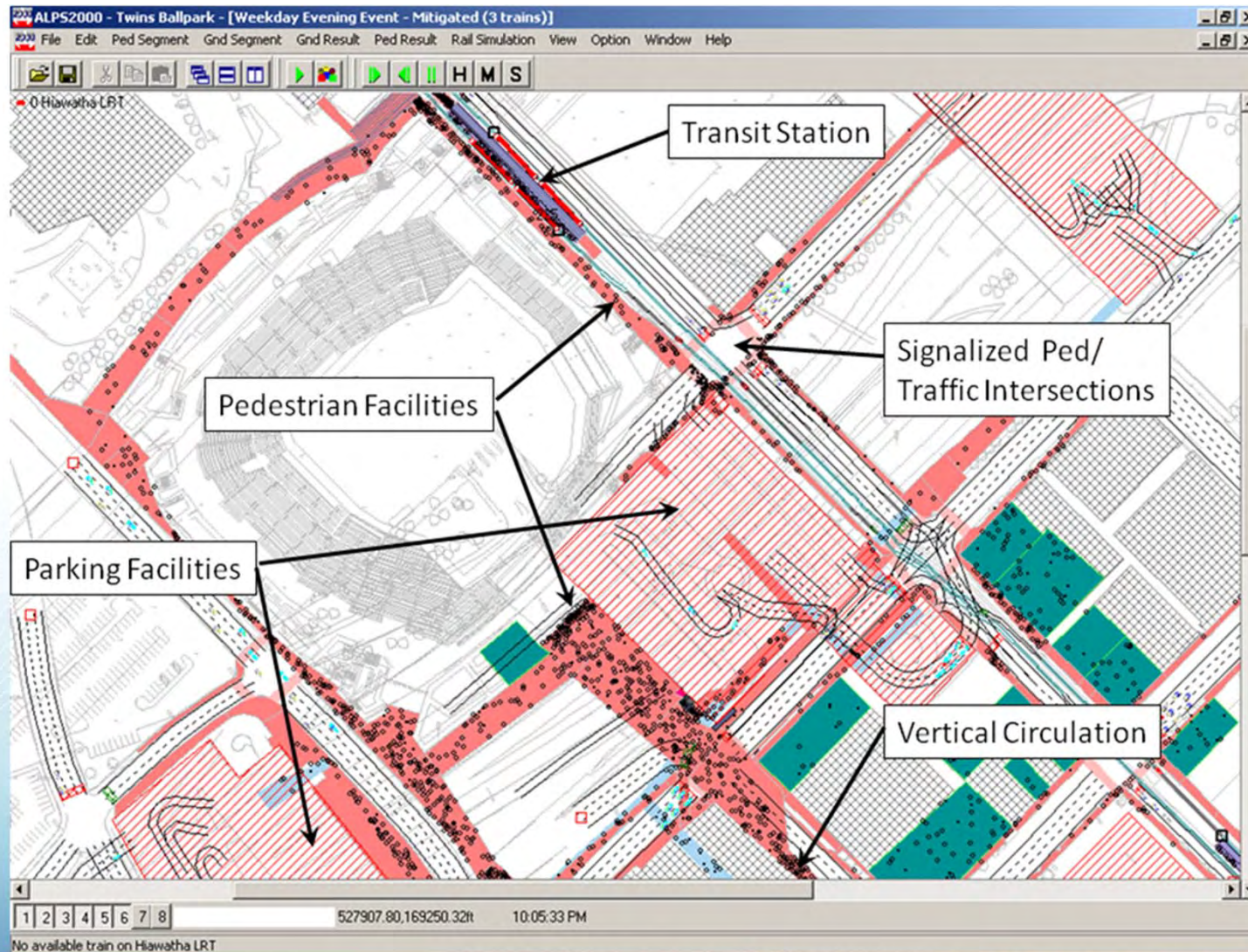


# Houston METRO Downtown LRT planning





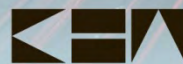
# Minnesota Twins stadium access planning







# **KIMLEY-HORN** INTEGRATED TRANSPORTATION SYSTEM (KITS®)



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and Associates, Inc.

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# King County Transit Intelligent Transportation Systems

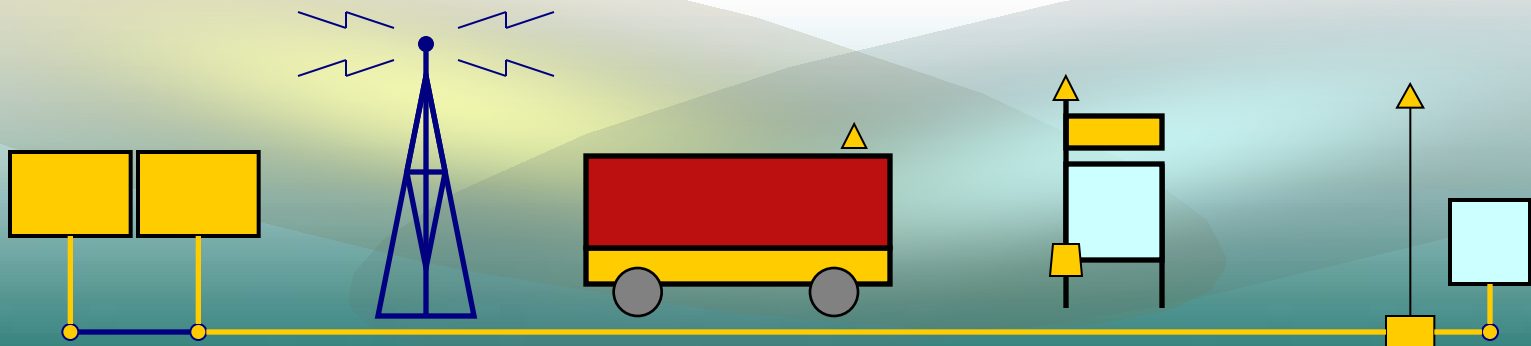
Overview of the King County Transit ITS  
Architecture

Presentation by John Toone  
King County Transit ITS Program Manager



# Presentation Overview

1. “Key” Information
2. ITS Architecture
3. ITS Infrastructure
4. Program Development



# Intelligent Transportation Systems

## Key Terms

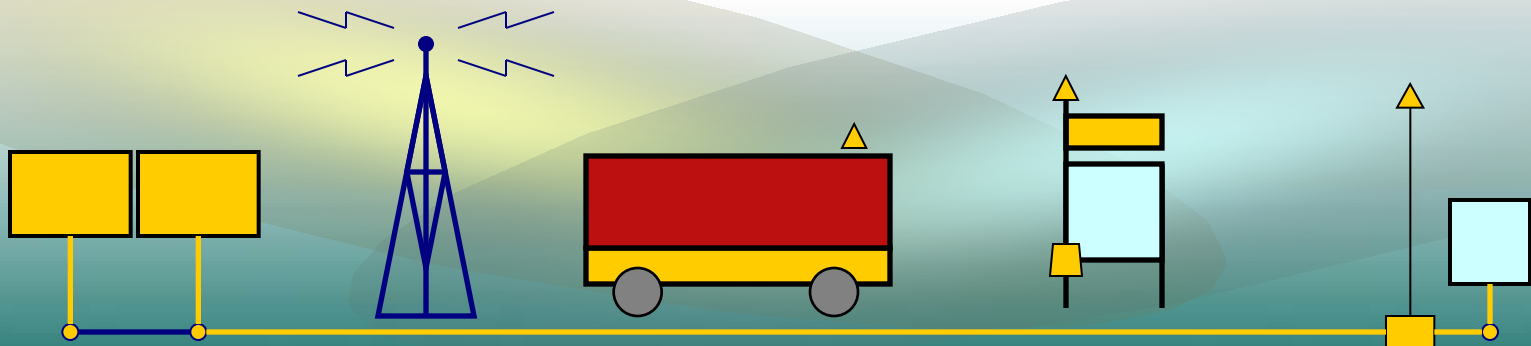
- **ITS** is the application of information technology to transportation management, e.g. adding data and communications to transportation systems.
- The **National ITS Architecture** was created by the USDOT as a concept of operation for ITS communication. It's a general framework to be refined by local MPO and agencies.
- “**Connected Vehicles**” is the technology concept of short-range wireless communication for vehicles.



# KC Transit ITS Architecture

## *Key Concepts*

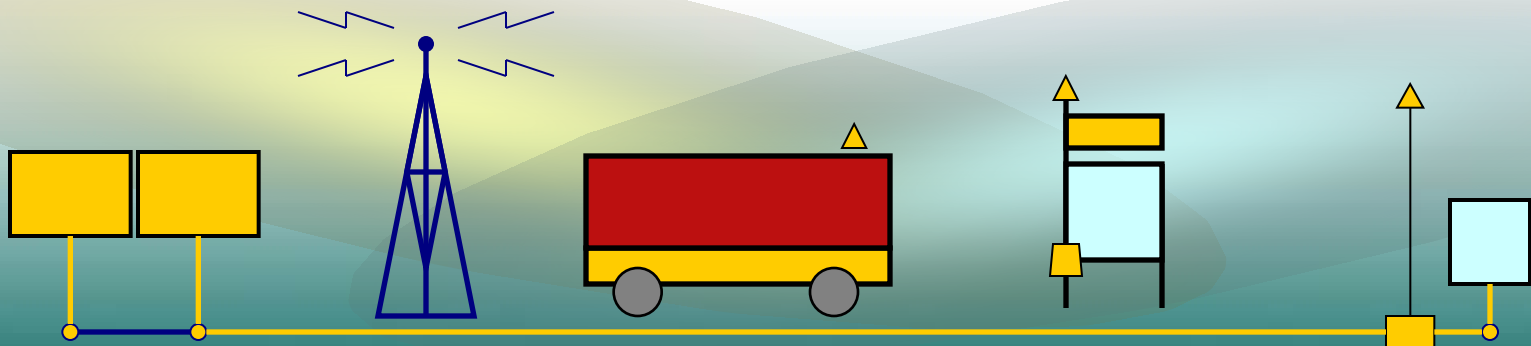
- Open Architecture
- Standards Based
  - Transportation Industry Standards
  - Information Technology Standards
- “Commoditize” ITS



# KC Transit ITS Architecture

## *Commoditized ITS*

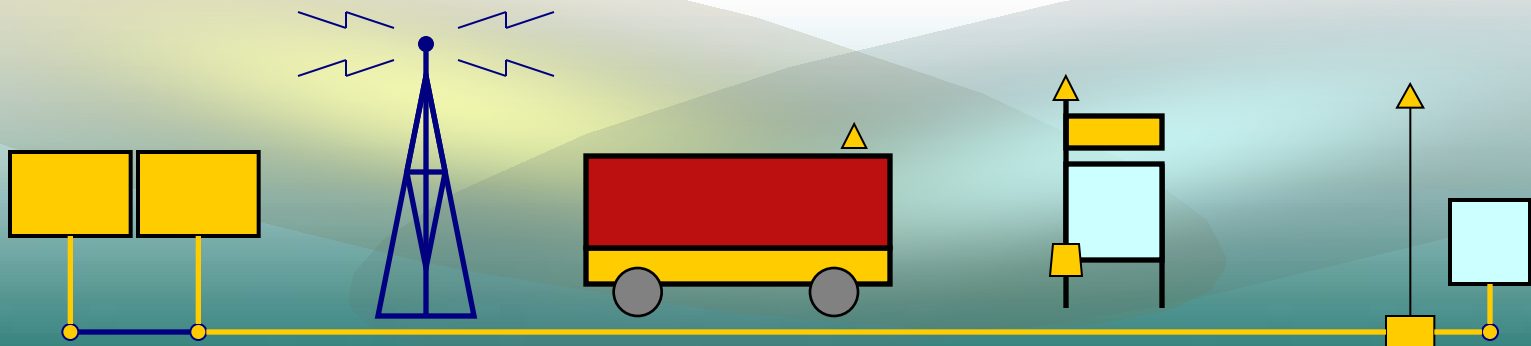
- Multipurpose
  - Shared cost of communication resources for each system.
- Extensible
  - New installations require little engineering.
- Expandable
  - New systems using IP networking can be easily integrated.



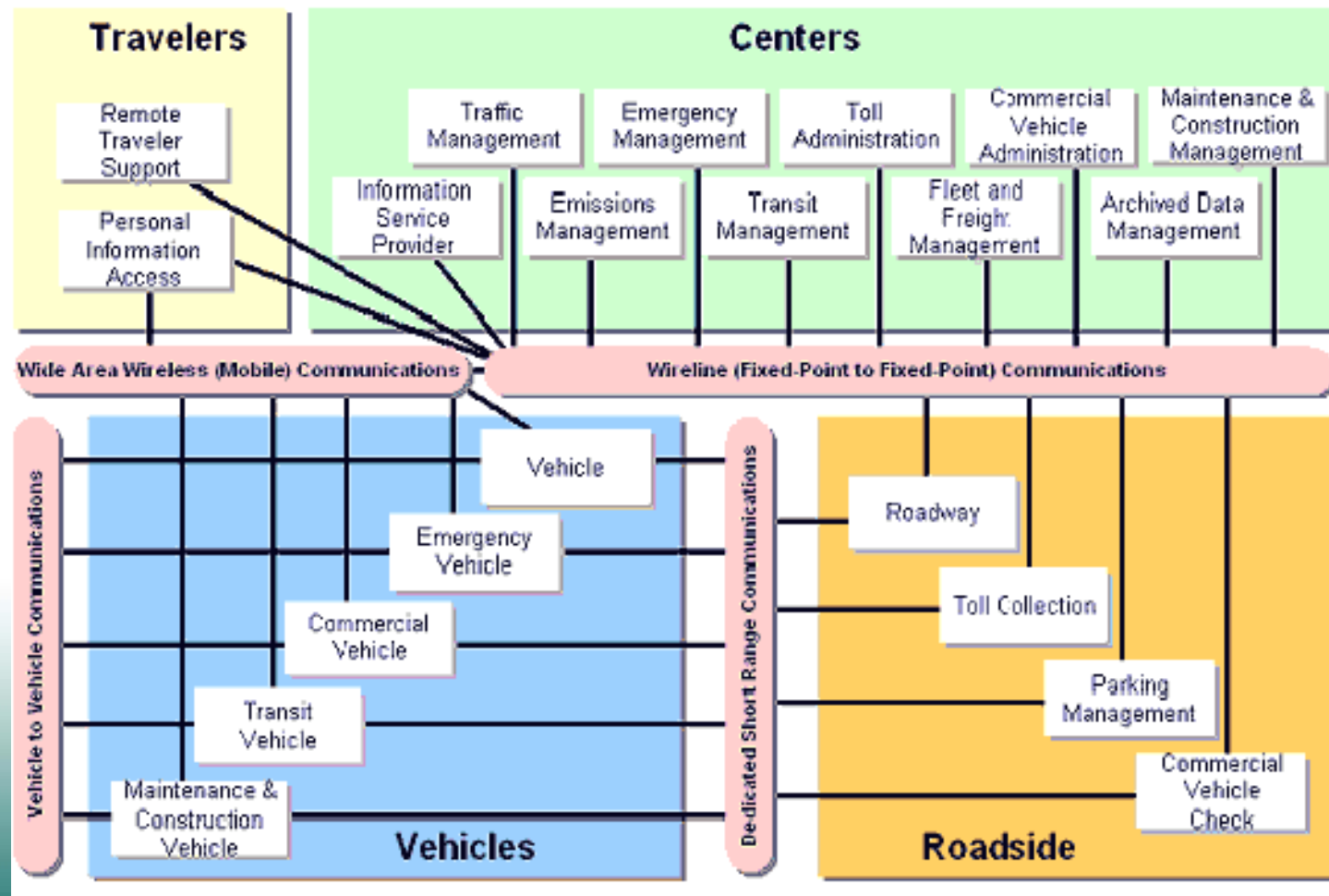


# Presentation Overview

1. “Key” Information
2. ITS Architecture
3. ITS Infrastructure
4. Program Development

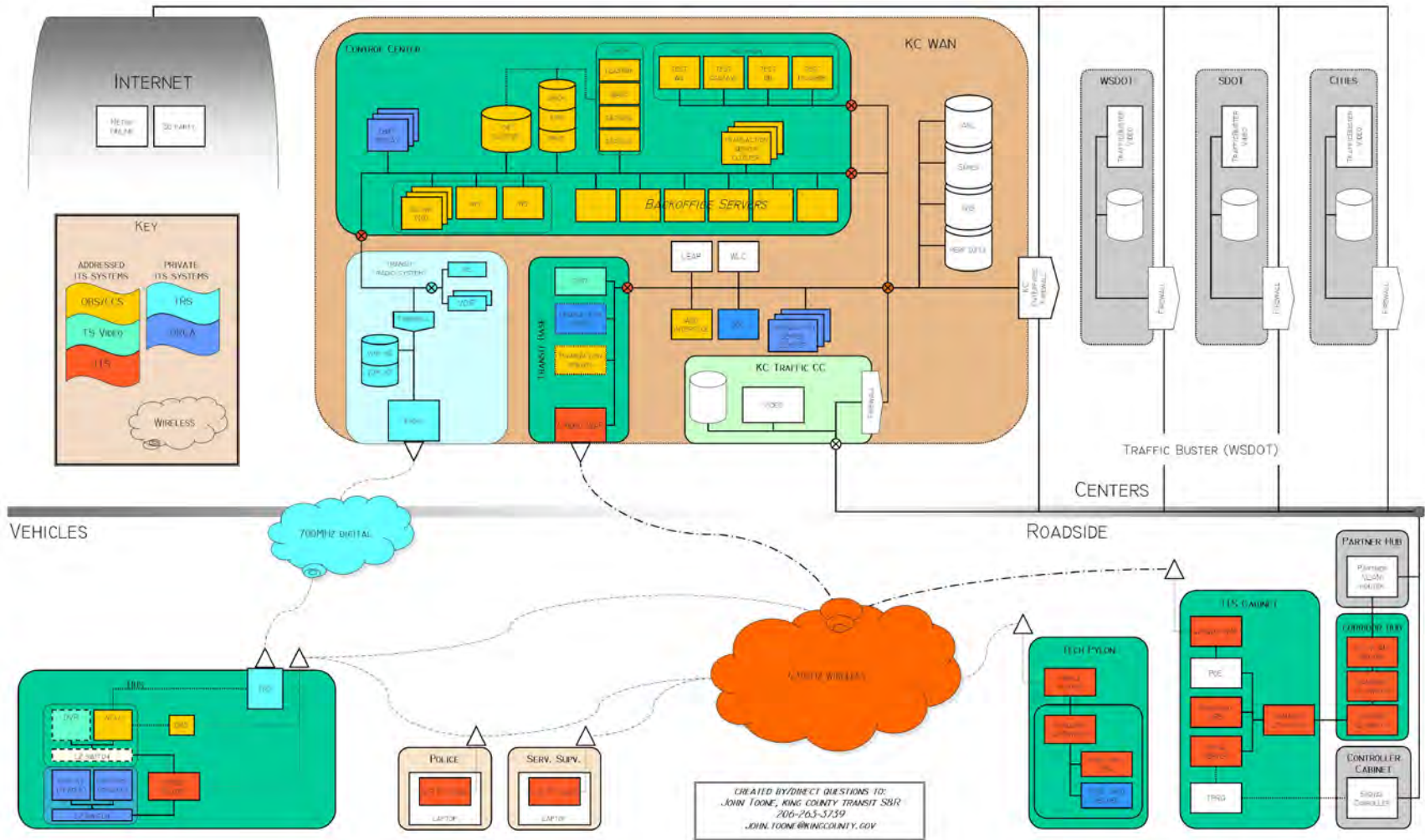


# National ITS Architecture





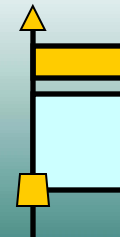
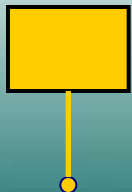
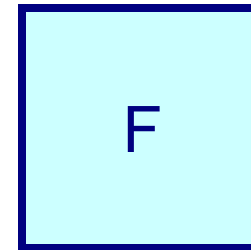
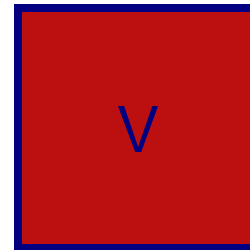
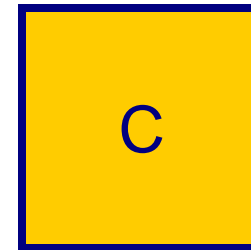
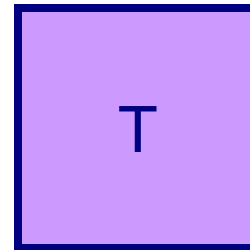
# KC METRO TRANSIT ITS ARCHITECTURE - v.2A (APPROVED FOR PUBLIC)



# KC Transit ITS Architecture

## Vehicles

- M/ADP Online
- RTIS
- RTIS Bus Away
- Signal Control
- ORCA
- Tech Pylon
- Security Video
- RTIS
- TED/SandRA
- ORCA
- Signal Control

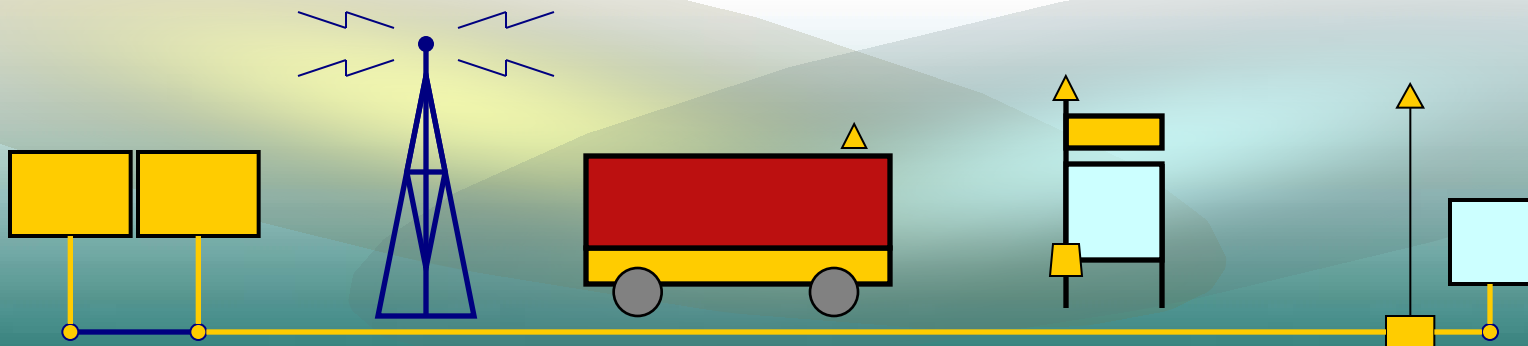
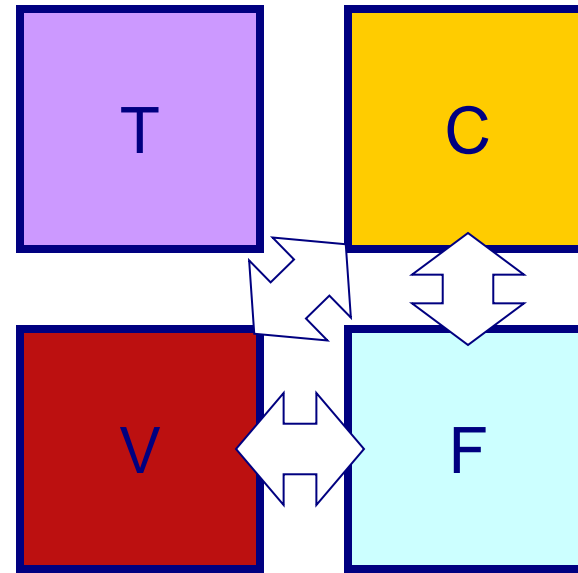




# KC Transit ITS Architecture

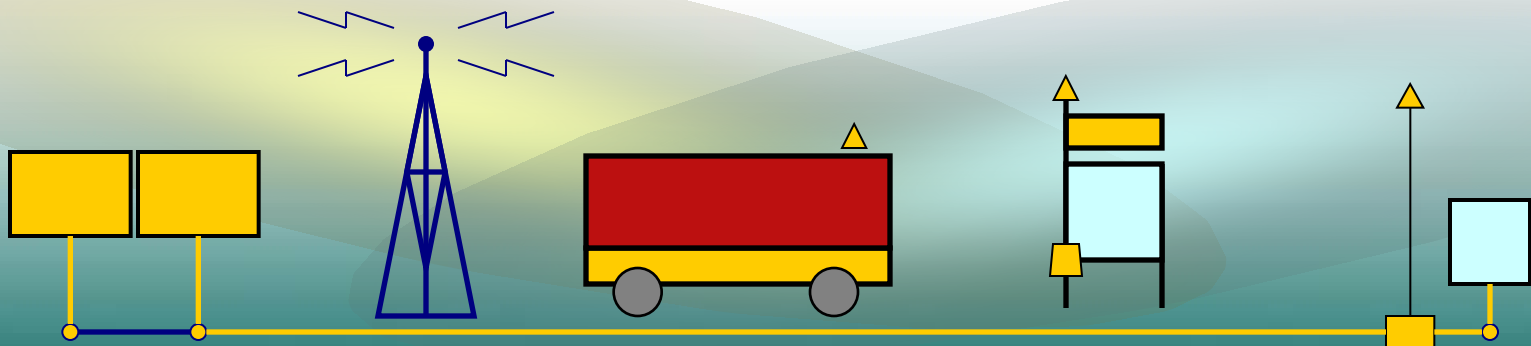
## Communications

- C2C *TrafficBuster*
- Fiber Optic interconnect
- 700MHz TRS
- 4.9GHz wireless



# Presentation Overview

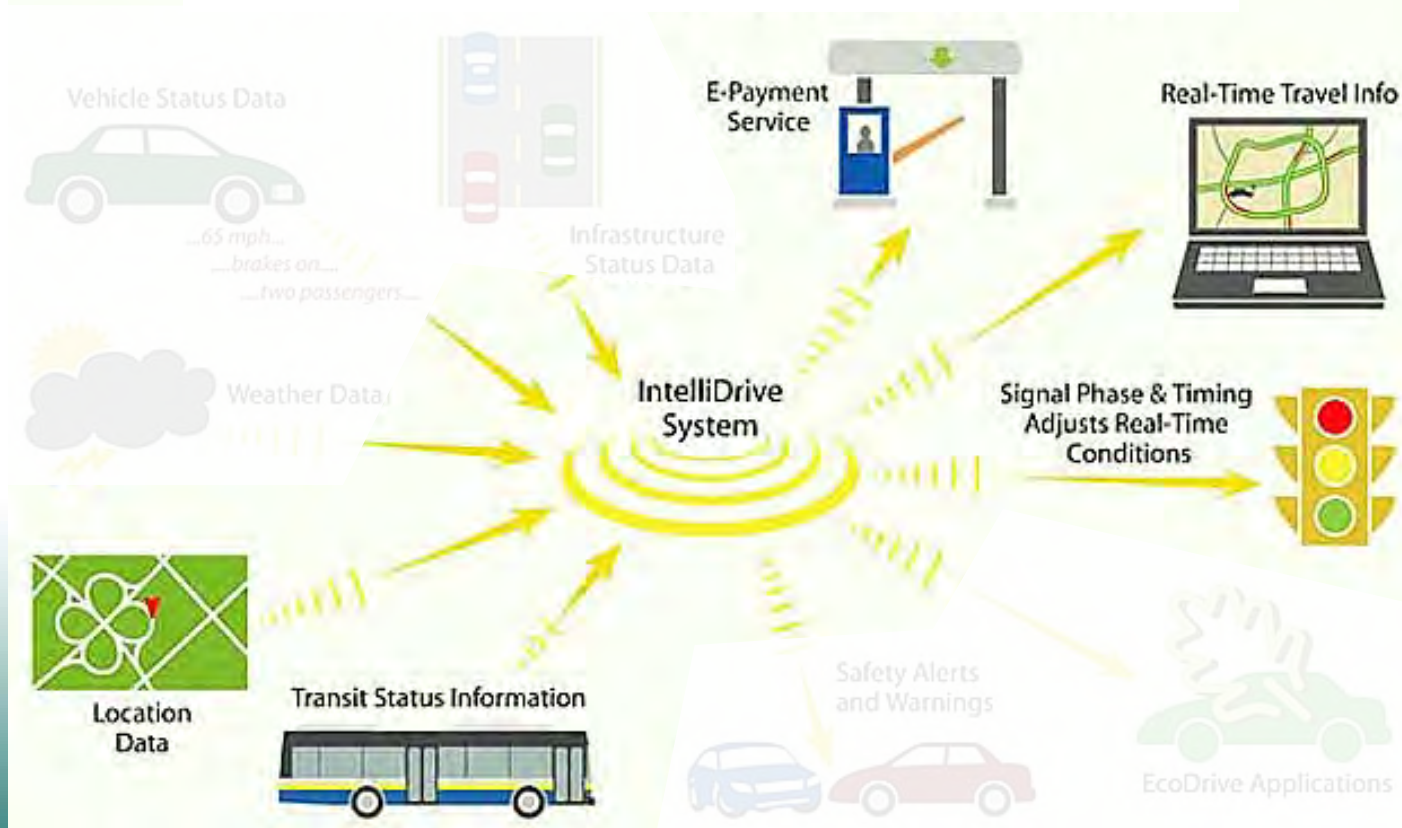
1. “Key” Information
2. ITS Architecture
3. ITS Infrastructure
4. Program Development





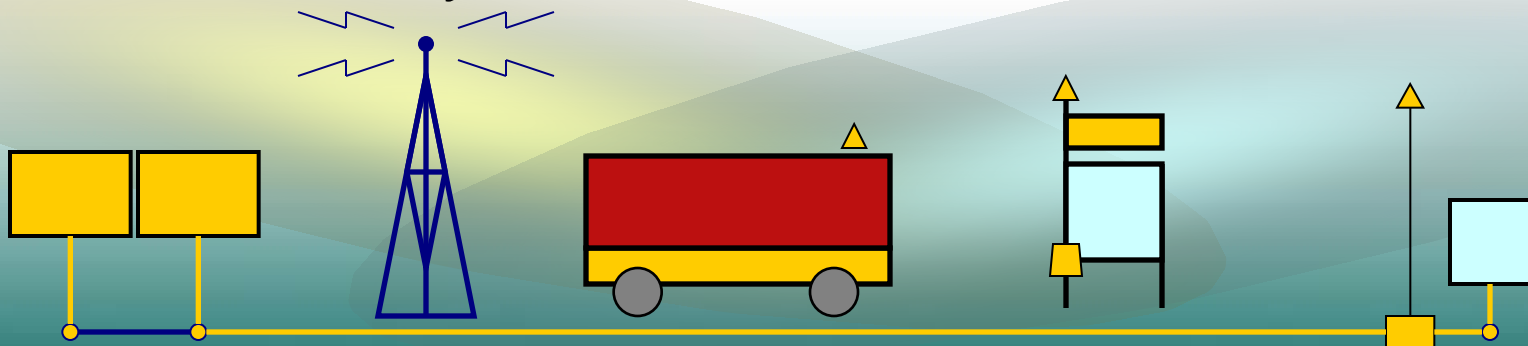
# KC Transit ITS Architecture

## *KC Transit ITS Network Environment*



# KC Transit ITS Architecture *Systems*

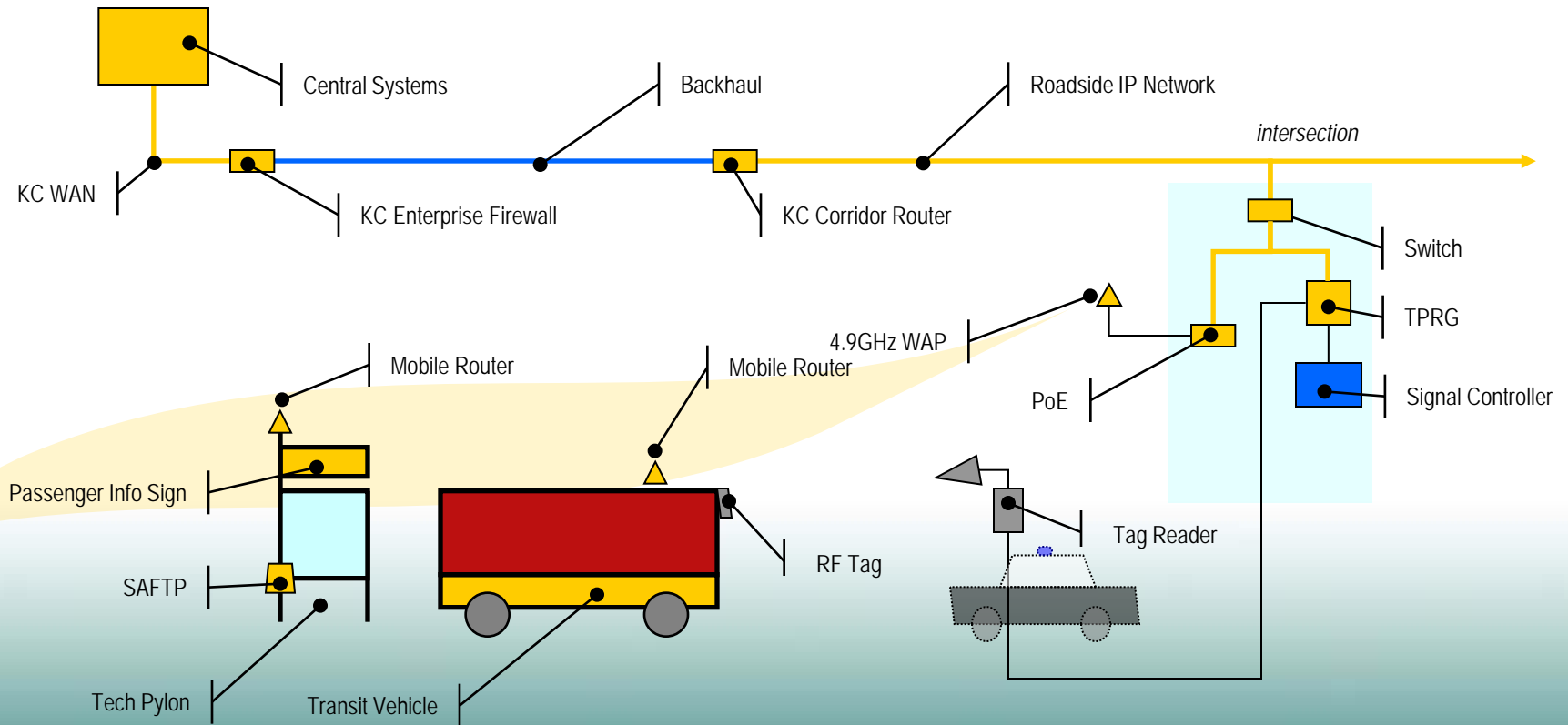
- Transit Signal Priority
- Electronic Fare Payment (ORCA)
- Next Bus Arrival Signs
- Signal Interconnect
- Automatic Vehicle Location
- Automatic Passenger Counting
- *Transit Security Video*



# Transit ITS Architecture

## Integrated Systems

### Transit ITS Architecture



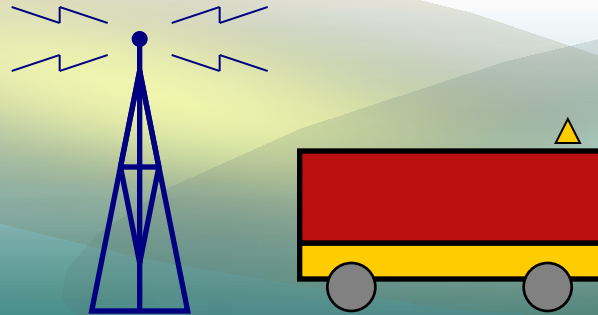


# KC Transit ITS Architecture

## *On-board Equipment*



- Eurotech 4.9GHz Mobile Access Router
- INIT On-board Systems (GPS, AVL, APC)
- ORCA fare card reader
- Motorola 700MHz radio

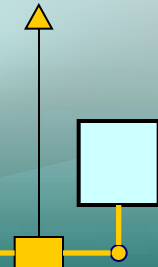


# KC Transit ITS Architecture

## *Roadside Equipment*



- Cisco Aironet 1524 Public Safety 4.9GHz WAP
- PoE injector
- Cisco IE3000 switch
- Digiport TS4 Mei
- Transit Priority Request Generator
- UPS



# KC Transit ITS Architecture

## *Tech Pylon Equipment*



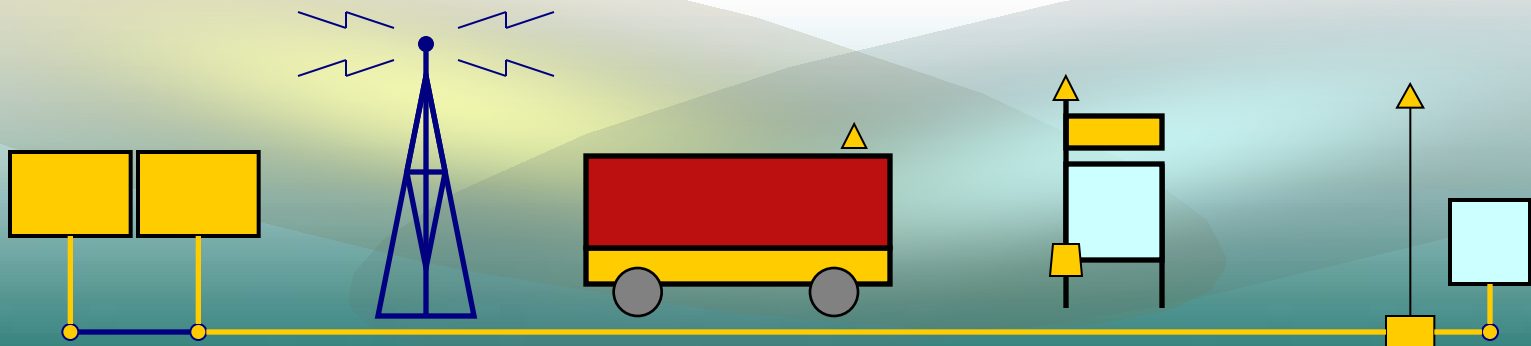
- Eurotech 4.9GHz Mobile Access Router
- Cisco IE3000 industrial switch
- Passenger Information Sign
- ORCA Fare card reader





# Presentation Overview

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# KC Transit ITS 2014 Coverage

## RapidRide

- A – SR99 South
- B – Bellevue/Redmond
- C – West Seattle
- D – Ballard
- E – Aurora Ave. North
- F – Burien/Renton

## SDOT

- Rainier Ave
- Market/45<sup>th</sup>

## Other

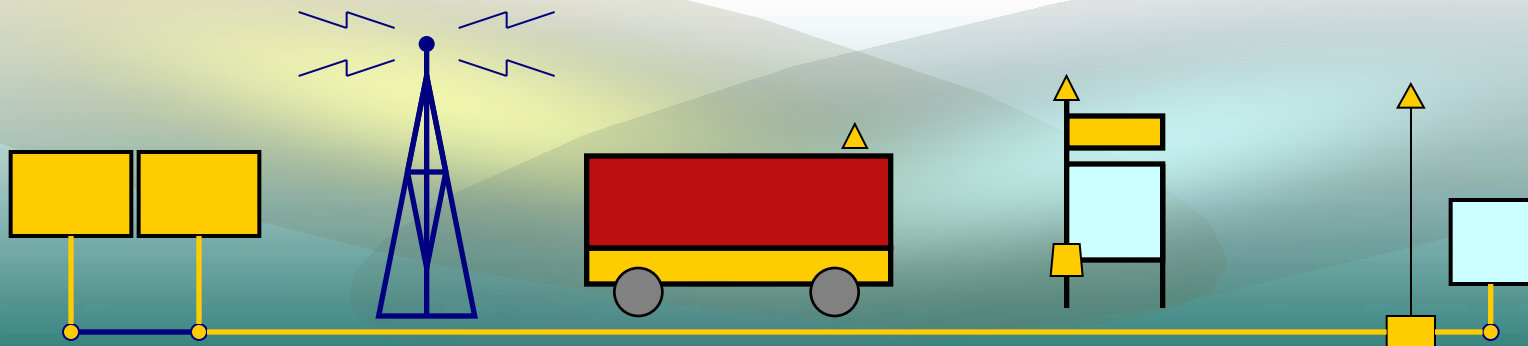
- Rte120
- SR520
- CBD



# KC Transit ITS Architecture

## *Future*

- >100 miles of ITS infrastructure by 2014 with >1,000 pieces of equipment
- Integrate transit security video
- Add additional C2C links
- Design concept of operation for Seattle CBD *Connected Vehicle* coverage
- Plan for transition to 5.9GHz DSRC (V2I)





# KC Transit ITS Program

- Transit Division
- Transit Systems Development & Operation
- John Toone, ITS Program Manager  
John.Toone@kingcounty.gov
- Sidney Quach, ITS Data Analyst

