



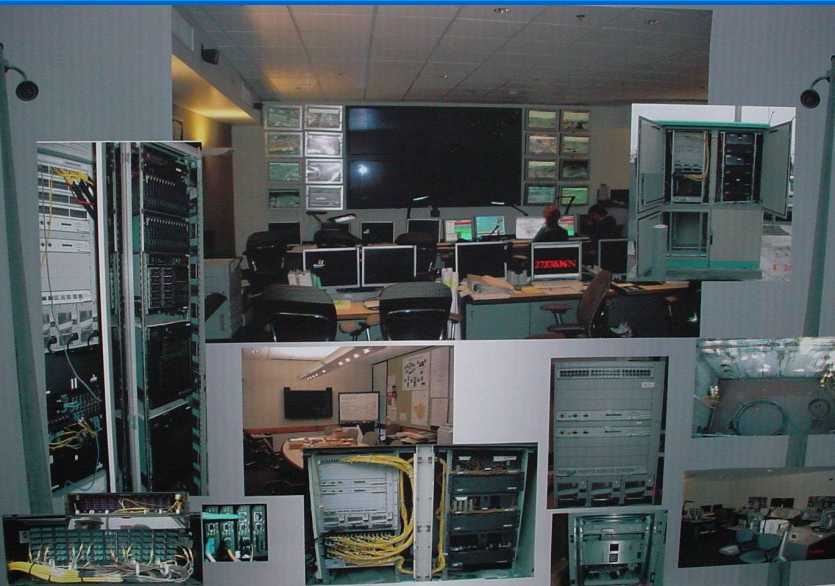
Intelligent Transportation Systems



Traffic Operations Center

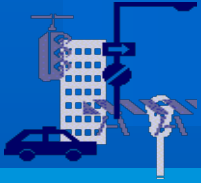
**PUBLIC WORKS DEPARTMENT
CITY OF FRESNO**


Presented by:
ITS Program Management



Intelligent Transportation Systems

ITS Program History!



-  Phase 1 – 1999/2001 Blackstone Corridor Constructed.
-  Phase 2 – 2001/2003 Traffic Operations Center Operational
Conduit & Infrastructure Built
for Herndon, Chestnut, Ventura-Kings
Canyon.
-  Phase 3 – 2006/2007 Fiber Optic Loop Installed,
Technology Deployed &
System Operational.

Intelligent Transportation Systems

Operations & Maintenance – Today!



-  ITS Program Funded (\$1.5 mil for O&M)
-  Operations & Maintenance Staffed with 8 Dedicated ITS Staff
-  ITS Standards Published (2008)
-  ITS Wireless Standards Published (2009)
-  Traffic Synchronization Underway!

Intelligent Transportation Systems

Traffic Synchronization (Fiber) 2000-2010



- ✓ Herndon Ave Synchronized Willow to Golden State
- ✓ Blackstone Ave Synchronized Olive to Herndon
- ✓ Kings Canyon Synchronized Downtown to Chestnut
- ✓ Chestnut Ave Synchronized Kings Canyon to Shields
- ✓ Clovis Ave Synchronized Shields to American
- ✓ Shaw Ave Synchronized SR168 – SR 99

Intelligent Transportation Systems

Traffic Synchronization (Wireless) 2010-2020



- ✓ First Street
 - ✓ Nees Ave
 - ✓ Bullard Ave
 - ✓ Ashlan Ave
 - ✓ McKinley Ave
 - ✓ West Ave
 - ✓ Shields Ave
 - ✓ Tulare Ave
 - ✓ Willow Ave
 - ✓ Palm-Nees
- | |
|------------------------|
| Nees to Ventura |
| Palm to Willow |
| Marks to Willow |
| Blackstone to Peach |
| SR 99 to Clovis Ave |
| Herndon to McKinley |
| West Ave to Chestnut |
| C Street to Clovis Ave |
| Ashlan to Shepherd |
| Herndon to Blackstone |

Intelligent Transportation Systems

Traffic Synchronization 2020-2025



Adaptive Signal Control Technology (ASCT)

- ✓ Herndon Ave *Adaptive Synchronization*
- ✓ Shaw Ave *Adaptive Synchronization*
- ✓ Ventura-Kings Canyon *Adaptive Synchronization*
- ✓ Friant-Blackstone *Adaptive Synchronization*
- ✓ Dynamic Downtown I *Adaptive Synchronization*
(ASCT & TSP Interoperability)

Intelligent Transportation Systems

Traffic Synchronization 2020-2025

Adaptive Signal Control Technology (ASCT)



 Ashlan Avenue *Time of Day*

Construction Phase

 Jensen Ave *Adaptive*

Construction Phase

 Friant Road *Adaptive*

Construction Phase

 Clovis Ave *Adaptive*

Construction Phase

 Palm Ave *Adaptive*

Design Phase

 Dynamic Downtown II

Design Phase

ASCT / TSP / EVP / I2V / SPM

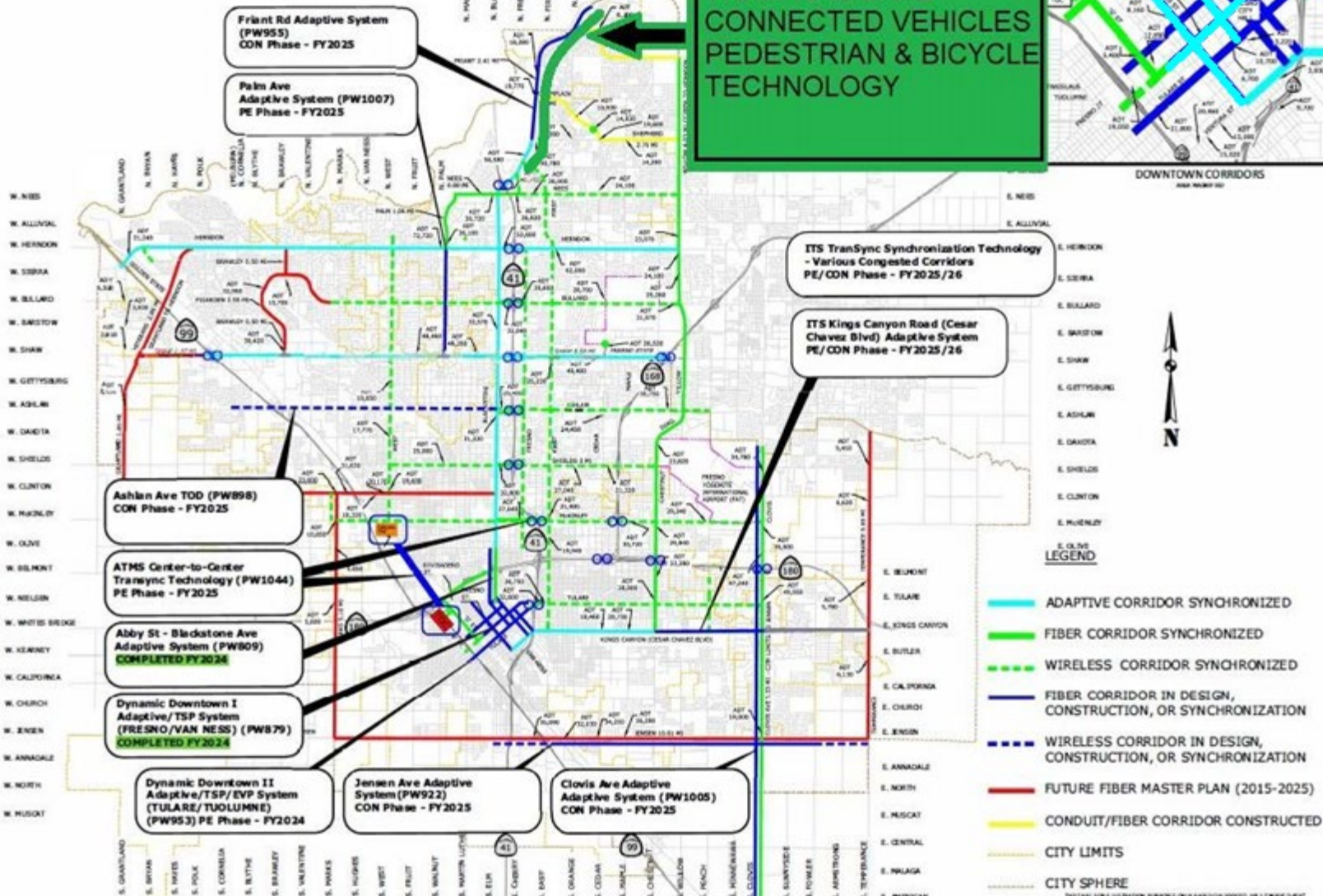
**INTELLIGENT TRANSPORTATION SYSTEMS
PUBLIC WORKS DEPARTMENT
CITY OF FRESNO**

NEXT GENERATION

**TRAFFIC SIGNAL
CONNECTED VEHICLES
PEDESTRIAN & BICYCLE
TECHNOLOGY**



DOWNTOWN CORRIDORS
AREA MAP



*NOT FOR CONSTRUCTION PURPOSES ONLY. DESIGN SUBJECT TO CHANGE. SHEET NUMBER FRESNO PUBLIC WORKS DEPARTMENT. CITY OF FRESNO COUNTY ENGINEER.

Advanced Technology Pilot Project

Friant Road (Audubon Drive to Copper River Road)

Next Generation CONNECTED VEHICLE (CV-V2X) SAFETY TECHNOLOGIES *for*

Traffic Signal
Infrastructure To Everything (V2X-I2X)
Speed Detection
Vehicle, Bicycle, Pedestrian Safety


John Stanbouljian
ITS Program Manager



Overview

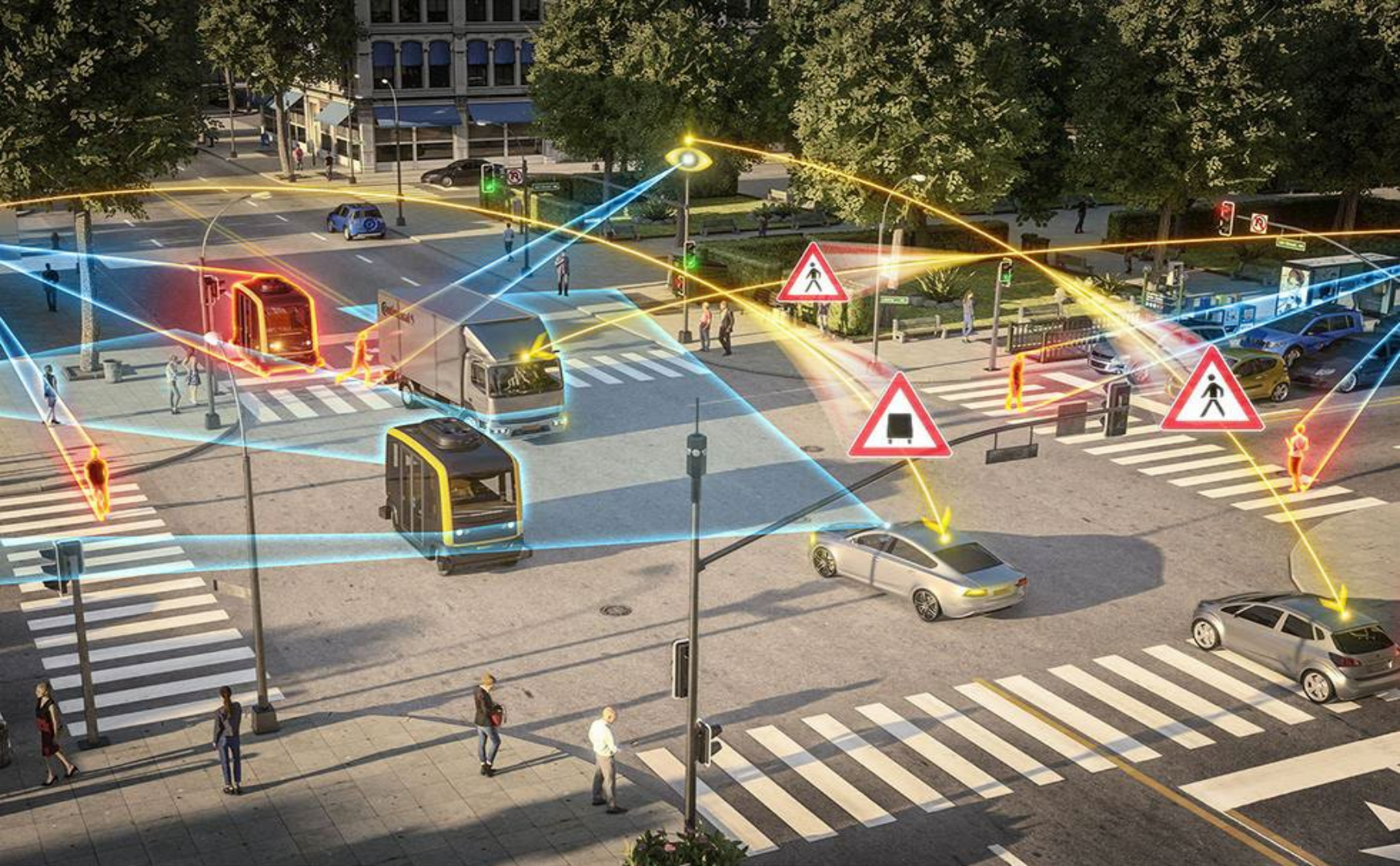
1. CV V2X / I2X Safety Technology
2. Scope of Work
3. Locations & Costs
4. Need
5. Project Benefits
6. Readiness & Experience
7. Environmental Justice & Impacts
8. Innovation & Replication

Iteris (V2X) Vehicle to Everything System *or Infrastructure to Everything (I2X)?*

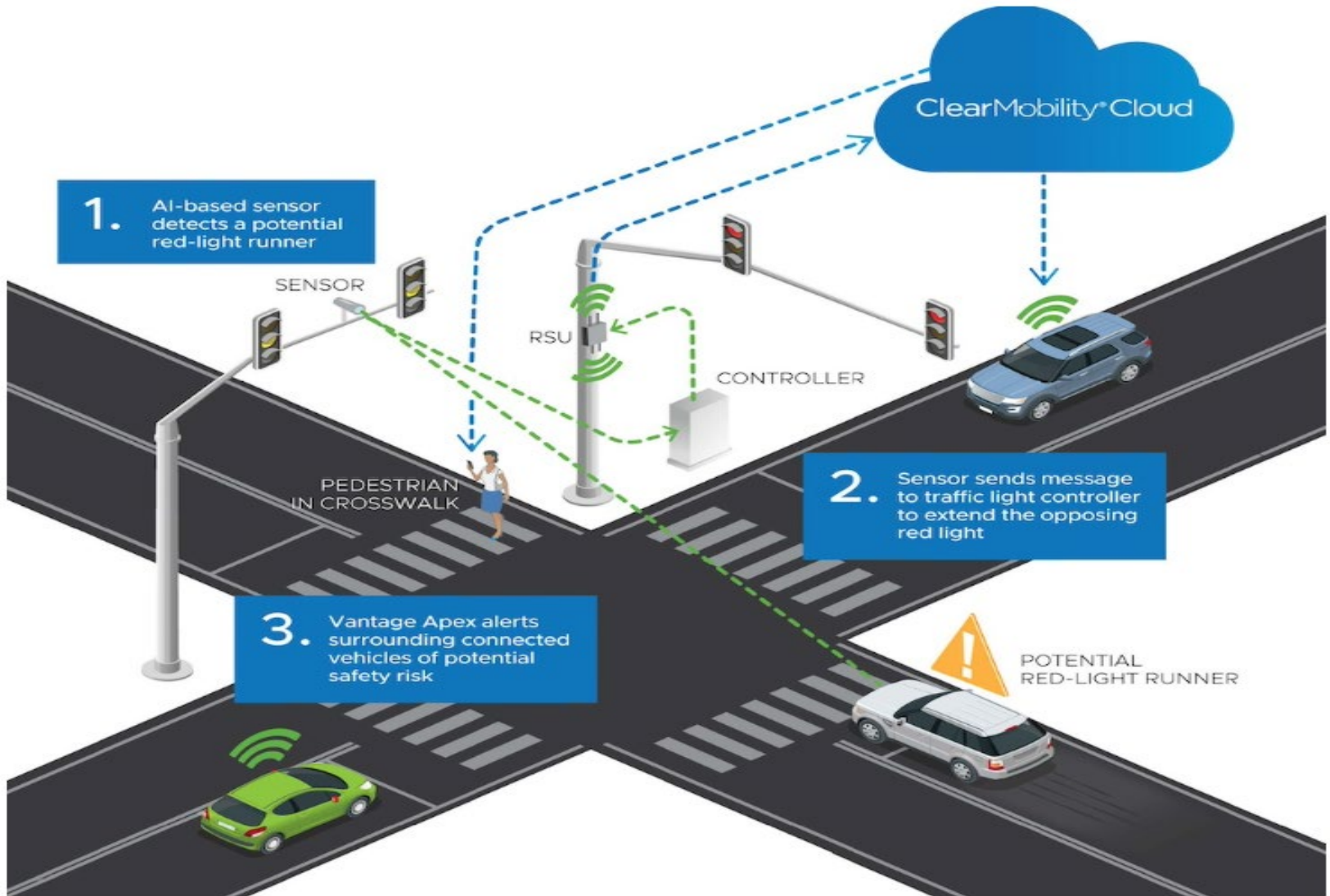
 Iteris Connected Vehicles V2X System integrates advanced traffic signal technology hardware (video detection to 300 feet, radar detection to 600 feet, Bluetooth & cellular), and software (Ped-Trax, Smart-Cycle, Clear-Guide, SPM, V2X-Connect) into a state-of-the-art Infrastructure-To-Everything (I2X) Advanced Transportation Management System (ATMS) for the safety and security of the Next Generation transportation system.

Iteris (V2X) Vehicle to Everything System

Pilot Project is Infrastructure to Everything (I2X)



Iteris (V2X) Vehicle to Everything System



Iteris (V2X) Vehicle to Everything System

Traffic Signal Hardware



Iteris (V2X) Vehicle to Everything System

Traffic Operation Center Software CV-V2X



Iteris V2X Connect™

Advanced and intuitive diagnostic tool to validate CV applications



Monitor, decode and validate CV applications in the field or offsite



Visualize CV data in real time on an interactive map



Record and replay V2X messages for offline analysis



PedTrax™

Tracking critical pedestrian activity with your Vantage video detection system



SmartCycle®

All the power of Vantage video detection for bicycle differentiation



Allows time for cyclists to safely cross the intersection



Greatly improve traffic flow by reclaiming unused cycle time when no bicycles are present



Automated bicycle counts



ClearGuide™ Speeding Analytics

New Product Enhancement

Overview

- New ClearGuide module for state DOTs, MPOs, counties and cities
- Also operates along specific routes and traffic links
- Solves the problem of limited, static and outdated speeding data collected with radar
- Uses probe data to visualize and quantify speeding problems across the roadway network
- Complements crash software systems through data export
- As a SaaS product it is unique in the sector

The Speeding Analytics module helps agencies:

Traffic Signal Safety Technology

Safe-Pace Cloud & Speed Tracker



TRAFFIC LOGIX Safe-Pace® Cloud Web Director

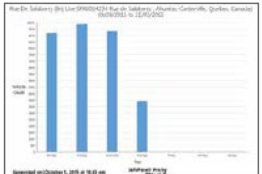
The innovative Safe-Pace Cloud powered by Web Director lets you connect to your signs online from anywhere. With the ability to connect to and control your signs from anywhere with an internet connection, the Safe-Pace Cloud adds unparalleled flexibility to your Safe-Pace signs. With detailed reporting, customized alerts, and real time data, you can see stats for each sign, change settings, check batteries and download data without ever traveling to sign locations. With the unlimited possibilities of remote management, Safe-Pace Cloud will help you maximize what your Safe-Pace signs can do.



Mapping



Tools Layout



Weekly Report - Vehicle Count - Daily Values


Features

- Cloud Based** – Secure, remote access for simple to use sign management from anywhere over the internet.
- Real Time Data** – See live performance data updated every five minutes.
- User Friendly** – Streamlined, easy-to-use interface.
- Comprehensive Reporting** – Use data to generate detailed reports you can use to better improve safety on your roads.
- Mapping Tool** – Map unlimited sign locations and create and apply parameters for each. Update sign location whenever a sign or trailer is moved.
- One-Screen Management** – Manage alerts, messages, and display settings all from one screen.
- One-click Scheduling** – One click lets you schedule and program multiple signs simultaneously.
- Complete Control** – Manage all aspects of sign configuration including schedules, messages, blinking limit, strobe limit, and display range.
- Scheduling** – Display settings can be constant or schedule based. Signs and beacons can be scheduled based on daily, weekly, and holiday schedules.
- At a Glance Update** – Statistics snapshot provides at-a-glance data updates including vehicle count, 85th percentile, and maximum and minimum speed.
- Real Time Alerts** – Receive email notification for alerts such as high or low speed or when batteries are low.
- Safe-Pace Compatible** – Compatible for use with all Safe-Pace radar speed signs.
- Zero Footprint** – Nothing to install, all you need is an internet connection.

Next Generation Speed Detection Technology.

Cloud/Cellular Real Time Data & Real Time Alerts.

Iteris (V2X) Vehicle to Everything System *or Infrastructure to Everything (I2X)?*

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Iteris (V2X) Vehicle to Everything System

Michigan Transportation Research Institute

University of Michigan Transportation Research Institute Pilot Infrastructure-to-Vehicle Connectivity to Improve Pedestrian, Bicycle, and Vehicles Safety and Mobility.

Article...University of Michigan Transportation Research Institute (UMTRI) funding \$20 mil pilot as part of connected vehicles & smart intersections program...

[HTTPS://WWW.ITERIS.COM/NEWS/ITERIS-SELECTED-UNIVERSITY-MICHIGAN-TRANSPORTATION-RESEARCH-INSTITUTE-SMART-MOBILITY-AND](https://www.iteris.com/news/iteris-selected-university-michigan-transportation-research-institute-smart-mobility-and)

Locations & Cost



The ITS Pilot Project safety improvements will be installed along Friant Road between Audubon Drive and Copper River Drive (7 signals).

- Audubon Drive
- Shepperd Avenue
- Fort Washington Road
- Champlain Drive
- Lakeview Drive
- Copper Avenue
- Copper River Drive

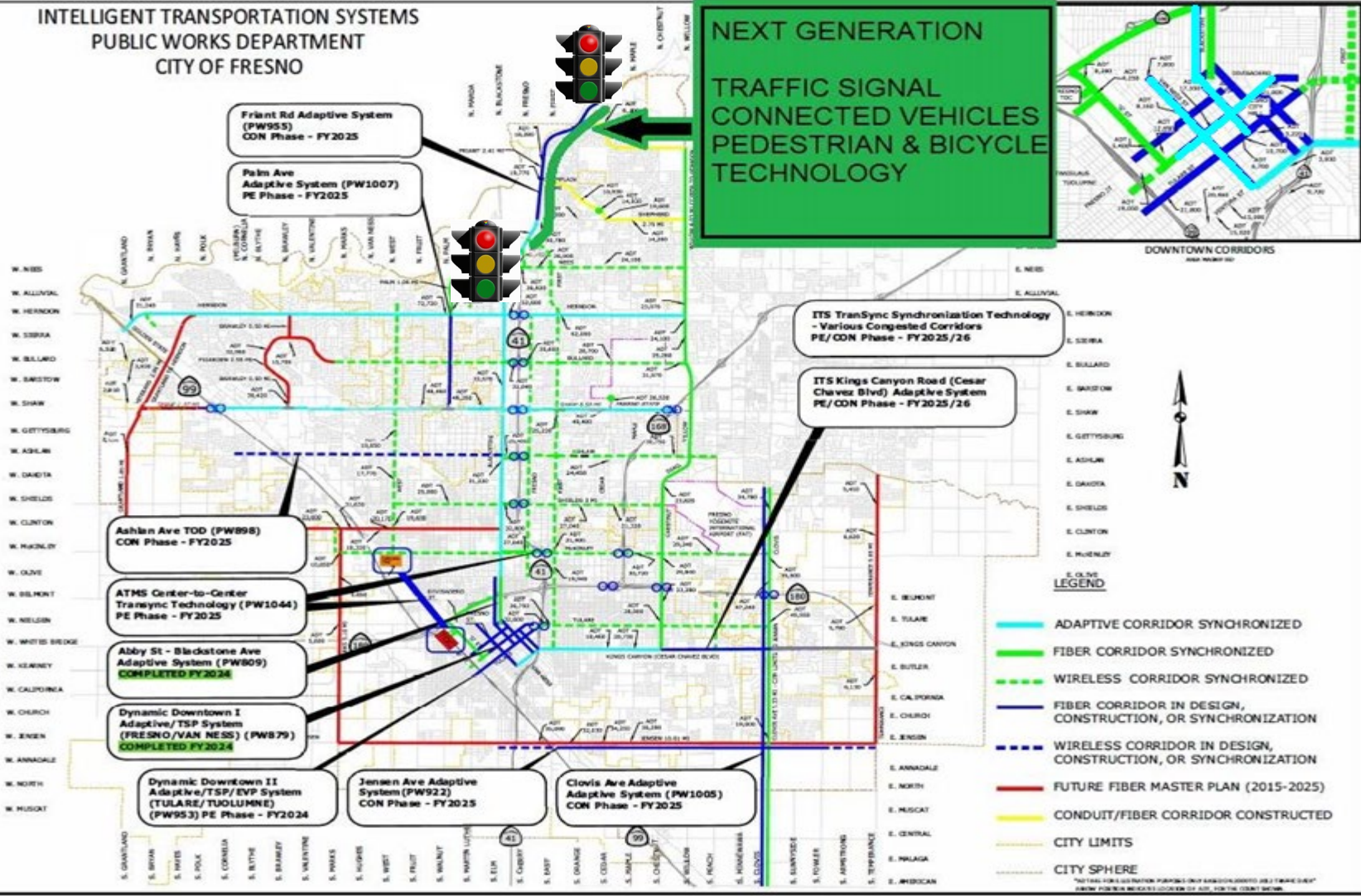
The Cost for the ITS Pilot Project is \$3M.

This ITS Project & Standards will be the Nexus for many Next Generation Connected Vehicle ITS Technologies for the Central Valley.

Project Area

INTELLIGENT TRANSPORTATION SYSTEMS
PUBLIC WORKS DEPARTMENT
CITY OF FRESNO

NEXT GENERATION
TRAFFIC SIGNAL
CONNECTED VEHICLES
PEDESTRIAN & BICYCLE
TECHNOLOGY



Friant Rd Adaptive System (PW955)
CON Phase - FY2025

Palm Ave Adaptive System (PW1007)
PE Phase - FY2025

ITS Transync Synchronization Technology
- Various Congested Corridors
PE/CON Phase - FY2025/26

ITS Kings Canyon Road (Cesar Chavez Blvd) Adaptive System
PE/CON Phase - FY2025/26

Ashlan Ave TOD (PW898)
CON Phase - FY2025

ATMS Center-to-Center Transync Technology (PW1044)
PE Phase - FY2025

Abby St - Blackstone Ave Adaptive System (PW809)
COMPLETED FY2024

Dynamic Downtown I Adaptive/TSP System (FRESNO/VAN NESS) (PW879)
COMPLETED FY2024

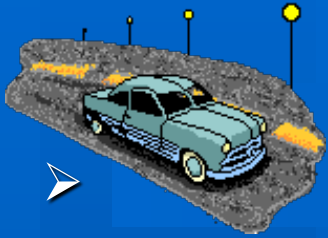
Dynamic Downtown II Adaptive/TSP System (TULARE/TUOLUMNE) (PW953)
PE Phase - FY2024

Jensen Ave Adaptive System (PW922)
CON Phase - FY2025

Clovis Ave Adaptive System (PW1005)
CON Phase - FY2025

- LEGEND**
- ADAPTIVE CORRIDOR SYNCHRONIZED
 - FIBER CORRIDOR SYNCHRONIZED
 - - - WIRELESS CORRIDOR SYNCHRONIZED
 - FIBER CORRIDOR IN DESIGN, CONSTRUCTION, OR SYNCHRONIZATION
 - - - WIRELESS CORRIDOR IN DESIGN, CONSTRUCTION, OR SYNCHRONIZATION
 - FUTURE FIBER MASTER PLAN (2015-2025)
 - CONDUIT/FIBER CORRIDOR CONSTRUCTED
 - CITY LIMITS
 - - - CITY SPHERE

*NOT ALL POSSIBLE NETWORK PHASES SHOWN SINCE THIS IS ONLY A GENERAL PLAN. CITY OF FRESNO PUBLIC WORKS DEPARTMENT



The Need

- **Connected Vehicles V2X/V2I & Cloud Based Speed Detection systems will incorporate next generation traffic signal technologies (*Ped-Trax, Smart-Cycle, Clear-Guide, SPM, V2X-Connect, SafePace Cloud*) into a state-of-the-art Infrastructure-To-Everything (I2X) Advanced Transportation Management System and improve overall pedestrian, bicycle, and vehicles safety and mobility.**
- **The ITS Project is an essential next generation technology project that will System Engineer, and upon successful Validation of new technologies, will introduce new ITS Standards for the region.**



Project Benefits

- **Improve safety and security of the transportation system for vehicles, bicyclists, and pedestrians.**
- **System Engineer, Deploy & Validate “Next Generation” technology & introduce City of Fresno ITS Standards.**
- **Potentially reduces greenhouse gas emissions.**
- **Support economic vitality, local transportation, and professional education & development.**





Readiness & Experience

City's ITS Program has successfully designed, constructed, and synchronized 25 ITS Projects, and 9 additional ITS Projects are in design or in construction.

The fiber traffic network is complete, synchronizing ~150 traffic signals.

The wireless traffic network is complete, synchronizing ~180 traffic signals.

The City's ITS Program and the Central Valley is ready for Next Generation Intelligent Transportation Systems.



Environmental Justice

- *The asthma rate in the project area is higher than 78%-97% of the census tracts in CA.*
- *According to CalEnviroScreen, the City of Fresno is one of the most disadvantaged Communities in the State.*
- *The Project will improve vehicle, bicycle and pedestrian safety for all; and may reduce emissions by encouraging safer alternatives modes of travel (walking & bicycling).*

Innovation & Replication



- *The state-of-the-art pilot Research & Development (R&D) Project will System Engineer Next Generation Connected Vehicles Traffic Signals Safety Technologies*
- *The R&D project will be deployed along the City's most congested multimodal corridor which interconnects the traveling public to commercial, residential, entertainment, parks and trails.*
- *Upon the completion of the Project, ITS Program will publish City ITS Standards which is used by all Central Valley Agencies.*

QUESTIONS?

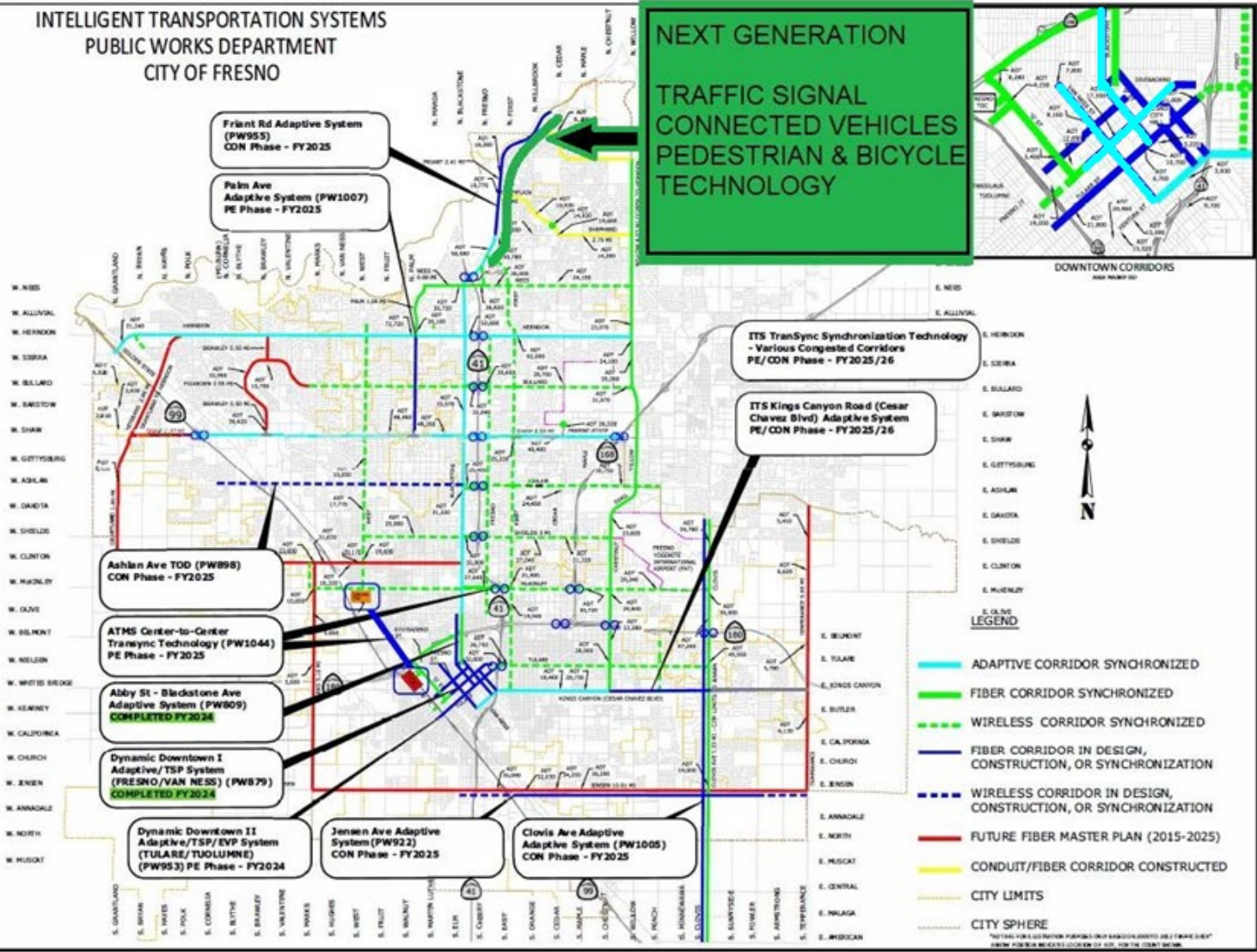
INTELLIGENT TRANSPORTATION SYSTEMS
PUBLIC WORKS DEPARTMENT
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NEXT GENERATION

TRAFFIC SIGNAL
CONNECTED VEHICLES
PEDESTRIAN & BICYCLE
TECHNOLOGY



DOWNTOWN CORRIDORS



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*NOT FOR CONSTRUCTION PURPOSES ONLY AND DOES NOT REPRESENT ANY CITY OR COUNTY DESIGN

ITS Program Projects 2005 - 2024

City of Fresno, Public Works Department, ITS Program

Decade of ITS Projects Design, Construction, and Synchronization Summary

	CITY	TIP	Status				
1	Clovis Ave	PW510	FRE090106	Completed			
2	Shaw Ave 99-41	PW439	FRE070107	Completed			
3	Shaw Ave 41-168	PW509	FRE090133	18 Adaptive Hemdon	PW743	FRE150029	Completed
4	Ashlan Ave (Blackstone - Peach)	PW626	FRE110133	19 Adaptive Shaw West	PW742	FRE150030	Completed
5	First Street	PW618	FRE110132	20 Adaptive Abby - Blackstone (Divisadero - McKinley)	PW809	LSTMP546	Completed 2024
6	CUSD - Fiber to 17 Schools	PW641	CUSD Fundi	21 Adaptive Blackstone - Friant (McKinley to Shepherd)	PW810	LSTMP545	Completed 2024
7	Central Valley Independent Network Project	PW653	CVIN Fundi	22 Adaptive Ventura - Kings Canyon (Van Ness to Chestnut)	PW811	LSTMP546	Completed 2024
8	Bullard Ave	PW617	FRE110131	23 Dynamic Downtown Adaptive, TSP, Video Detection	PW879	Measure C New Technology	Completed 2024
9	McKinley Ave	PW622	FRE110135	24 Ashlan Ave (Blackstone - Cornelia)	PW898	LSTMP645	Construction Phase FY2025
10	Nees Ave	PW623	FRE110134	25 Adaptive Jensen Ave (Elm to Temperance)	PW922	FRE090137	Construction Phase FY2025
11	Friant-Nees-Palm	PW549	LSTMP198- FRE	26 Dynamic Downtown 2 Adaptive, TSP, EVP, Video Detection	PW953	Measure C New Technology	Construction Phase FY2025
12	Willow Ave	PW542	FRE090109	27 ITS Friant Road Adaptive	PW955	CMAQ	Construction Phase FY2025
13	Shields Ave	PW550	LSTMP067-FRE	28 ITS Clovis Ave Adaptive	PW1005	CMAQ	Construction Phase FY2025
14	Tulare Street	PW624	FRE110136	29 ITS Palm Ave Adaptive	PW1007	CMAQ	Design Phase FY2025
15	West Ave	PW616	FRE110130	30 ITS C2C - City/Caltrans ATMS System Systems	PW1044	Measure C New Technology	Design Phase FY2025
16	Downtown Fresno & Van Ness	PW689	FRE130034	31 ITS TranSync Synchronization Tech	NEW	Carbon Reduction Program	Design Phase FY2025
17	Freeway Crossings	PW688	FRE130033	32 ITS Cesar Chavez/KC Blvd Adaptive	NEW	CMAQ	Design Phase FY2025

Project Schedule

Measure C New Tech Grant: Connected Vehicles - Vehicle to Everything (V2X), Speed and Bicycle Detection Systems

