

Metro Shared Mobility Intelligent Transportation Systems (Formerly Highway Program - ITS)

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Executive Officer
Shared Mobility ITS



June 28, 2022





Metro ITS Program



ITS manages several programs and projects that involve ITS strategies, conventional traffic engineering, and transportation technology.

- Signal and ITS Grants Management
 - Signal Synchronization and Bus Speed Improvements
 - Measure R and M
 - I-710 Mobility Improvement Program
- Transit Signal Priority
- Integrated Corridor Management
- Goods Movement Technology
- Connected Vehicles
- Performance Measurement
- ITS FIRST
- Regional ITS Architecture
- Regional Integration of ITS



Grant Programs



Call for Projects Signal Sync and Bus Speed Improvements

197

Completed Projects

49

Active Projects

\$1.16 Billion

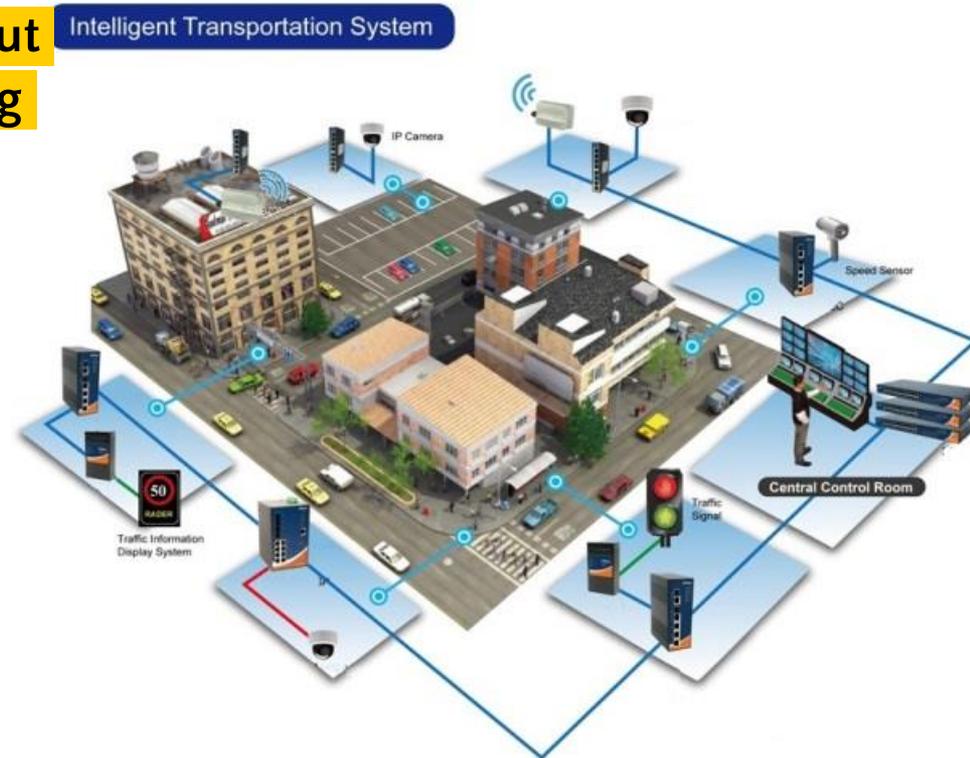
Signal & ITS Programming

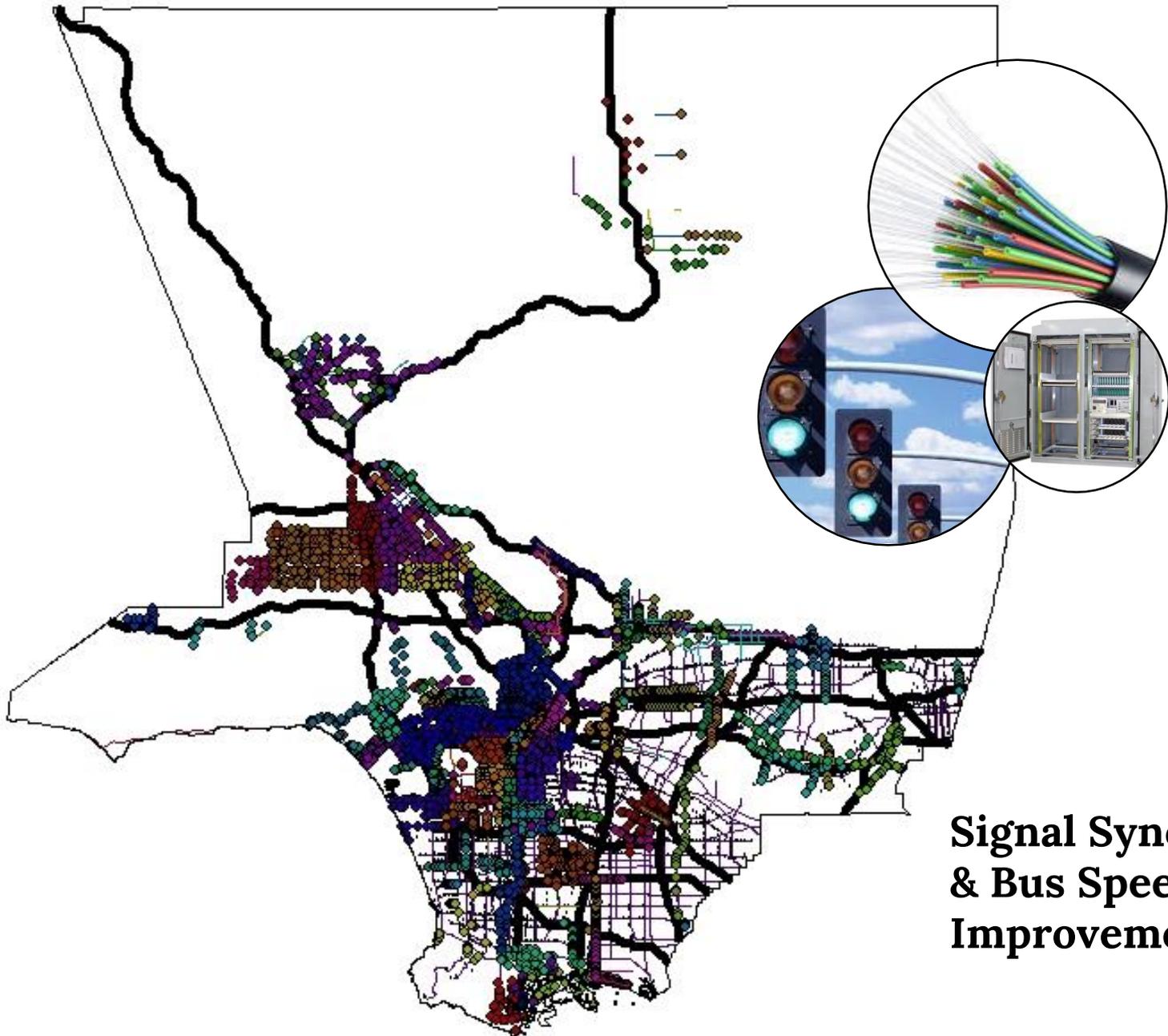


Signal Sync and Bus Speed Improvements

Improving arterial traffic flow without major capital investments by utilizing ITS technologies

- Conventional Traffic Engineering Projects
- Transit Preferential Treatment and Priority Systems
- Computerized Traffic Control and Monitoring Systems
- Intelligent Transportation Systems





Signal Synchronization & Bus Speed Improvements



Measure R & M Subregional Funds

ITS and Transportation Technology

ITS and Transportation Technology projects will be eligible for funding under multiple transit and highway multi-year subregional programs.

- Multi-agency/jurisdiction system integration
- Advanced Traveler Information Systems
- Integrated Corridor Management (ICM)
- Transportation technology applications
- Connected Vehicle concepts
- ITS or Transportation Technology projects
- Innovative ITS and Transportation Demonstrations/Pilots
- Other ITS and Transportation Technology projects deemed qualified by Metro



Measure R Subregional Funds

17

Completed Projects

25

Active Projects

6

Future Projects

\$77.38 Million

Signal & ITS Programming



Measure M Subregional Funds

8

Active Projects

12

Future Projects

\$68.32 Million

Signal & ITS Programming



SR-710 North Mobility Improvement Projects (MIPs)

11

Active Projects

19

Future Projects

\$106.26 Million

**Signal & ITS Programming
(Measure R Funds, State Funds)**



Countywide Signal Priority (CSP) Program



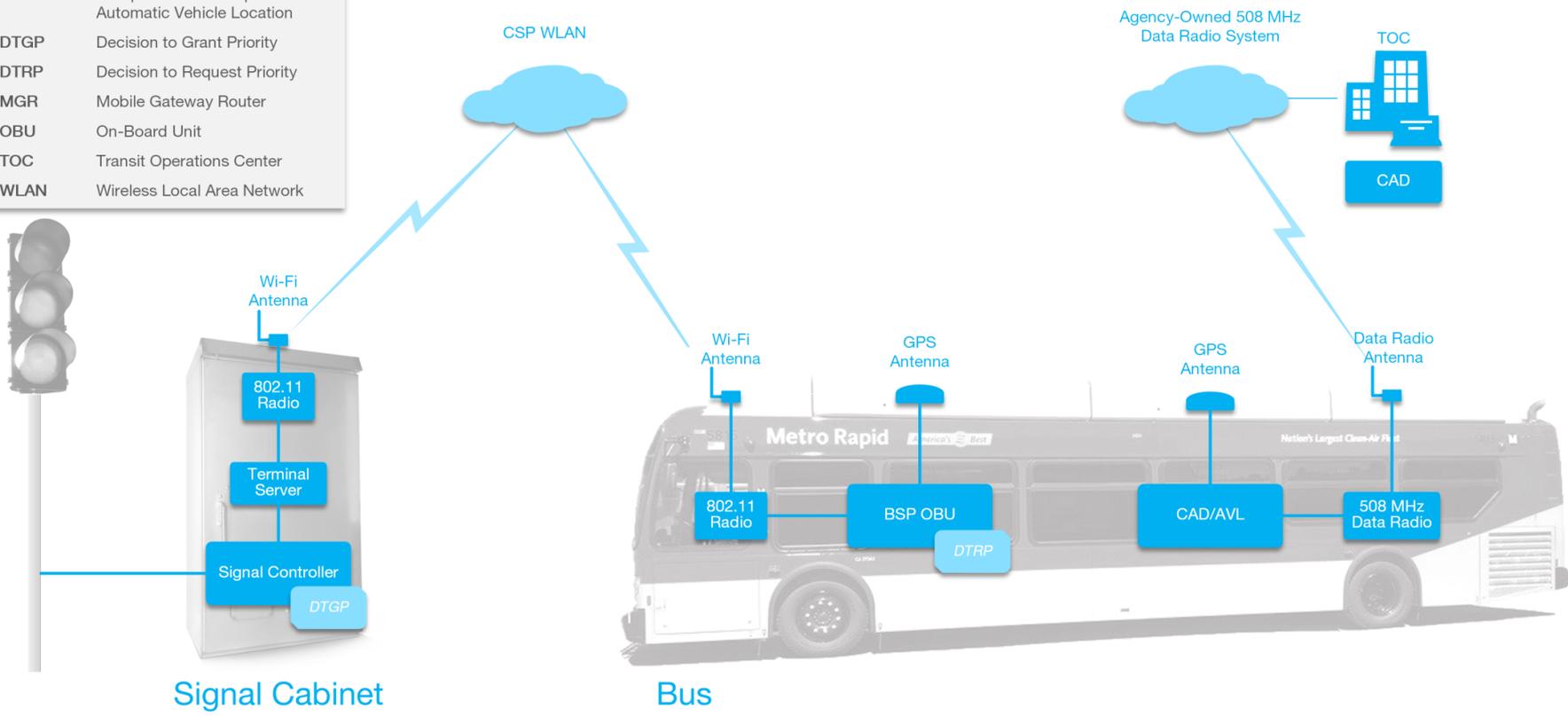
Countywide Signal Priority

Bus to Intersection Communications over 2.4ghz 802.11b/g WLAN

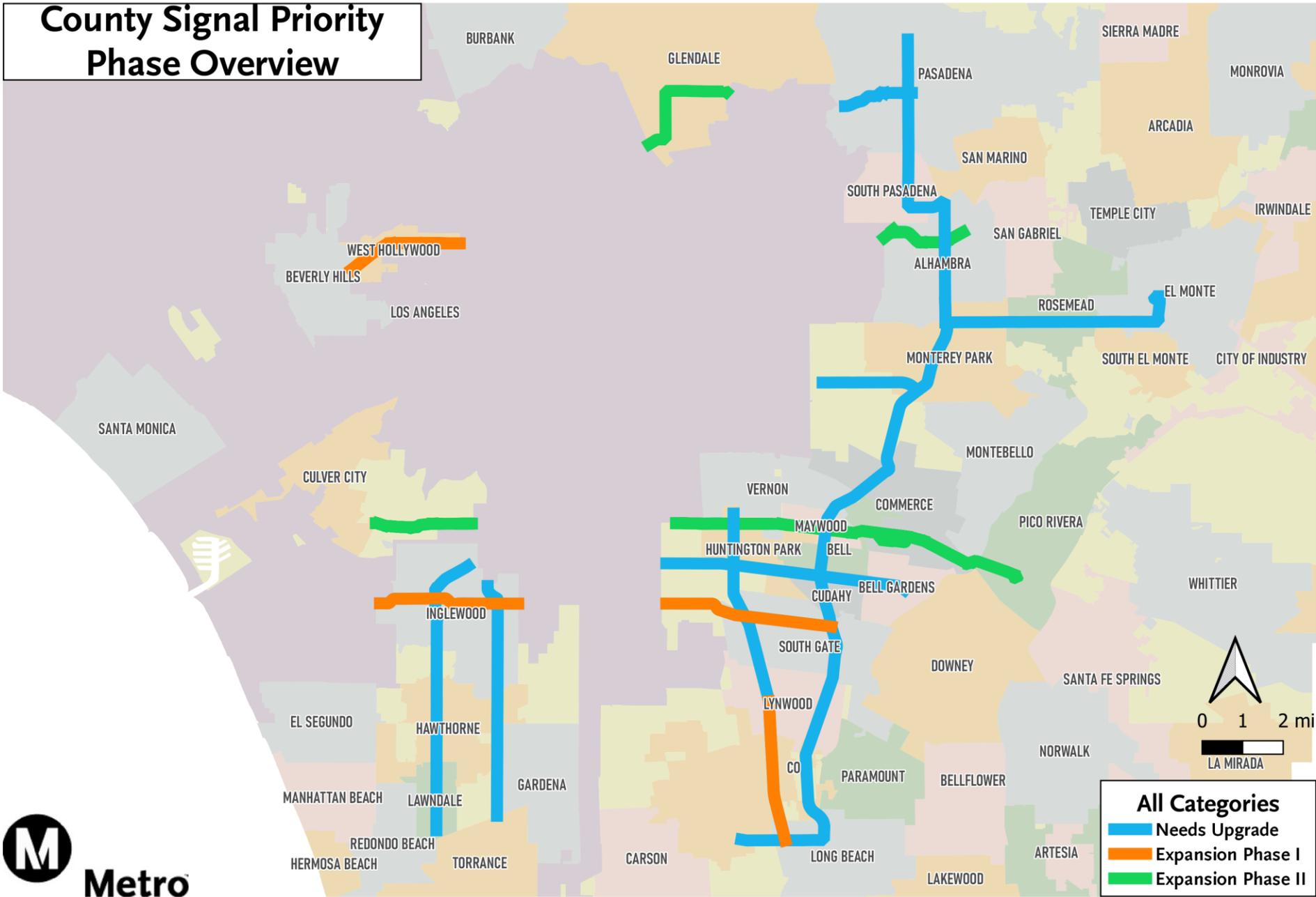
One of the first CV-type Deployment in Nation

Legend

CAD/AVL	Computer-Aided Dispatch/ Automatic Vehicle Location
DTGP	Decision to Grant Priority
DTRP	Decision to Request Priority
MGR	Mobile Gateway Router
OBU	On-Board Unit
TOC	Transit Operations Center
WLAN	Wireless Local Area Network



County Signal Priority Phase Overview





Countywide Signal Priority

Migration of Central BSP Network to the Cloud

Phase I
Internal and Field IP Re-Configuration

- Field Terminal Servers
- DCB Tunnel
- Firewalls
- New Router @ Iteris

Phase II
Metro CSP Database (Legacy)
Cloud (AWS) Infrastructure Setup

CSP Data Processor (Legacy)

- Receive Request/DTGP Data
- Insert into Database (AWS)

BSP Database

- Most Recent (by bus/intersection)
- Archive
- Intersection (GPS/City/Int Code)

Phase III
Reporting Web Server
Cloud (AWS) Reporting Implementation

CSP Analysis Reporting Web Server

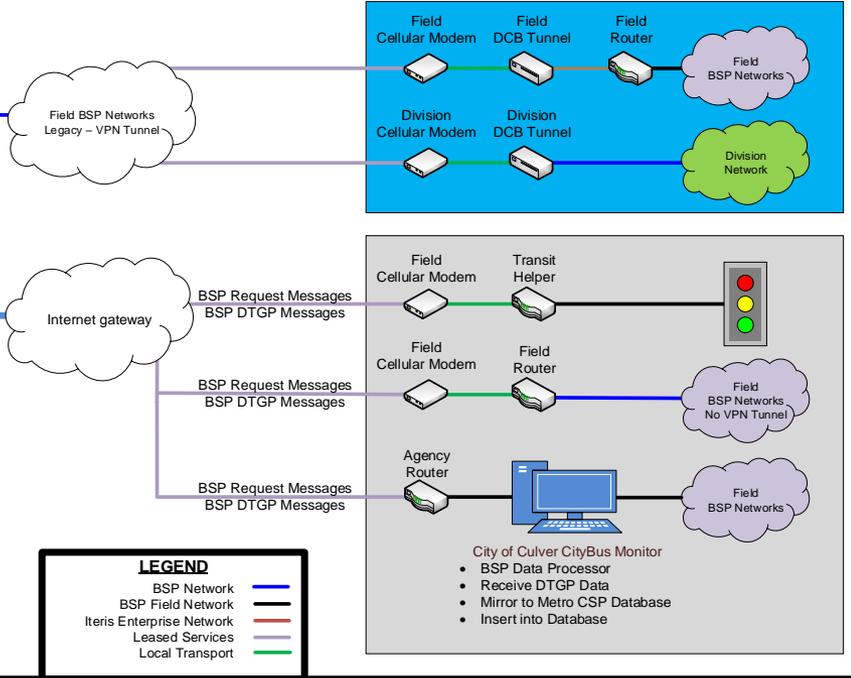
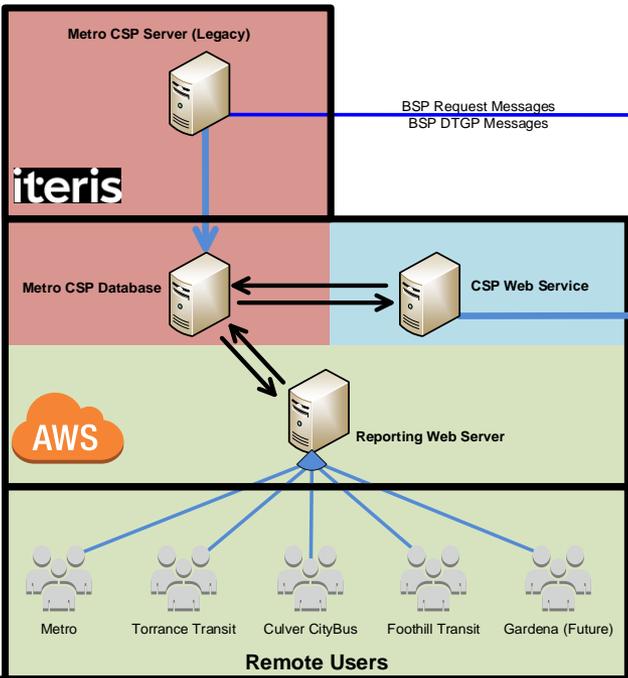
- User account
- Reporting

Phase IV
CSP Web Service

BSP Web Service (Data Processor)

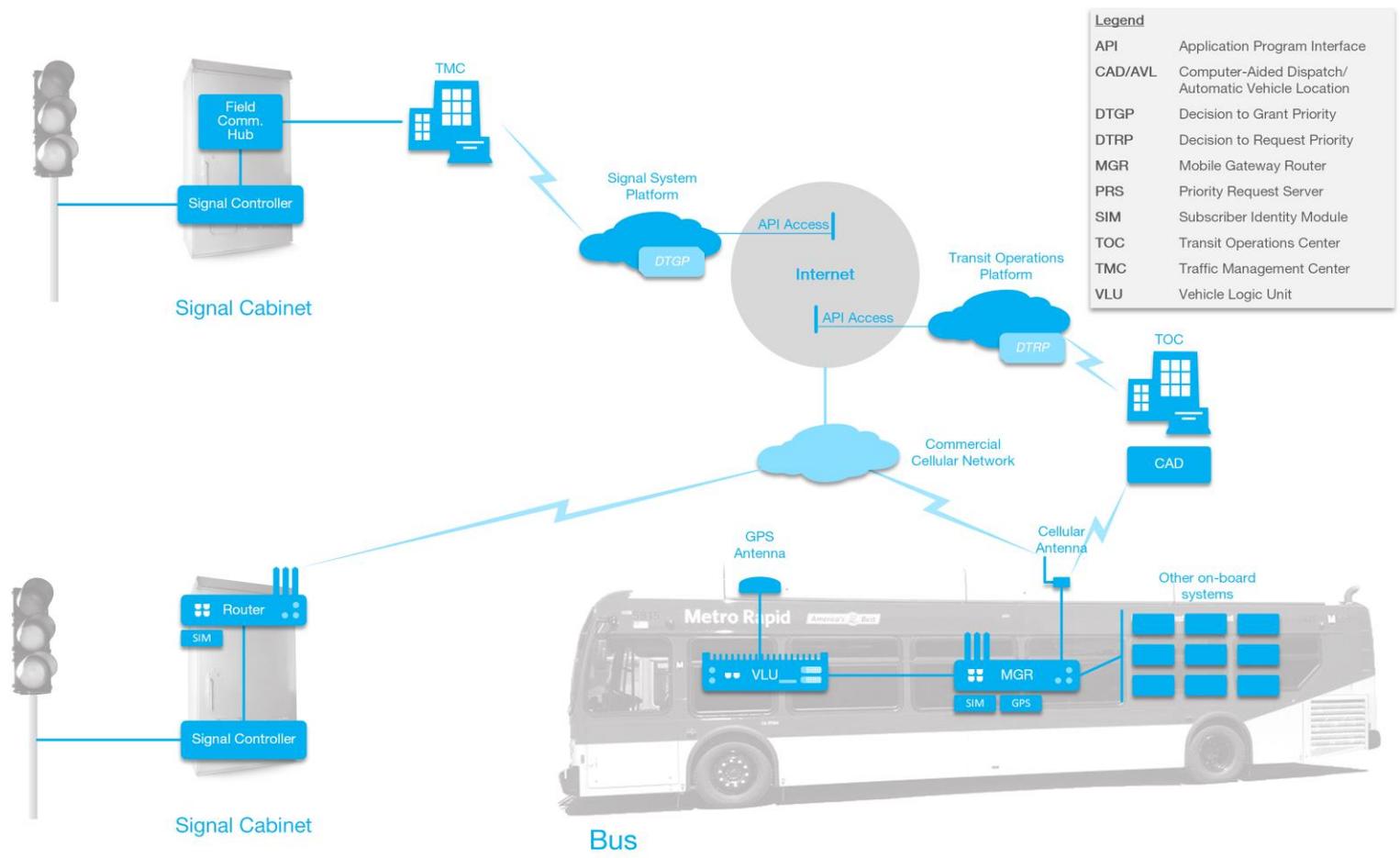
- Receive Request/DTGP Data
- Insert into Database
- Request Gateway (FUTURE)

Future Deployment





Countywide Signal Priority



Legend	
API	Application Program Interface
CAD/AVL	Computer-Aided Dispatch/ Automatic Vehicle Location
DTGP	Decision to Grant Priority
DTRP	Decision to Request Priority
MGR	Mobile Gateway Router
PRS	Priority Request Server
SIM	Subscriber Identity Module
TOC	Transit Operations Center
TMC	Traffic Management Center
VLU	Vehicle Logic Unit

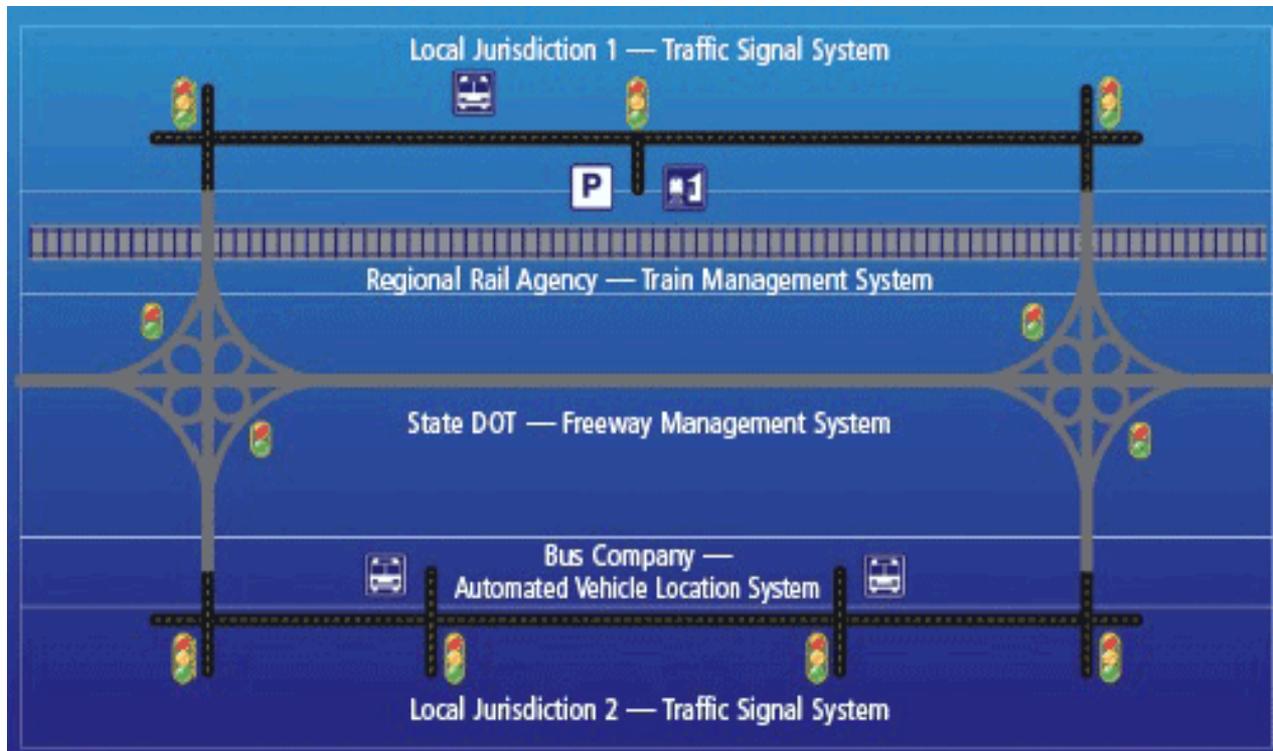


Integrated Corridor Management (ICM)



What is Integrated Corridor Management (ICM)?

○ ICM is an approach to improving transportation by integrating various networks together, so that partner agencies can manage the transportation corridor as a unified system.



Stylized Representation of an ICM Corridor (Source: FHWA)

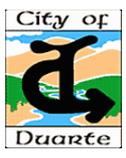
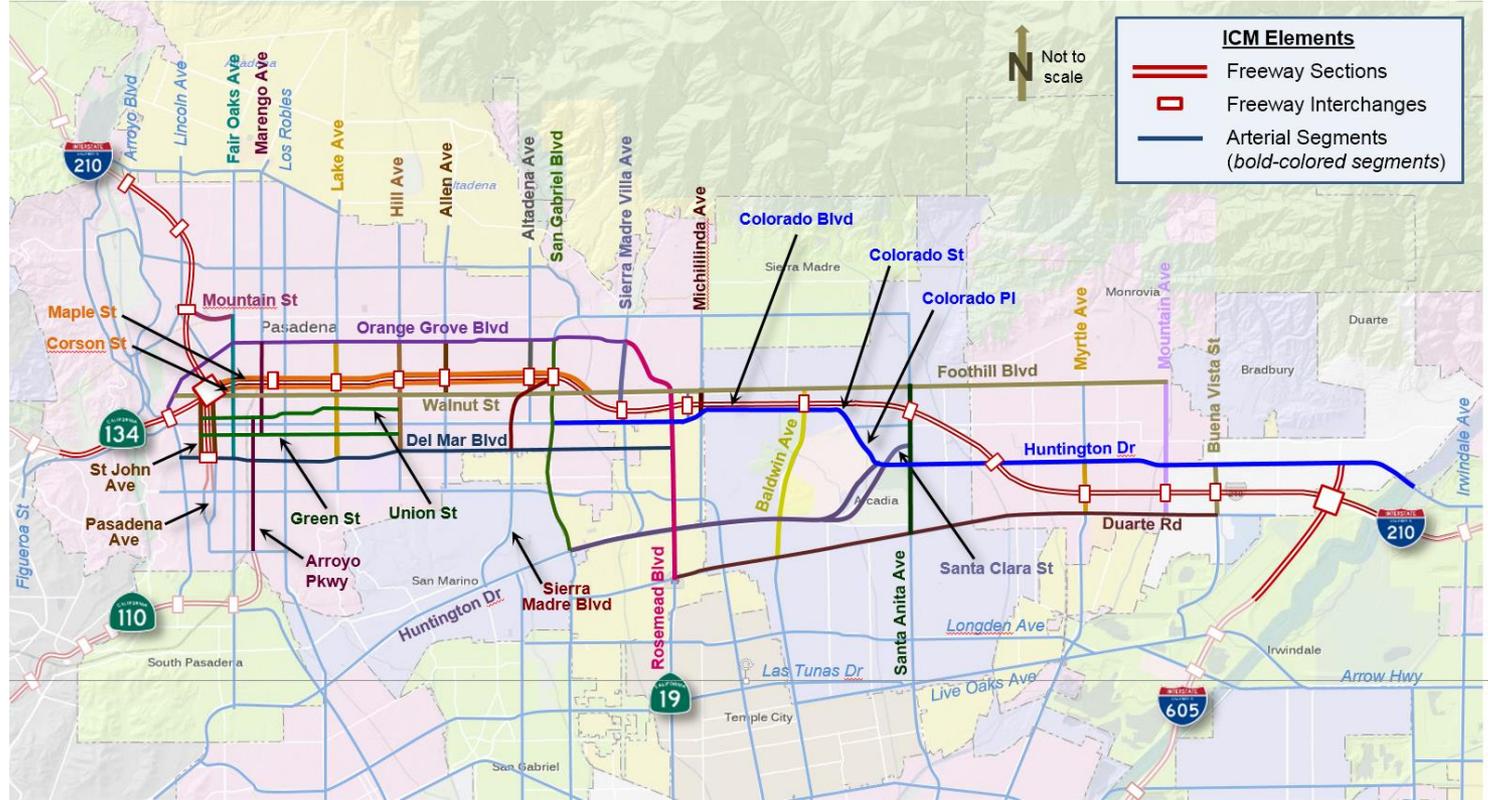


Integrated Corridor Management (ICM)

No.	Expected Benefit	Description
1	 Optimize arterial, freeway and transit operations	The ICM system will help move traffic more efficiently by managing the movement of incident-related traffic on arterials back to the mainline.
2	 Make travel safer	Reduced secondary collisions on the freeway and adjacent arterials are expected with improved operations, as studies have shown.
3	 Minimize the impact of traffic incidents	Developing corridor-specific system management strategies and traffic incident response plans is expected to minimize incidents.
4	 Improve travel throughout whole corridor	Travel will be improved with the ICM system by reducing delays caused by traffic incidents and improving travel time reliability.
5	 Use technology to integrate systems	Integrated operations among the ICM stakeholders will allow close collaboration with a collective focus on achieving project vision and goals.
6	 Build multi-jurisdictional partnership	Multimodal integrated operations will increase collaboration, partnership, and equitable travel solutions among all corridor agencies, including transit and freight management.
7	 Improve air quality and environment	By reducing congestion delays and improving operations, air quality and quality of life for communities along the corridor are expected to be improved.



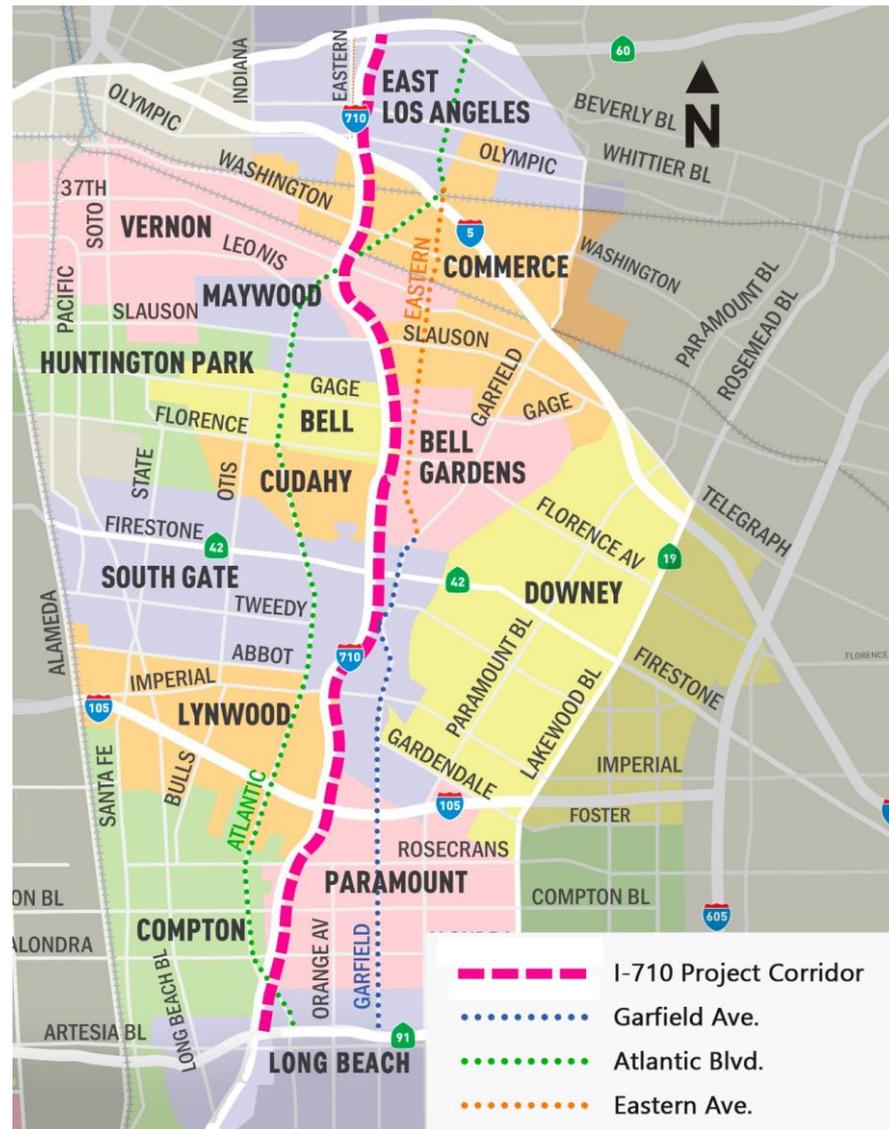
I-210 Connected Corridor





I-710 Integrated Corridor Management (ICM)

- 14 local jurisdictions, including Caltrans
- 16 freeway connection points to local arterial streets
- 147 traffic signals
- Among highest truck traffic in region
- Vital goods movement corridor
- Very important regional arterial network





I-105 Integrated Corridor Management (ICM)

- 6 local jurisdictions, including Caltrans, LAWA, and Metro
- 150+ traffic signals
- Major attractions (SoFi Stadium, LAX, future Clippers Arena)
 - Football, Basketball, Concerts, 2026 FIFA World Cup, 2028 Olympic Games
- Future ExpressLanes
- C-Line (Green) and other transit options



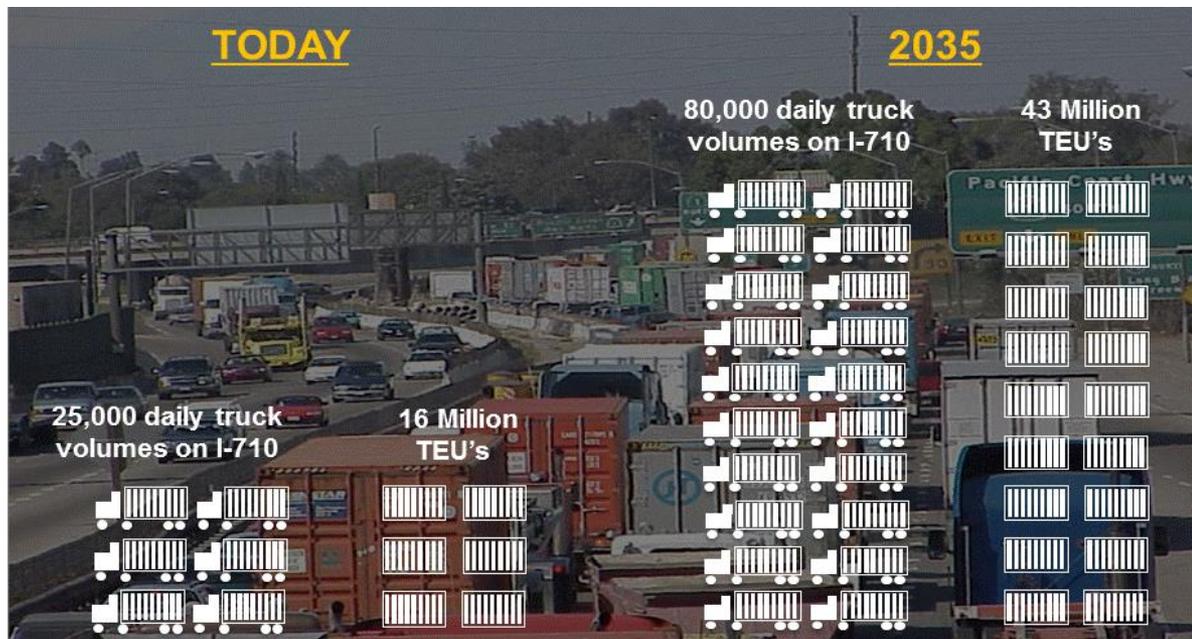


Goods Movement Technology



Goods Movement Technology

Deploying technology to reduce congestion and improve air quality





Technology Plan for Goods Movement



Drayage dispatchers will have access to freight focused traveler information resources.



Drayage drivers will know of traffic conditions at the port before they start their trip via 511 in both English and Spanish.



Radio traffic reporters will have access to more accurate information than ever before.



Third party vendors can use the data from the data warehouse to create Apps for their customers.



Technology systems within the ports improve efficiency through the Gateway Cities region.



An enhanced enforcement network creates a safer environment.



Planners can use the data archived in the data warehouse to better plan for goods movement.



Navigation and traffic data vendors will have access to more accurate and timely information.

TECHNOLOGY PROJECTS

-  Freight TIS and Data Warehouse
-  Freight Traveler Information Dissemination
-  Arterial Smart Corridors
-  Freeway Smart Corridors
-  Automated Truck Research
-  Container Moves Productivity Improvement
-  Truck Enforcement Network System





Partial Automation of Truck Platooning

Level 2 Automation

- Cooperative adaptive cruise control (CACC)
- ACC: Radar Sensors and Electronic Control of Engine
- 5.9GHz Dedicated Short Range Communication (DSRC) for Vehicle-to-Vehicle Communication

Reduce energy consumption, improve traffic flow, while maintaining safety





Freight Advanced Traveler Information System (FRATIS)

Enhances traveler information systems to address specific freight needs

○ Integrates data on wait time at intermodal facilities, incident alerts, road closures, work zones, routing restrictions

Drayage Optimization

○ Optimize truck/load movements between freight facilities, balancing early and late arrivals





DrayFLEX

DRIVERS AVAILABLE

DISPATCH PLAN OPTIONS

QA DRIVER2501 9876543210
Vehicle ID: 9E33247

PLAN 1 ⓘ	PLAN 2 ⓘ
3 Moves/42 Miles	4 Moves/73 Miles
4 hr 25 min	6 hr 35 min
\$210 (\$-30 ↓)	\$213.5 (\$-26.5 ↓)
Approximate Time	Approximate Time
<ol style="list-style-type: none"> 131 W 223RD ST, CARSON -- SHIPPERS MIDDLE RD 12 min SHIPPERS MIDDLE RD -- DAMCO SFS 39 min DAMCO SFS -- TTI 44 min 	<ol style="list-style-type: none"> 131 W 223RD ST, CARSON -- Home Lomita Yard Hub 13 min Home Lomita Yard Hub -- Trapac 14 min Trapac -- TTI 21 min

PLAN 2



Cancel

Submit Plan

Bobtail	Pool chassis	Company's chassis	Truck with empty container	Truck with full container





DrayFLEX

AT&T 2:48 PM 64%

DrayFLEX-Trip

Where would you like to go?

Search Destination

Going to a Favorite Location?

Nottingham Drive, CA | Yusen Terminals, LLC

Going to a Terminal? List

	Matson		PCT	
5	In Q	3	In Q	3
39	In Terminal	22	In Terminal	6
44	Total Visit Time	24	Total Visit Time	9

Home Map Alerts Settings

AT&T 5:49 PM 99%

Terminals

Ports of Los Angeles/Long Beach
Last Updated: 1/15/2021 5:47:59 PM

PCT PCT

In Q	In Terminal	Total Visit Time
9 minutes	54	63

TraPac TraPac Container Terminal

In Q	In Terminal	Total Visit Time
9 minutes	36	44

TTI Total Terminals International, LLC

In Q	In Terminal	Total Visit Time
15 minutes	54	69

Home Map Alerts Settings

Trip Planner

Current Location

Yusen Terminals, LLC

Appointment Time: 11:00 AM

34 mins Via I-710 / CA-103 26 mi ETA to Terminal: 12:19 PM	+0 mins Via I-5 / I-710 26.3 mi ETA to Terminal: 12:19 PM 50
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Total Time In Terminal: 1h 8m

STEPS NAVIGATE



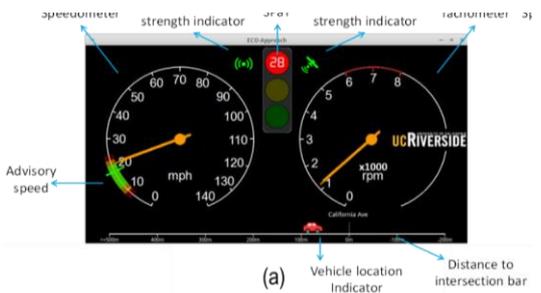
Connected and Automated Vehicles



CEC/POLA and CARB Eco-Drive

Eco Drive

America's Global Freight Gateway Connected Truck Demonstration



Speedometer DSRC signal strength indicator SPaT GPS signal strength indicator Tachometer



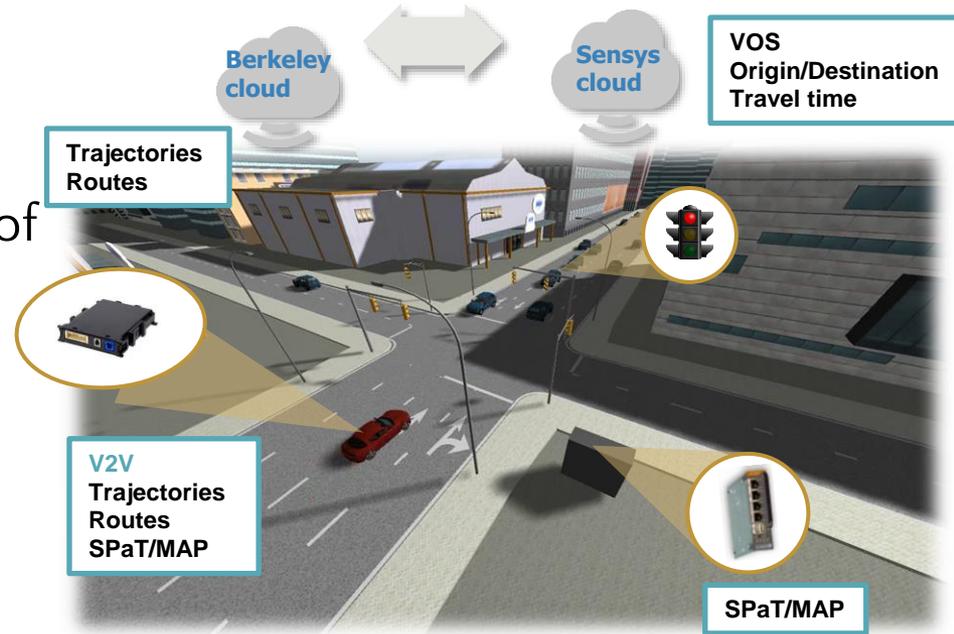
Speedometer DSRC signal strength indicator SPaT GPS signal strength indicator Tachometer





Predictive Data-Driven Vehicle Dynamics and Powertrain Control

- ARPA-E Grant
- Live Oak Avenue
- Reduction in energy consumption of plug-in hybrid electric vehicles
- Signal Phase and Timing Data
- Vehicle Speed
- Torque
- Battery Charging Power
- DSRC communications



Source: Sensys





SPaT through 3rd Party Data Providers

⦿ Traffic Technology Services (TTS)

- Personal Signal Assistant
- Signal Phase and Timing Data
- Cellular communications
- Information from central server to passenger vehicle
 - Audi
 - Toyota
- Advise driver with countdown to green, and speed feedback while approaching an intersection
- Arcadia, Santa Clarita, County of LA (future), Caltrans (future)
- Works with most central traffic control systems



Source: Telematics Wire





Measure Up! Arterial Performance Measurement Program



Measure Up! Program

- Be able to assess mobility performance measures on arterial corridors
- Arterial performance measurement tool to support local agency and sub-regional operations and planning efforts
- Support data-driven decision-making





Measure Up! Program

Arterial Performance Measurement Framework

- Vehicle hours of delay
- Person hours of delay
- Travel-time variability
- Travel-time reliability
- Vehicle Miles Traveled
- Average Travel Speed
- Average Travel Time

South Bay Conditions Analysis

Countywide Baseline Conditions Analysis

Arterial Performance Measurement Pilot

Clearguide

Travel Demand						
Vehicle Miles Traveled (VMT)						
	AM Peak (6-9 AM)	Midday (9AM - 3PM)	PM Peak (3-7PM)	Night (7PM - 6AM)	Total Daily VMT	AD (All Day)
	4.9	6,732	10,059	9,731	8,261	34,783
	2.4	8,244	14,532	10,630	9,726	43,132
	1.0	2,971	6,135	4,392	4,510	18,007
	0.7	2,198	4,540	3,250	3,337	13,326
N	5.2	19,450	30,524	20,338	22,116	93,027
S	3.1	7,412	16,824	16,495	14,102	54,833
S	0.8	1,788	4,057	3,978	3,401	13,223
E	2.0	3,656	11,504	14,068	6,223	35,456
S	5.2	13,244	31,508	27,105	17,758	89,615
S	2.4	5,866	14,146	11,448	8,690	40,150
S	1.0	2,797	5,928	4,007	3,372	16,104
N	1.9	5,600	10,479	8,501	6,833	31,414
N	0.7	1,478	4,106	3,251	3,453	12,289
N	1.0	1,397	5,549	4,393	4,667	16,606
N	1.0	1,826	5,489	4,512	3,787	15,615
W	2.0	7,673	10,860	8,193	6,042	32,769
N	0.8	2,256	4,546	3,590	2,462	12,855
N	1.5	3,990	8,039	6,348	4,354	22,731
N	0.9	2,366	4,768	3,765	2,582	13,482
S	0.8	1,889	4,301	3,807	2,584	12,581
S	0.9	1,981	4,511	3,993	2,710	13,194
	1.5	3,340	7,606	6,732	4,569	22,246
	3.1	7,201	15,842	13,163	11,407	47,413
	0.8	1,737	3,772	3,174	2,751	11,434
	0.3	816	1,786	1,244	1,047	4,892
		3,262	7,144	4,974	4,187	19,567
		494	1,082	754	634	2,965
		787	1,640	1,333	937	4,818
Sum-Jurisdiction by Arterial						





Measure Up! Program – Subregional Workbooks

Previously known as the Arterial Baseline Conditions Analysis Reports

Volumes were collected in 2016 and 2018

INRIX speed data for 2014–2018

Aggregated and analyzed data for 360+ intersections in LA County

Now available via www.riits.net

The screenshot displays the 'Measure Up! Program' web application. The header includes a navigation menu and the title 'Measure Up! Program'. Below the header, there is a search bar and a filter section with 'Order by: Relevance'. The main content area shows '13 datasets found' and lists several subregional workbooks, each marked as 'PRIVATE':

- South Bay Cities Measure Up! Workbook**: This is the Arterial Performance Measurement Workbooks and Reports for South Bay Cities subregion. The workbook includes performance measures on major arterials in the subregion...
- Las Virgenes - Malibu Measure Up! Workbook**: These are the Arterial Performance Measurement Workbooks and reports for the Las Virgenes-Malibu subregion. The workbooks includes performance measures on major arterials in the...
- San Fernando Valley Measure Up! Workbook**: This is the Arterial Performance Measurement Workbooks and Reports for San Fernando Valley subregion. The workbook includes performance measures on major arterials in the...
- North County Measure Up! Workbook**: The workbook(s) includes performance measures on major arterials in the subregion and includes measures such as: VMT, ADT, Average Hourly Flow During Period (VPH), Average...
- Central Los Angeles Measure Up! Workbook**: This is the Arterial Performance Measurement Workbooks and Reports for Central Los Angeles subregion. The workbook includes performance measures on major arterials in the...
- Gateway Cities Measure Up! Workbook**

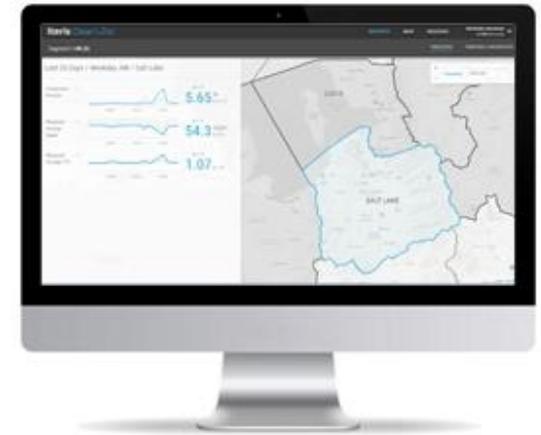
On the left side of the interface, there are filters for 'Organizations', 'Groups', and 'Tags'. The 'Organizations' filter shows 'Measure Up! Program (13)'. The 'Groups' filter shows 'There are no Groups that match this search'. The 'Tags' filter shows 'speed (11)', 'travel time (11)', 'ADT (10)', and 'LA Metro (10)'.



Measure Up! Program - Clearguide

ClearGuide (<https://metro.iteris-clearguide.com/>)

- Online roadway performance monitoring tool (freeways and arterials)
- Data, performance measures, route congestion, map animations, etc.
- Using HERE real-time crowd-source data and historical data
- Manual traffic volume collected on selected arterials





Measure Up! Program - Clearguide

iteris ClearGuide

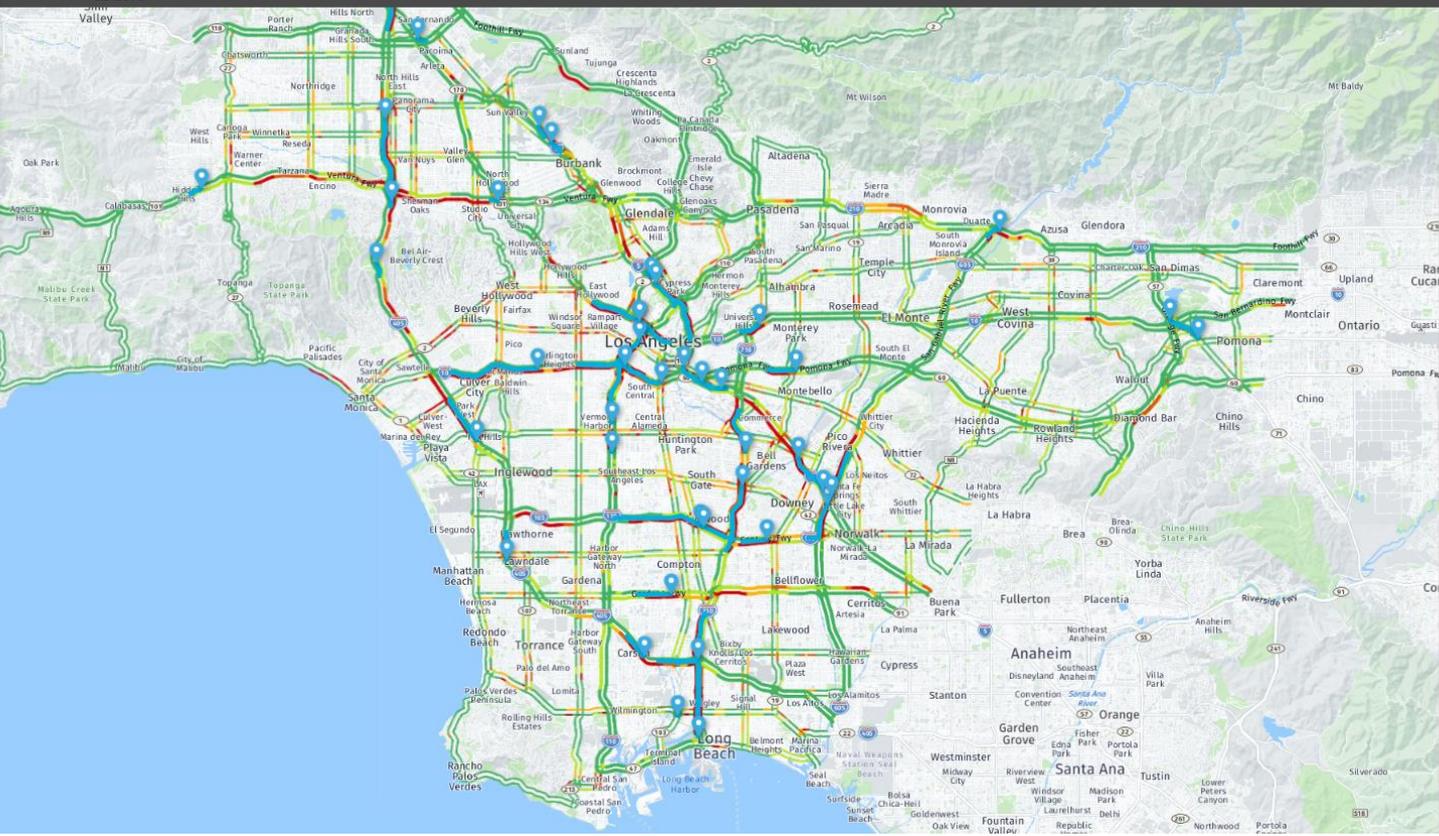
MAP ROUTES EXTRAS ABOUT Los Angeles

TODAY

NOW 3:31:58 PM

March 2021						
Su	Mo	Tu	We	Th	Fr	Sa
28	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	6	7	8	9	10

Latest



TRAFFIC WEATHER MAP

Real-Time

- % of Free-Flow Speed
- Speed (mph)
- Data Quality
- Anomalies

Static

- Free Flow Speed
- Speed Limit
- Network
- Volume Profile

Extras

- Mile Markers
- Bottlenecks

Filter

Last Updated: 3/15/21 3:31:58 PM





Measure Up! Program - LOCUS



Aggregated Transportation Flow Data Los Angeles County, CA

Total Trips: **25,627,667** | Total Transit Trips: **860,001** | Transit Market Share: **3.4%** | Total Person Miles Traveled: **126,664,362**

*Estimated daily trips and daily person miles traveled.

Click to reset filters.

Origin Neighborhood: (All)

Origin Selection: (All)

Origin Block Group: (All)

Destination Neighborhood: (All)

Destination Selection: (All)

Destination Block Group: (All)

Day of Week: Weekday (Mon-Fri)

Equity Group: (All)

Time of Day: (All)

Purpose: (All)

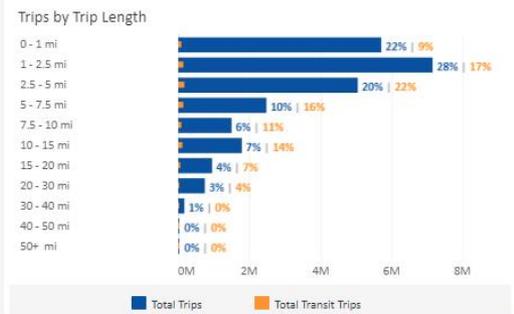
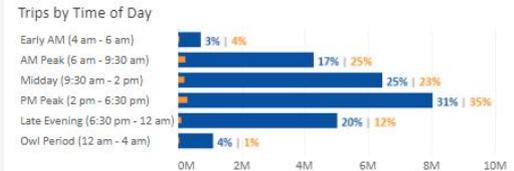
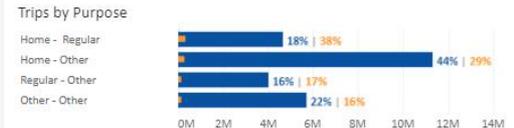
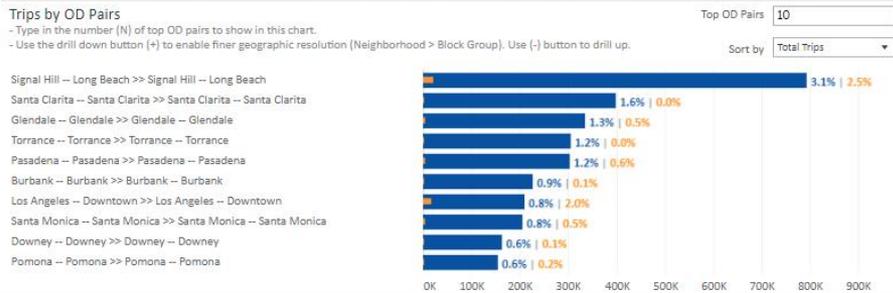
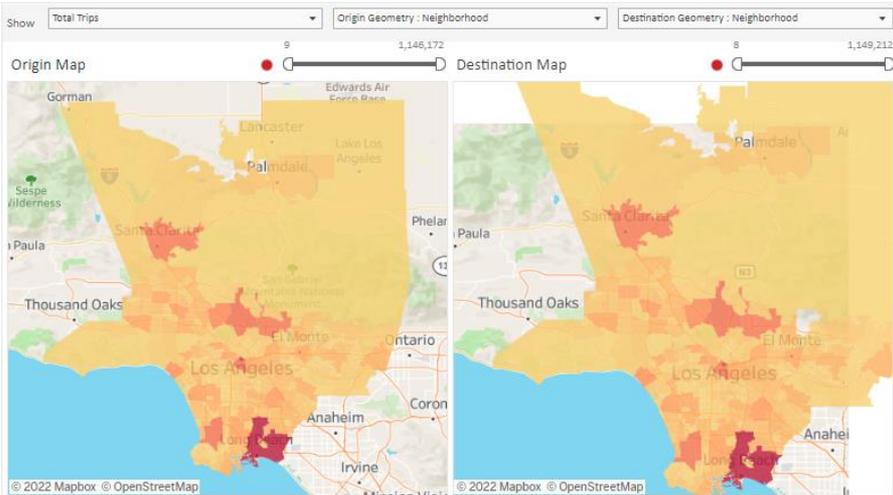
Trip Length Mi: (All)

Trip Type: (All)

Hover over ● for details.

Navigate to: **Transit Market Share**

LOCUS CAMBRIDGE SYSTEMATICS





ITS Field Inventory Resource Sharing Tool (ITS FIRST)



ITS Field Inventory Resource Sharing Tool (ITS FIRST)

DISPLAY VIEW **LOG OUT**

MLK & Normandie
Owner Agency 1: N/A
Owner Agency 2: N/A
Owner Agency 3: N/A
Owner Agency 4: N/A
Owner Agency 1 %: N/A
[View Details](#)

Eastern and Valley
Owner Agency 1: City of LA
Owner Agency 2: N/A
Owner Agency 3: N/A
Owner Agency 4: N/A
Owner Agency 1 %: N/A
[View Details](#)

Olympic Bl and Vermc Av
Owner Agency 1: City of LA
Owner Agency 2: N/A
Owner Agency 3: N/A
Owner Agency 4: N/A
Owner Agency 1 %: N/A
[View Details](#)

Alvarado St and Pico I
Owner Agency 1: City of LA
Owner Agency 2: N/A
Owner Agency 3: N/A
Owner Agency 4: N/A
Owner Agency 1 %: N/A
[View Details](#)

ABOUT CONTACT TERMS OF USE **M**





ITS Field Inventory Resource Sharing Tool (ITS FIRST)

ITS FIRST

DISPLAY VIEW LOG OUT

Map Satellite

LEGEND Traffic Bus

BACK TO RESULTS PREVIOUS NEXT

Alameda St & Cesar E Chavez Bl

EDIT DELETE PDF



Google Photo (1 of 1)

Camera Location and Agency Info

Owners	Operators	Maintainers
 City of LA	 City of LA	 City of LA
Street 1: Alameda St	Street 2: Cesar E Chavez Bl	Street 3: N/A
Verification Date: N/A		

App Version: 1.0.7

ABOUT CONTACT TERMS OF USE





CONNECT-IT: LA County Regional ITS Architecture



CONNECT-IT



CONNECT-IT
Connect and Integrate Transportation Technology
An ITS Architecture for the LA Region

[Home](#) [About](#) [ITS Projects](#) [Search Architecture](#) [Standards](#) [Technical Support](#)





CONNECT-IT



Arterial Traffic Management



Bike Share Programs



Connected and Autonomous Vehicles



Countywide Signal Priority (CSP)



Emergency Management



Goods Movement Technology



Metro ExpressLanes



Integrated Corridor Management (ICM) Projects



ITS First



LA County Information Exchange Network (IEN)



Traffic Management Centers (TMC)



Measure Up! Arterial Performance Measurement



SoCal 511



Parking Management Systems



Regional Integration of Intelligent Transportation Systems (RIITS)



Transit Access Pass (TAP) Program

LA County-specific projects and programs are identified in CONNECT-IT



Regional Integration of ITS (RIITS)



RIITS



Vision

Our vision is to deliver multi-modal transportation information services through a flexible platform to achieve regional mobility, safety and sustainability goals.

Mission

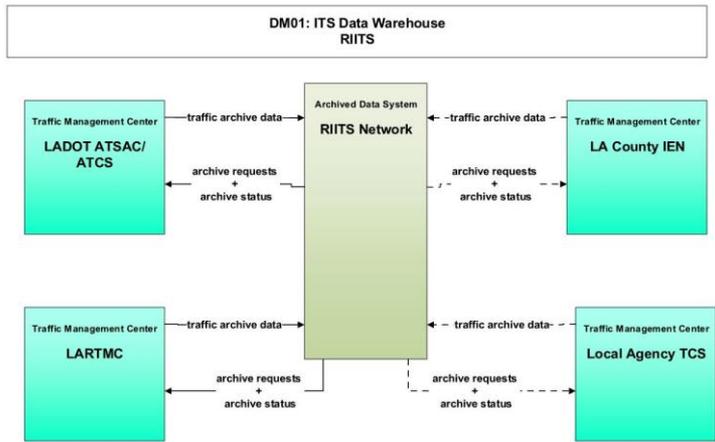
RIITS' primary mission is to support the exchange of transportation information and resources between and within government organizations for regional operational mobility improvements.

RIITS provides a comprehensive, timely, and reliable regional data source. It supports information exchange in real-time between freeway, traffic, transit and emergency service agencies to improve management of the Los Angeles County transportation system and better serve the traveling public. In addition to ongoing investments to incorporate more reliable ITS data sources, RIITS is currently being enhanced with an Archived Data Management System (ADMS) that will capture and store real-time data streaming through the RIITS network.



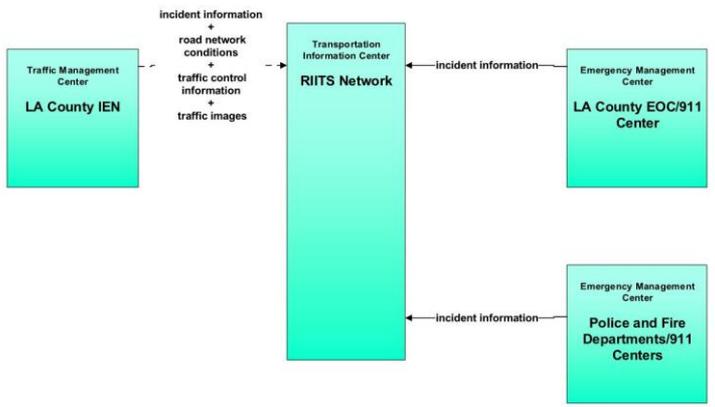


RIITS



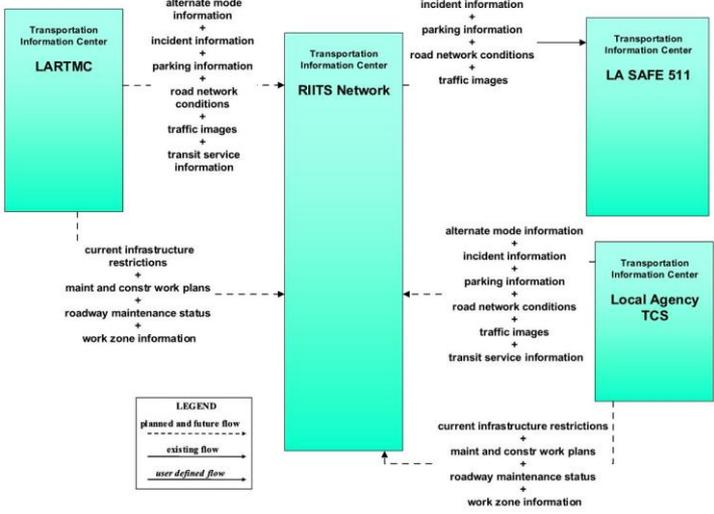
LEGEND
 planned and future flow
 existing flow
 user defined flow

T101: Broadcast Traveler Information RIITS (2 of 2)



LEGEND
 planned and future flow
 existing flow
 user defined flow

T101: Broadcast Traveler Information RIITS (1 of 2)



LEGEND
 planned and future flow
 existing flow
 user defined flow



Thanks!

Any questions ?