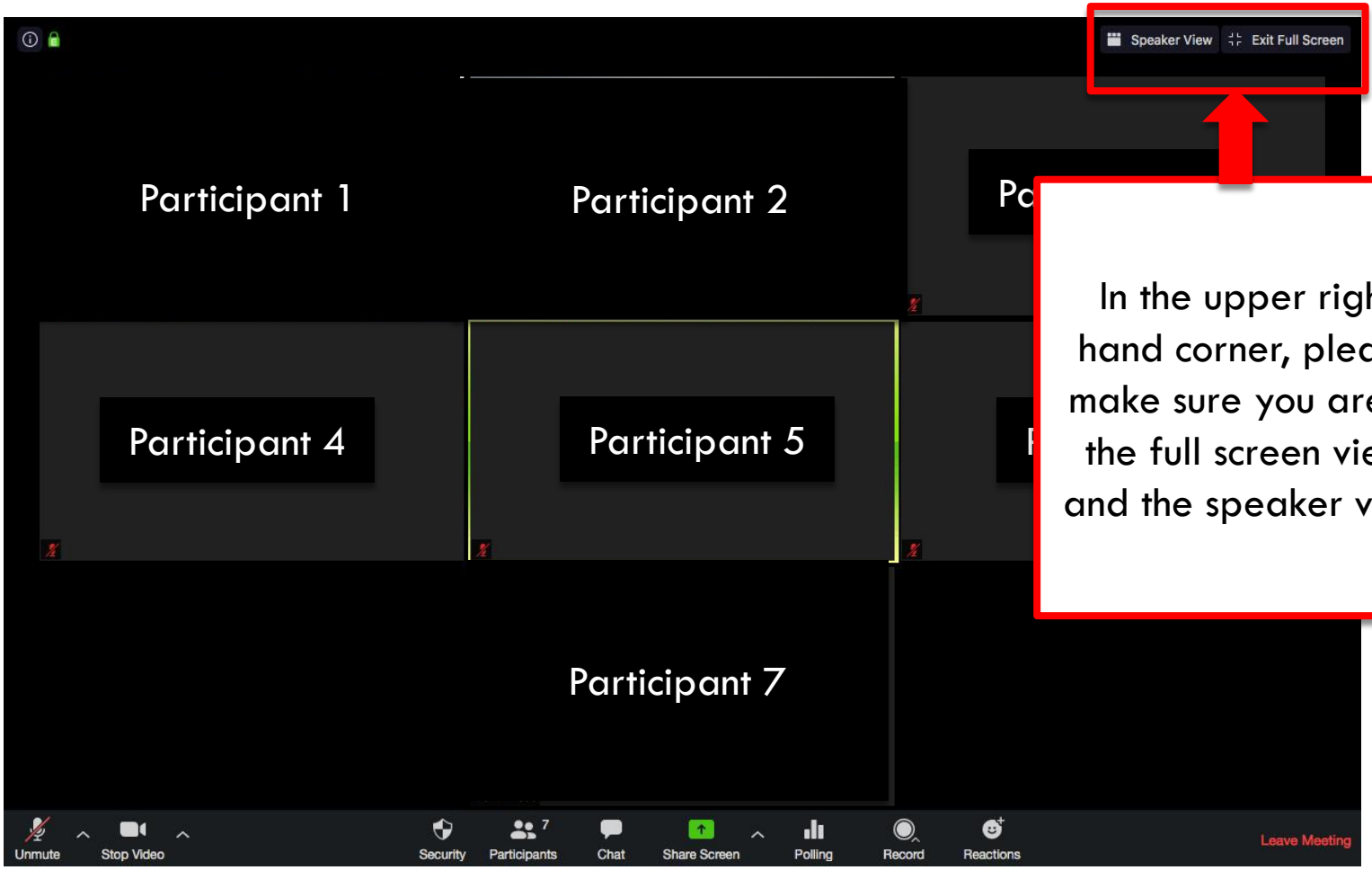
# Connected Corridors
# (Virtual) Face-to-Face Meeting

Tuesday, July 21st, 2020
1:30 – 3:30 pm
via Zoom Video Conferencing

# Zoom Tips

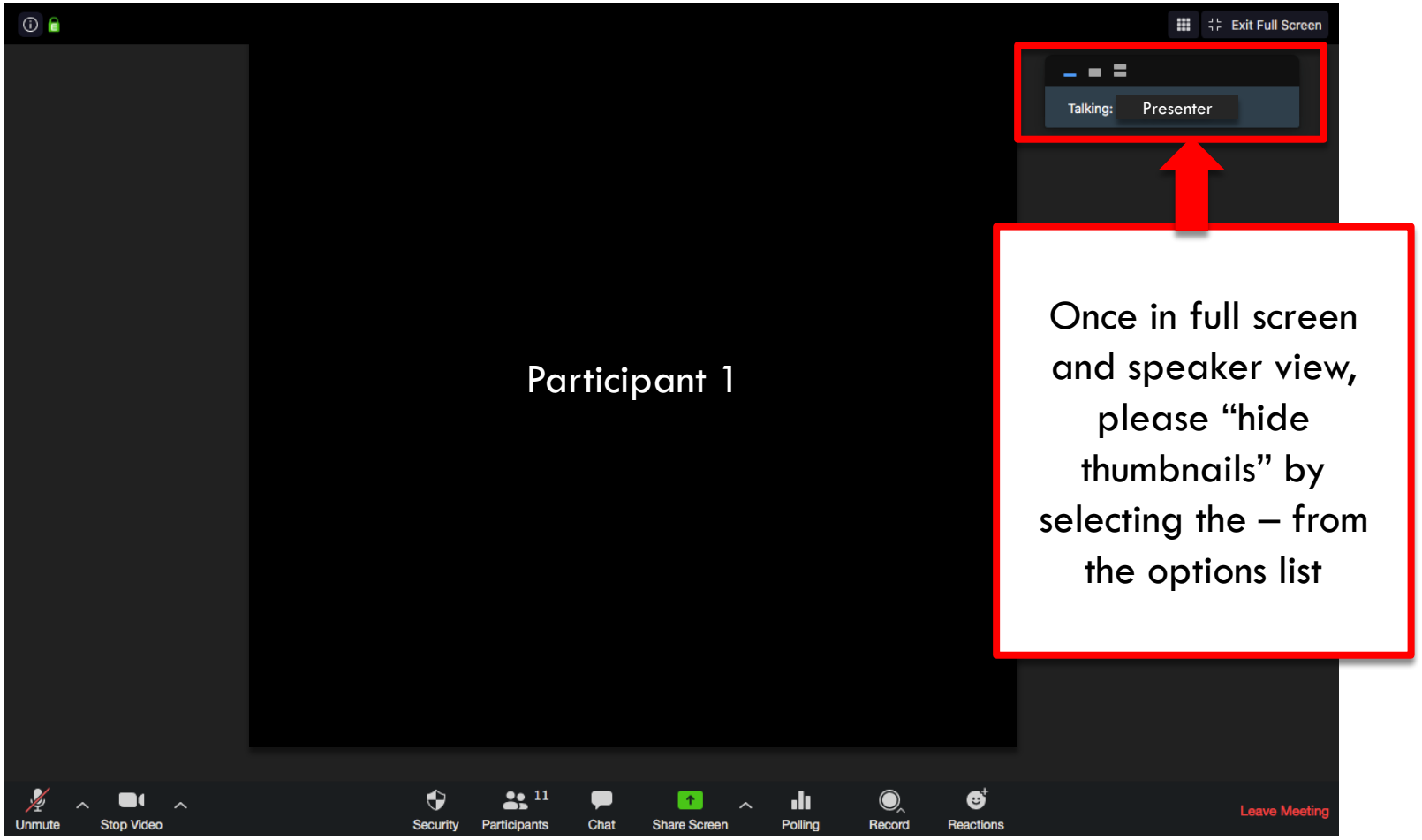





In the upper right hand corner, please make sure you are in the full screen view and the speaker view

# Zoom Tips




Exit Full Screen
Talking:
Presenter
Participant 1
Unmute
Stop Video
Security
Participants
11
Chat
Share Screen
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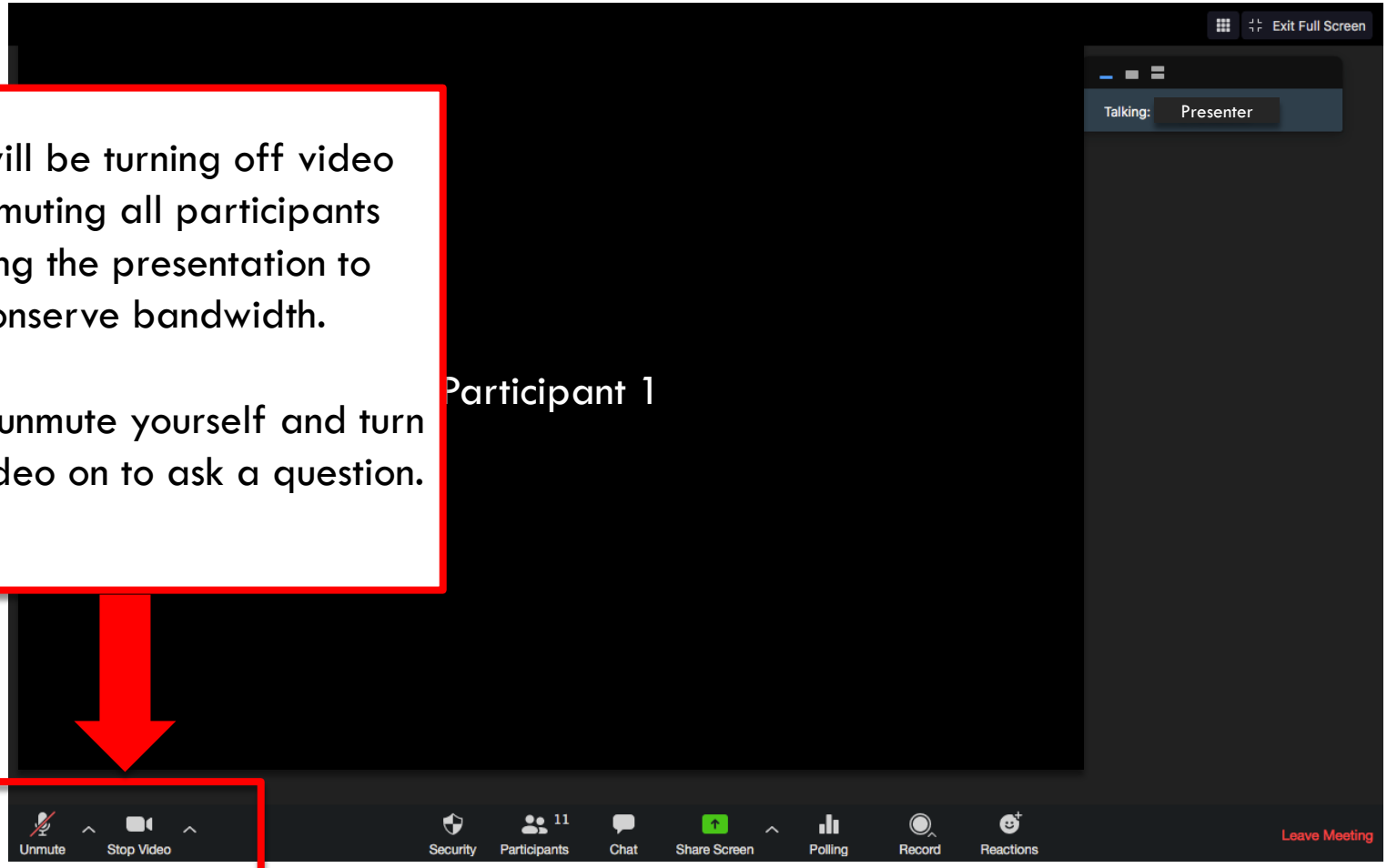
Record
Reactions
Leave Meeting
Once in full screen and speaker view, please "hide thumbnails" by selecting the – from the options list

# Zoom Tips



We will be turning off video and muting all participants during the presentation to conserve bandwidth.

Please unmute yourself and turn your video on to ask a question.



# Agenda



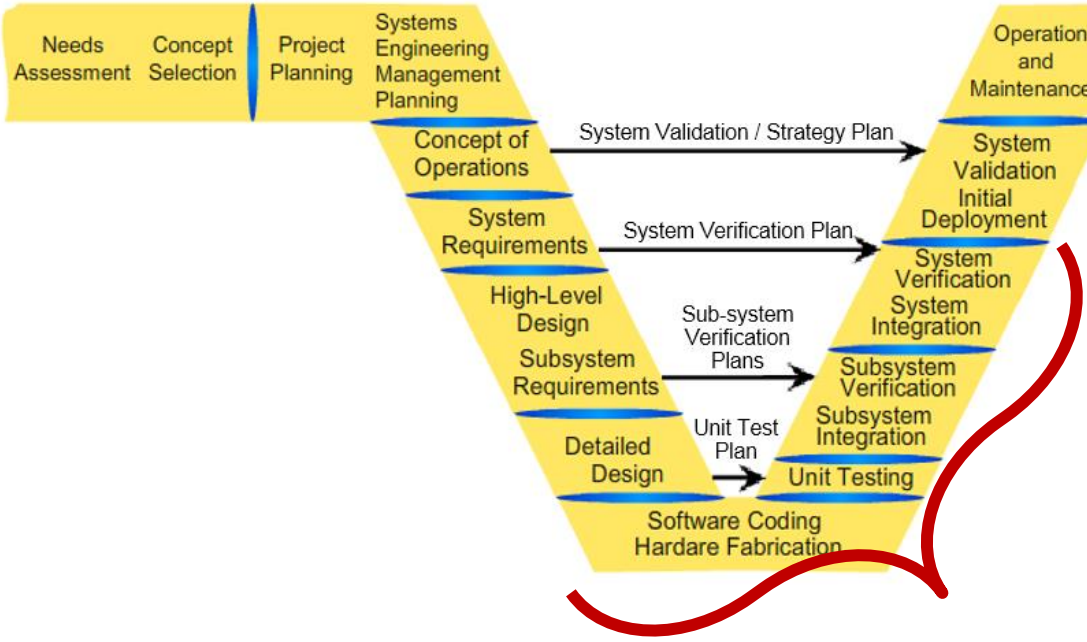
- **1:30 - 1:50 PM – Greetings, Introduction and Progress Summary**
- **1:50 – 2:10 PM - CC ICM System Demo**
- **2:10 – 2:20 PM - AMS Update**
- **2:25 – 2:35 PM - Kapsch Status Update**
- **2:40 – 3:00 PM - SMG Before and After Study**
- **3:05 - 3:15 – Parsons Call for Projects Update**
- **3:15 – 3:30 – Round Table and Closing**
  - Next Meeting - Tuesday September 1st

Note: Meeting location sequence Monrovia, Duarte, LA Metro, Caltrans TMC, County, Arcadia, Pasadena

# I-210 Pilot Implementation Project Progress Summary

# Systems Engineering Status






Software in Integration and Production environments:

**Data Hub:**

Data feeds for the following:
Ramp meters via ATMS*,
CMS signs via ATMS,
Freeway sensing via PeMS,
Freeway sensing via ATMS*,
Arcadia intersection signals via Transcore Transuite,
LA County intersection signals via KH Kits,
Caltrans intersection signals via TSMSS (Transcore Transuite),

**Corridor Management System:**

Incident capture (integration environment only),
Asset display (ramps, signals, signs).

**Test DSS:** integration environment only.

Note: * These still need to be verified in production.

# Schedule – Till Launch (Page 1 of 2)



- **Complete Call for Projects Procurement** – **Jan 2020**
- **ATMS with CC modifications deployed to Production** – **March 2020**
- **Major functions of the Test DSS work with production ATMS incident data** (demonstrated) – **May 2020**
- **Data Hub configuration and deployment management functions (deployment/release hardening)** – **May 2020**
  (conducted incremental releases with containers, further hardening as we go through the pilot)

- **Complete ATMS Modifications** – **October 2020**
  (received the estimate, need to verify and coordinate the timeline)
- **Prediction (Aimsun) running in the cloud** – **July 2020**
- **Complete McCain Transparity C2C interface** (Pasadena) – **October 2020**
- **Rules Engine (Drools) running in the cloud** – **October 2020**
  (full rules engine; no hardening)
- **All ITS Elements Installed in Field** – **Q3-4 2020**
  (see 20200520_SLD_I210ASI_MonthlyStatusMeeting_v1_PARSONS.pptx)

# Schedule – Till Launch (Page 2 of 2)



- **Integrate Lane Closure System*** – **September 2020**
- **All data (except new arterial DMS signs) being received** – **November 2020**
  (i.e. all ITS elements are installed and sending data through their C2C interfaces)
- **Estimation running in the cloud** – **December 2020**
- **Performance Management System Available** – **December 2020**
- **Complete C2C DMS Sign Interfaces** – **February 2021**
- **Complete Version 1.0 System Production Deployment/Release** – **February 2021**
- **System Operational Test and Validation** – **March-May 2021**
- **Before Study** – **March to May 2021**
- **Launch Pilot** – **May 2021**

**Note:**
* Caltrans HQ IT involvement required

# Schedule – Pilot Launch to Pilot Completion



- **Pilot Launch – May 2021**
- Kapsch – May 2021 – September 2021
- Parsons – September 2021 – January 2022
- Interim Benefits Analysis – January 2022
- Telegra – January 2022 – May 2022
- After Study – March to April 2022
- Kapsch – June 2022 – September 2022
- Documentation Completed – September 2022
- Procurement of CMS system – August 2022
- Procurement of Aimsun – August 2022
- **Pilot complete - September 2022**

# Main Planned Accomplishments for August 2020



- **Software Development**
  - Standing up and automation of Cloud AMS environment for DSS
  - Completion of McCain C2C interface testing for Pasadena and deployment of the software update. Beginning of verification of production data
- **Analysis Modeling and Simulation (AMS)**
  - Developing inventory of response plans with two routes, and rules for selection
  - Defining details for CMS messages and trailblazer signs and coding them into the rules
  - Improving integration between DSS and Kapsch CMS EcoTrafiX

# Networking and Center to Center Connectivity Status



- **Caltrans C2C network connectivity for Data Readers transitioning to built-in monitoring provided out of the box by AWS load balancers**
  - Prior instance-based monitoring mechanisms are changing as the Data Readers move into containers and load balancers added
  - This mechanism for monitoring connection to the external data sources ("green boxes") is coming online in Dev, Test, and Research
  - Automated network connectivity monitoring for production will follow suit when the load balancing architecture is deployed there
- **Pasadena C2C**
  - Looking forward to testing the connectivity between the Data Hub and Pasadena's servers in support of McCain Transparity application C2C
  - McCain anticipating deployment into D7 network in early August
  - First use of HTTPS encrypted SOAP dialogs; certificate infrastructure being designed in conjunction with RIITS

# Networking and Center to Center Connectivity Status (continued)



- **Iteris data feed**
  - Authenticated connection to external broker complete as proof-of-concept; Data Hub pushes configurable set of channels to external broker
  - Waiting on networking connectivity with Iteris box(es) across the D7 network
- **Ongoing weekly meetings between RIITS and PATH**
  - D7 Caltrans continues to be available as needed
- **Field asset monitoring (unchanged status)**
  - Metro and Caltrans leading the effort with IGC (Irvine Global Consulting)
  - Bi-weekly calls are being held
  - PATH provided ITS element location and type information

# C2C Connectivity Graphs since last Face-to-Face



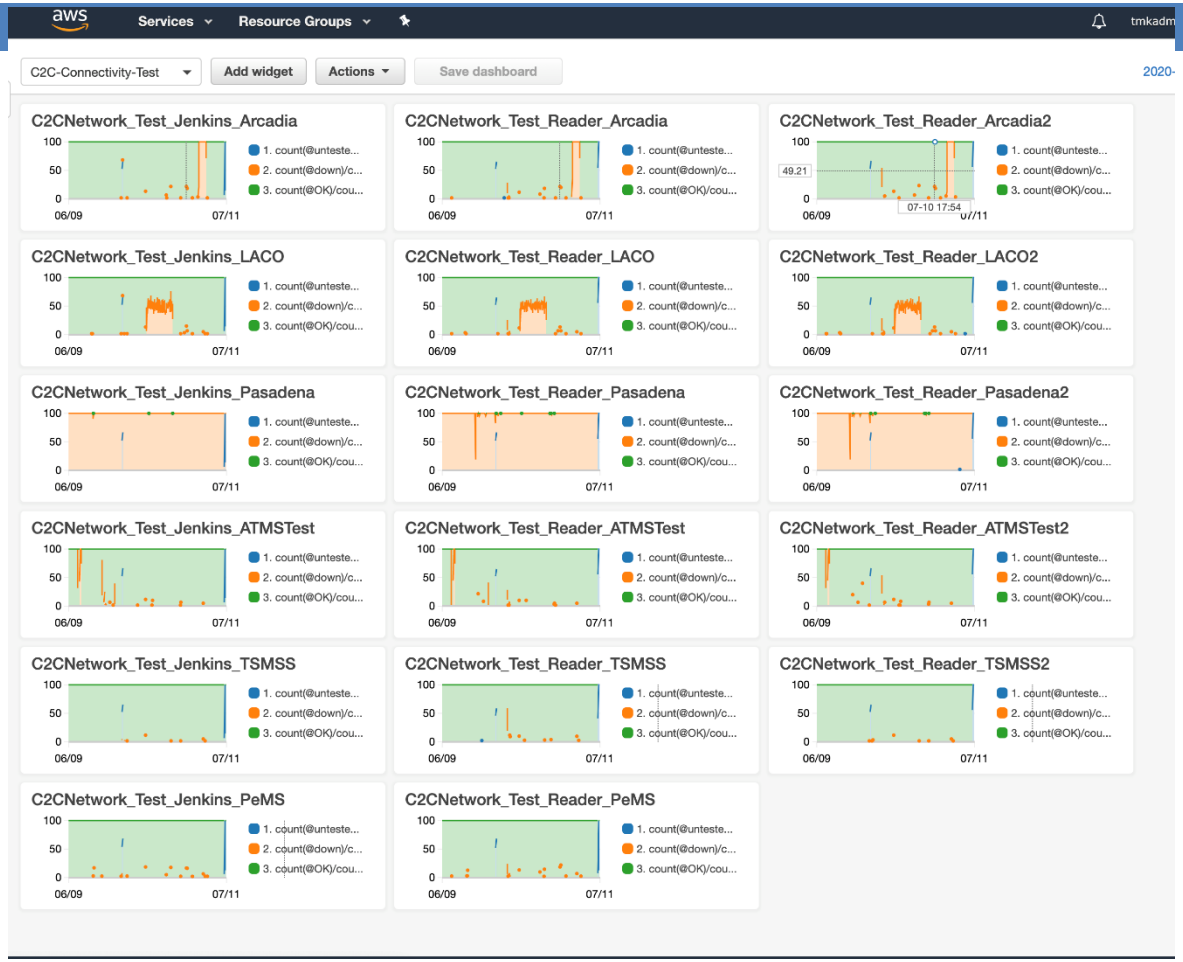



Chart Legend: Green – OK, Yellow – Down, Blue – Untested.
Two interruptions described on next slide

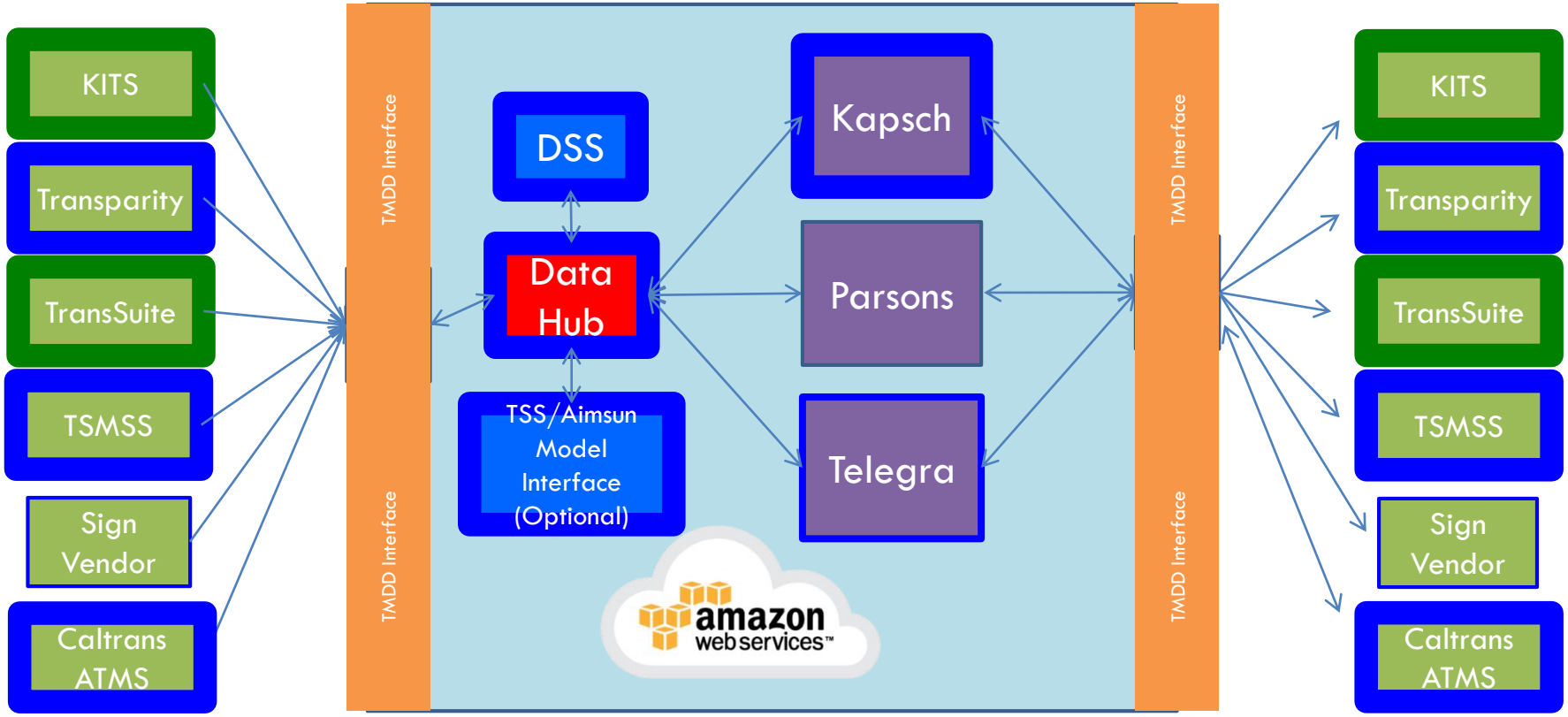
# C2C Connectivity interruptions



- **LACO connection intermittent failures June 24-29th**
  - Applications showed only occasional connection problems
  - Subsequent to hardware changes made in RIITS network; rapidly fixed once detected
- **Arcadia TMDD service down July 5/6**
  - All data flows interrupted for ~38 hours
  - Service restored without incident
- **Apparent brief outage of the Test ATMS server, resolved with no action taken by PATH.**

# C2C Interface Implementations - Status






**Legend:**
Green border – Done; Blue border – In Progress (thickness commensurate with progress)

# Systems Integration



- **Pasadena**
  - McCain/Transparity C2C interface – Continuing testing. Expect to be deploying to Pasadena in early August with a production data review to follow. Networking and SSL security a potential hurdle to on-time deployment
- **Dynamic Message Signs – Pasadena, LACO, Caltrans**
  - Continuing coordination with Parsons on sign C2C interfaces. Awaiting interface development
- **Caltrans**
  - Task order issued for ATMS updates. Meeting next week between Parsons, D7, and PATH to finalize/clarify any remaining questions
- **Iteris/PeMS**
  - Beginning effort to demonstrate capabilities to push data to State repository. Data Hub is ready and we are awaiting network connectivity

# Systems Development

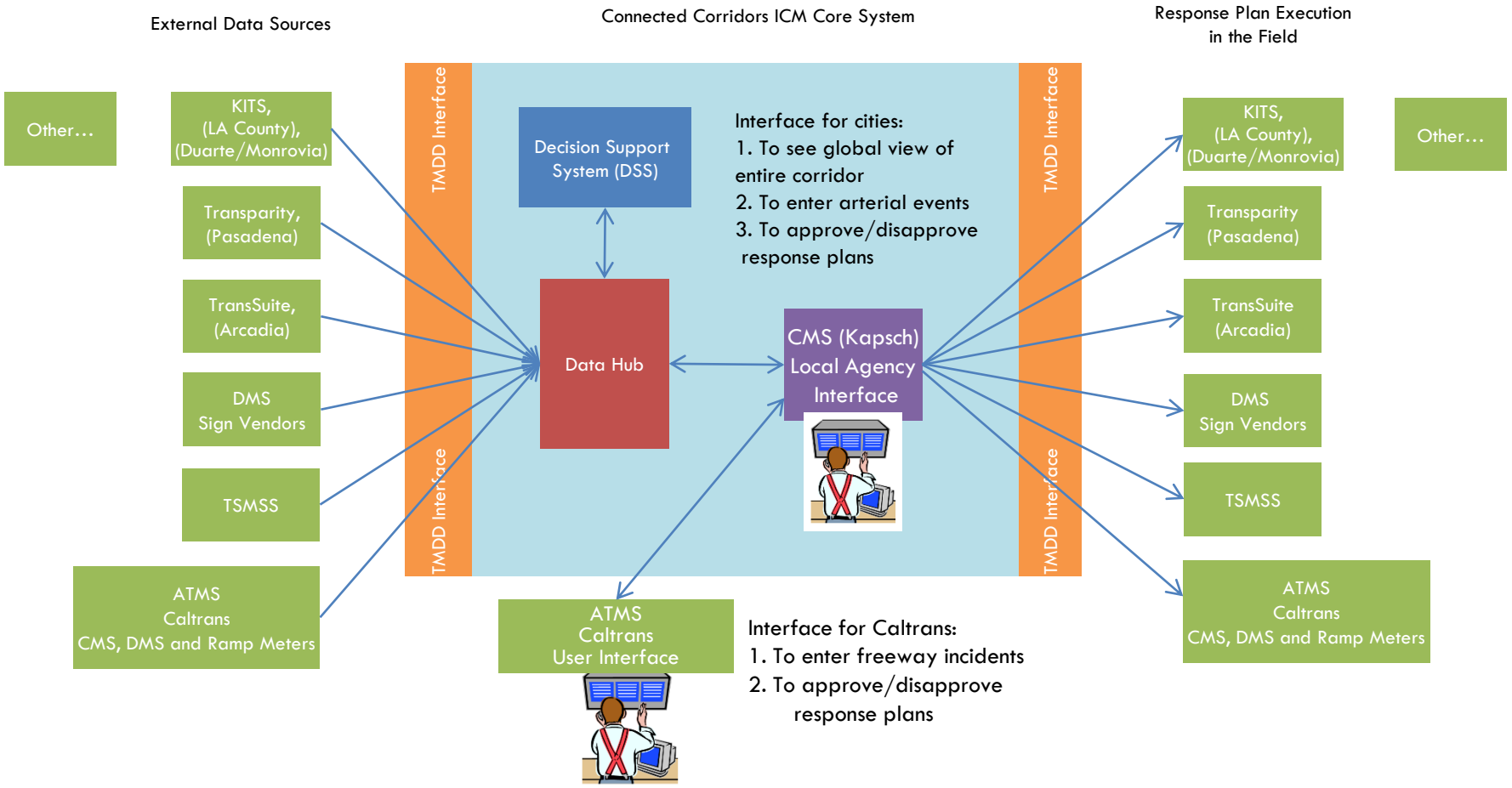


- **Production system initial stand-up**
  - CMS – working with Kapsch to send and display response plan.
- **Improve release frequency – goal is new release to test every week**
  - Releases are on a weekly schedule
- **Updates**
  - Currently working to add automated deployment of Test DSS components to AWS. Increased scope to containerize and fully integrate Test DSS components into ICM workflow processing and ICM configuration. This is the top priority

# Analysis Modeling & Simulation and ICM System Demo

# CC ICM System Overview



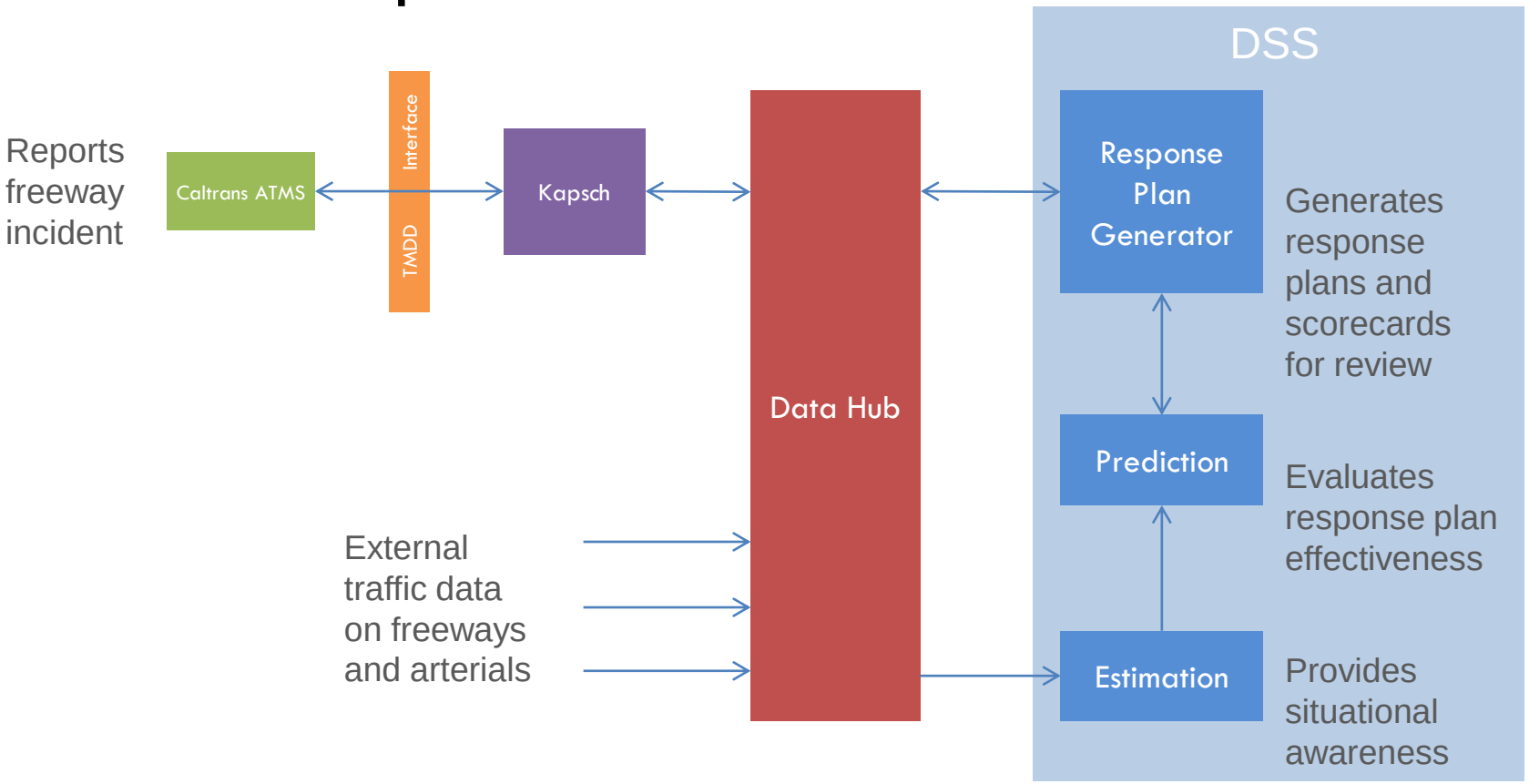


# Demonstration Overview

# Demonstration Overview



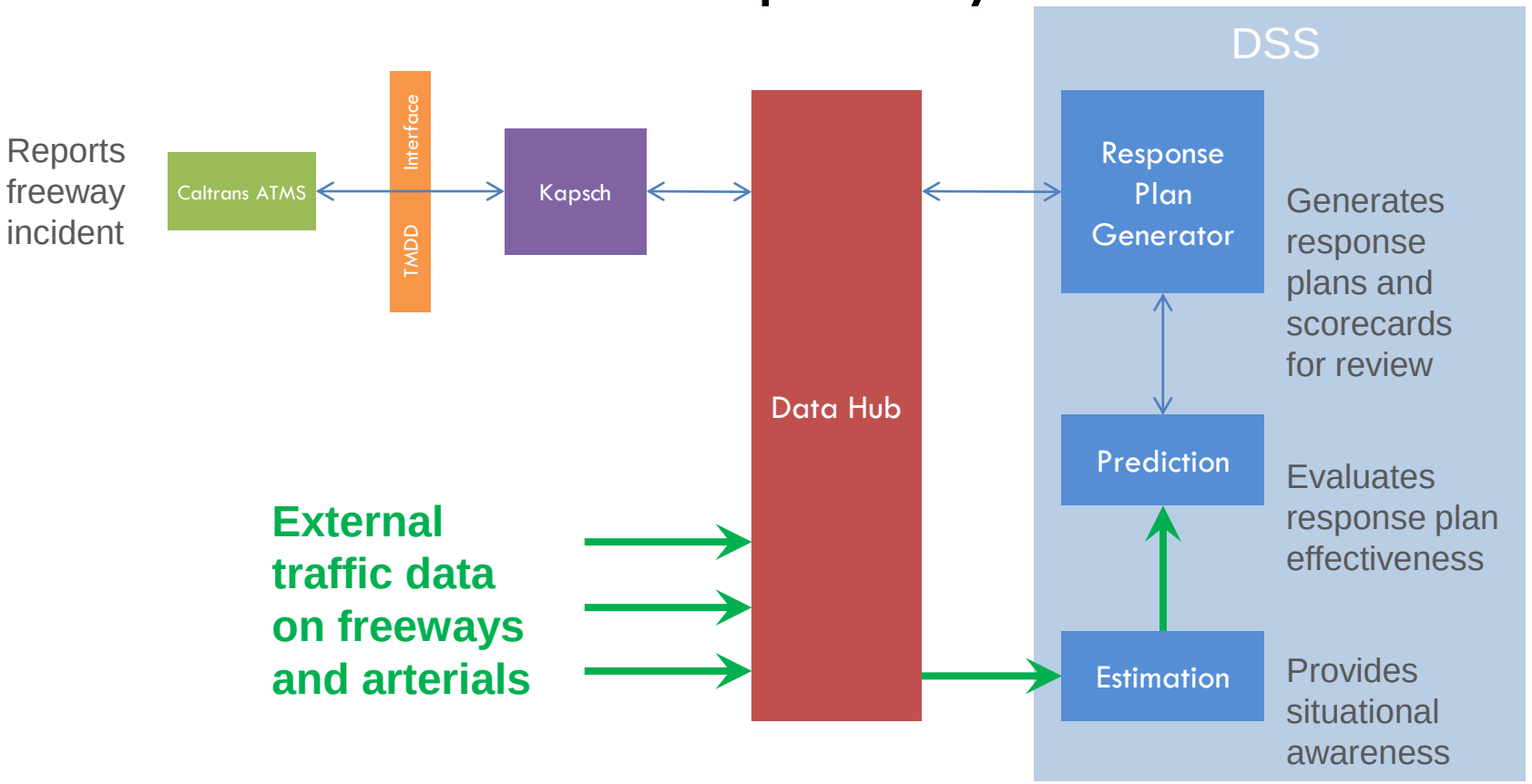
- **This is the map that illustrates data flows**



# Estimation Data Flow (Previous Demo)



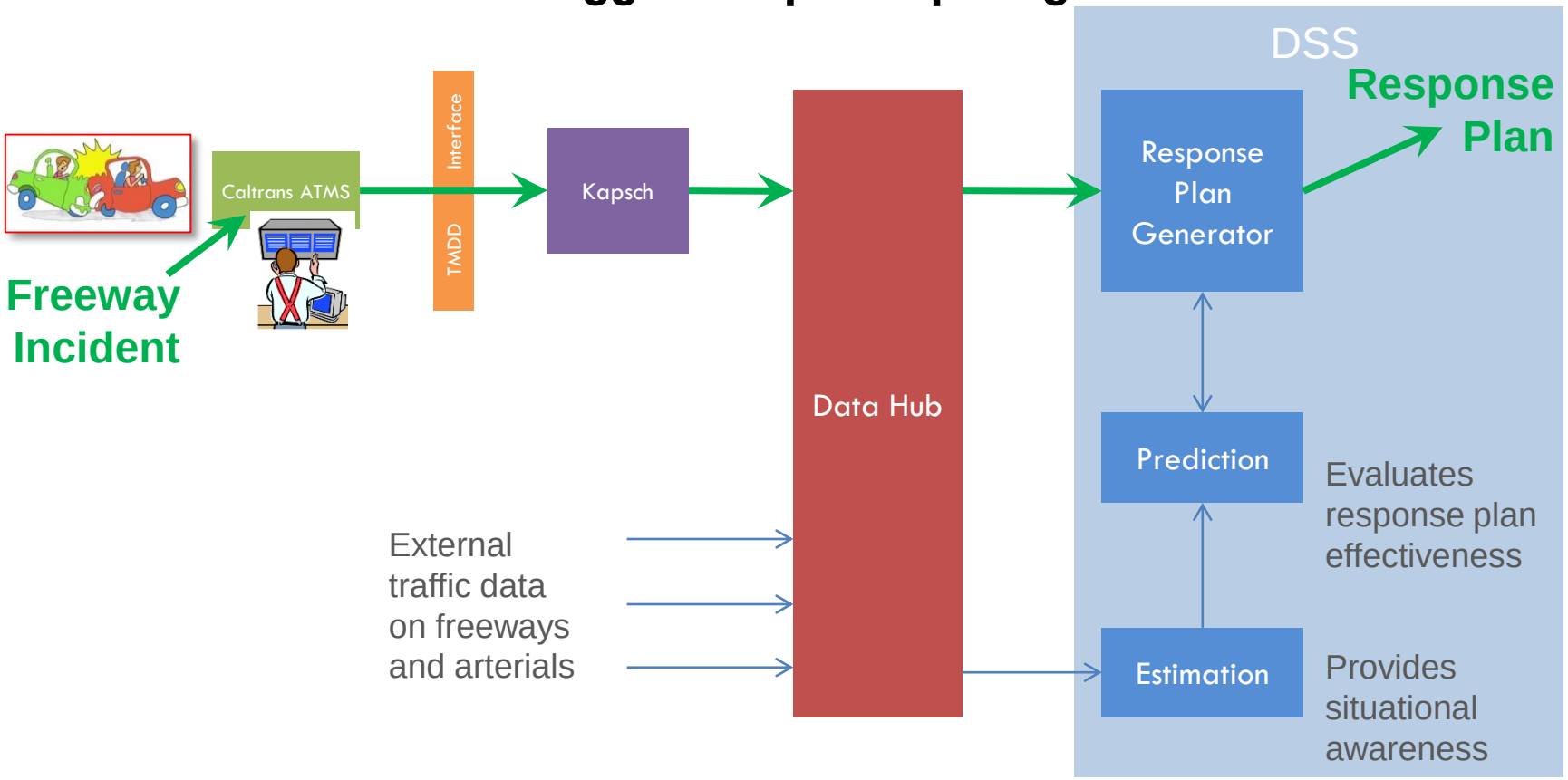
- **Estimation was demonstrated previously**



# Incident Data Flow (Previous Demo)



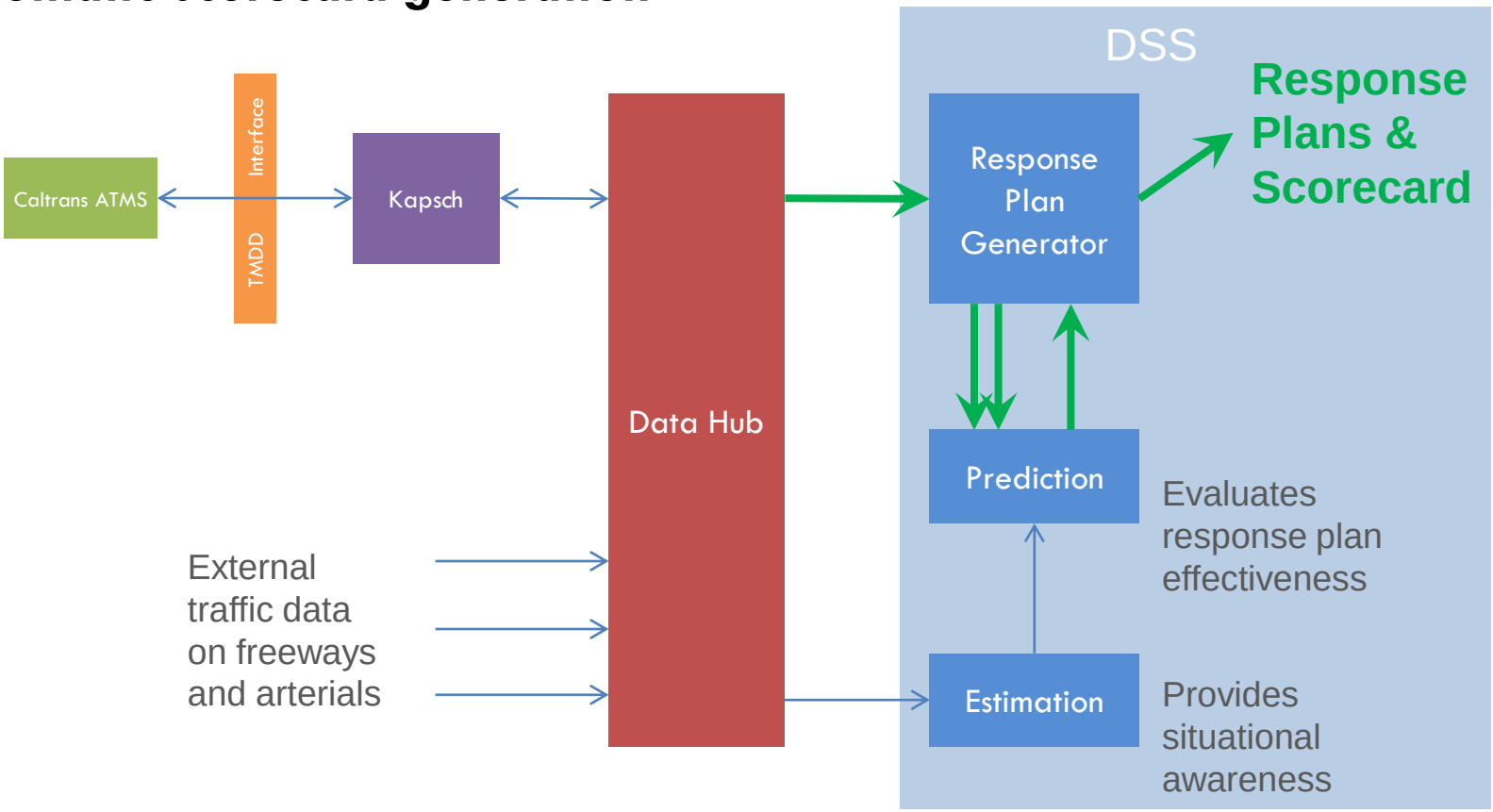
- **An ATMS incident triggers response plan generation**



# Scorecard Generation (Last Time)



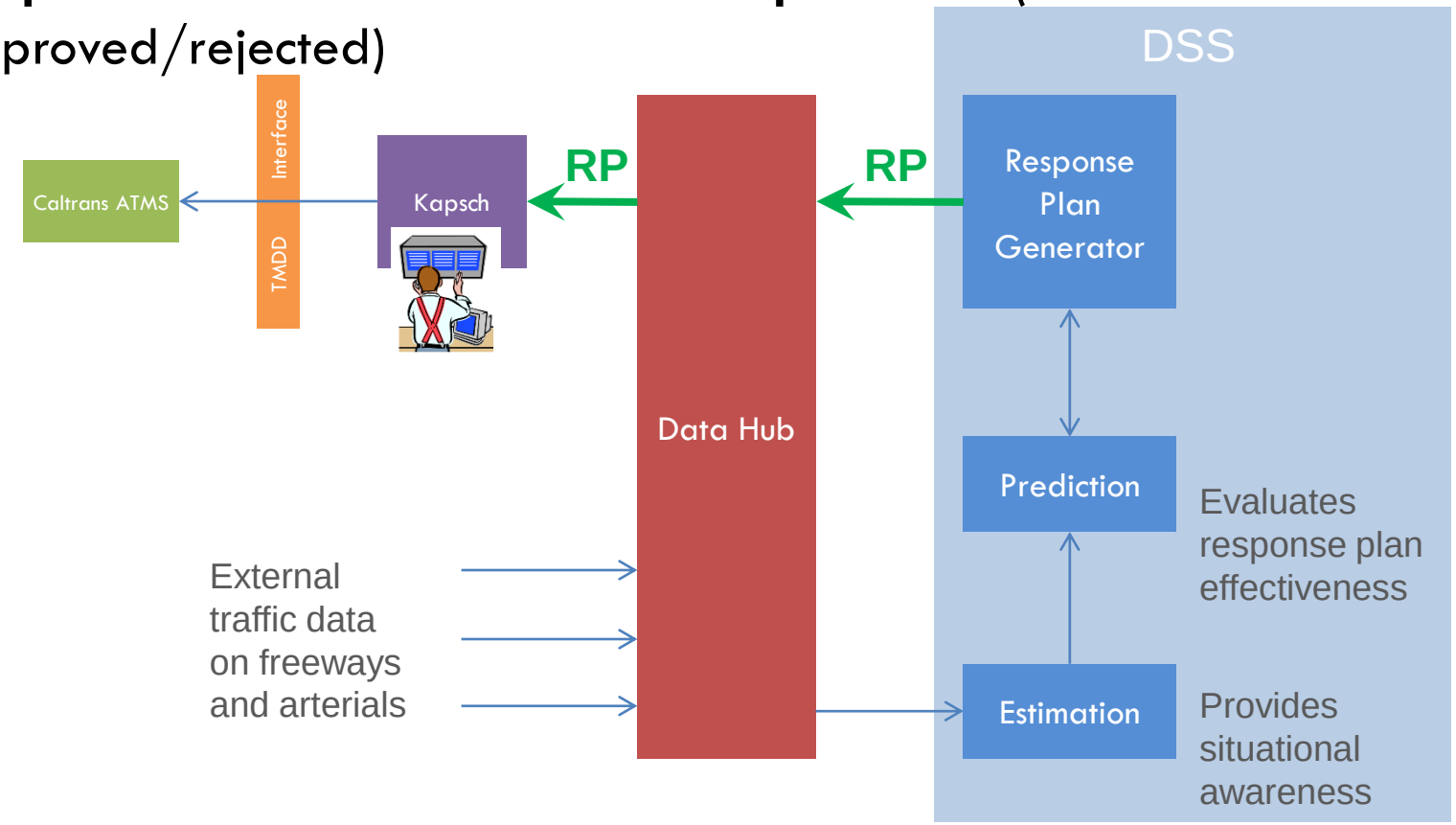
- **Automatic scorecard generation**



# Demo For Today



- **Response Plan communicated to Kapsch CMS** (RP reviewed and approved/rejected)



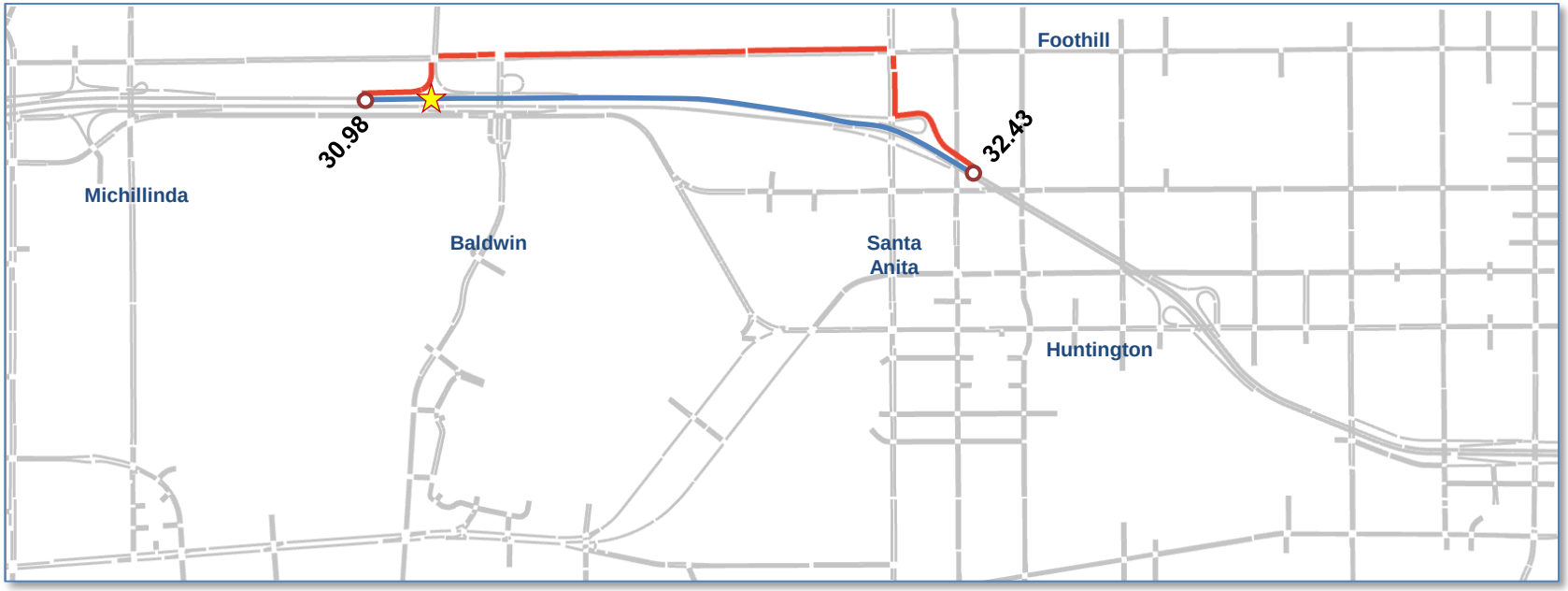
# Response Plan

Visualization and Approval

# Response Plan For Visualization



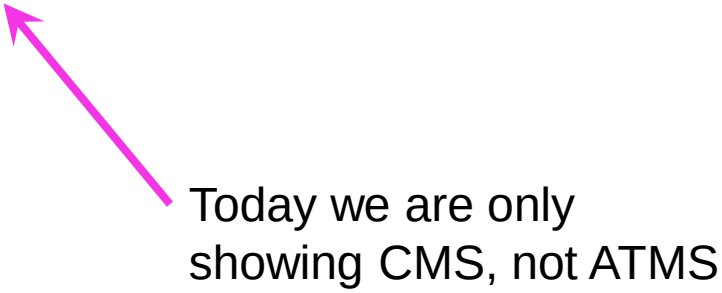
- Incident on I-210 WB between Postmiles 30.98 and 32.43
- Exit at Santa Anita and take Foothill to Baldwin entrance
- System will show intersection signals and ramp meter



# Approval Process

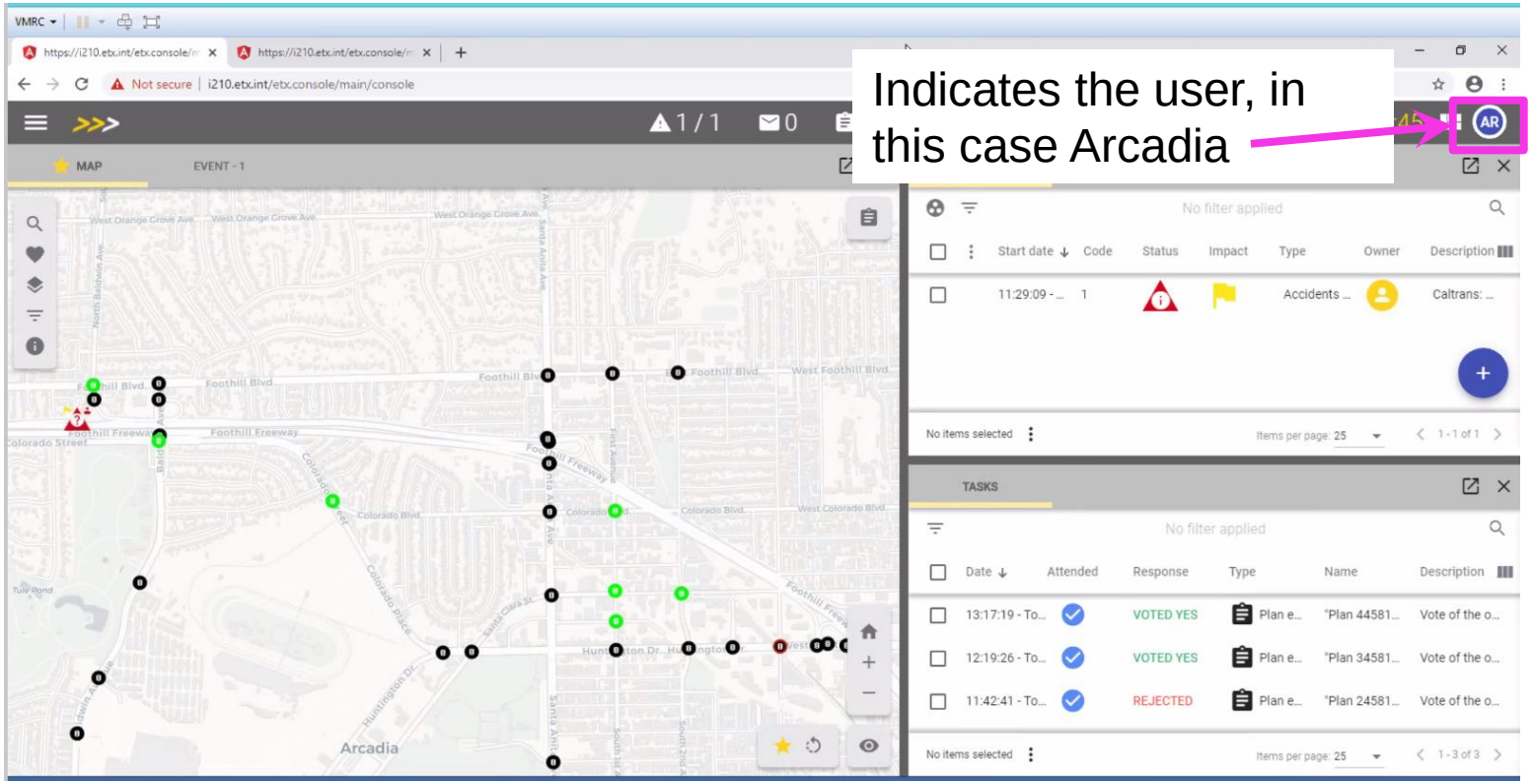


- **The proposed response plan requires approvals**
- **Assets required for the response plan are operated by the following jurisdictions:**
  - Caltrans: Uses ATMS for approvals
  - Arcadia: Uses CMS for approvals



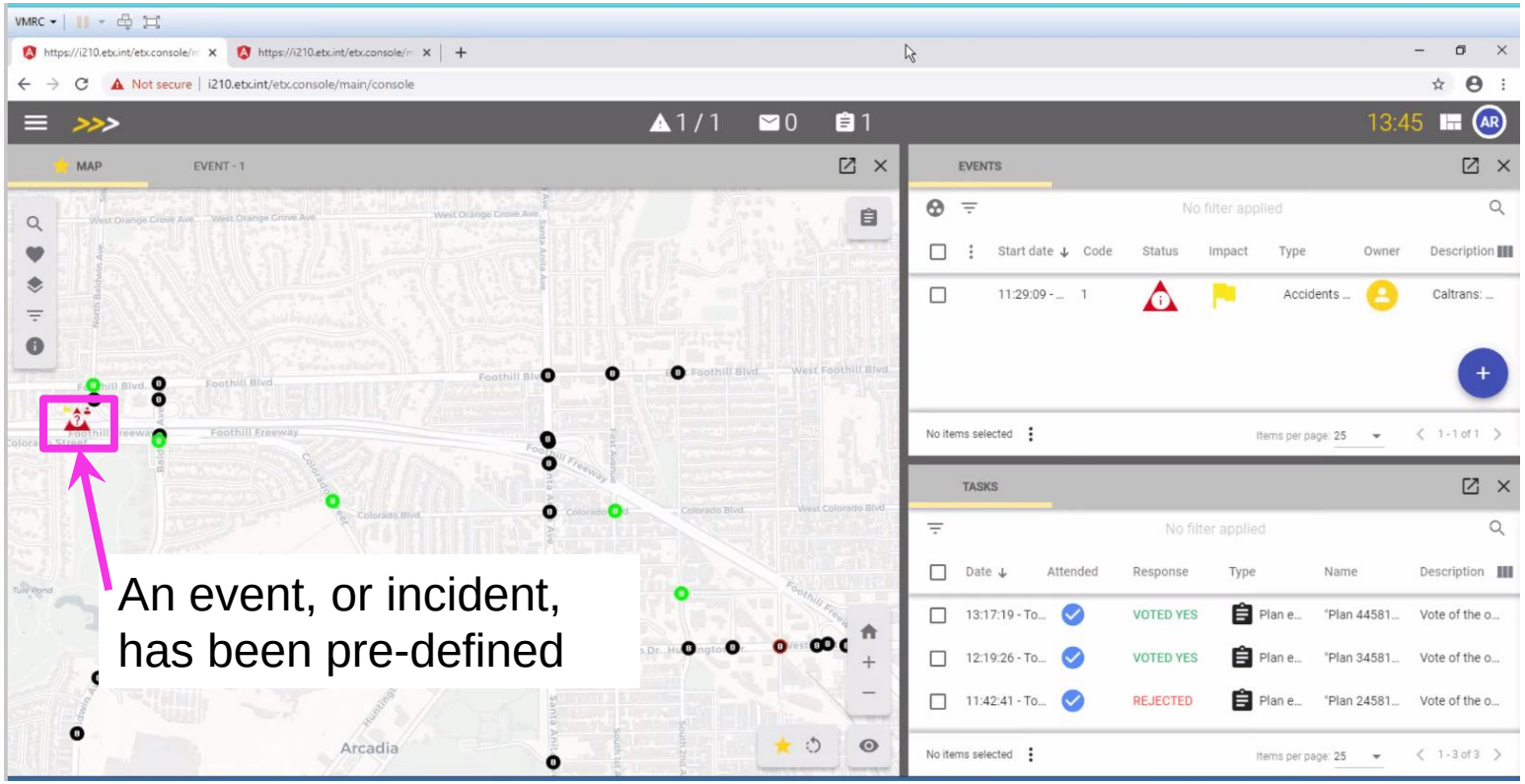
# Preview of Demo (1)





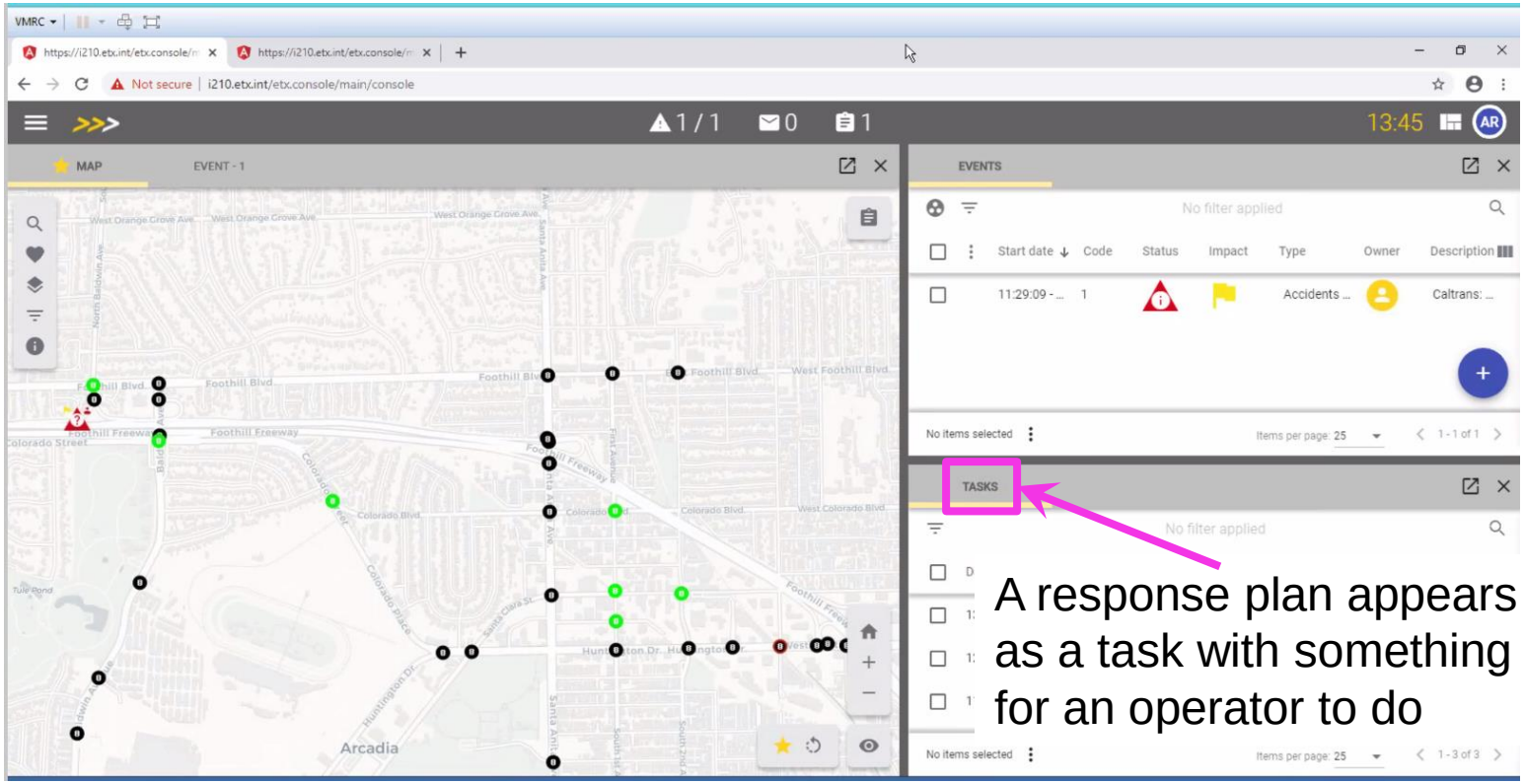
# Preview of Demo (2)





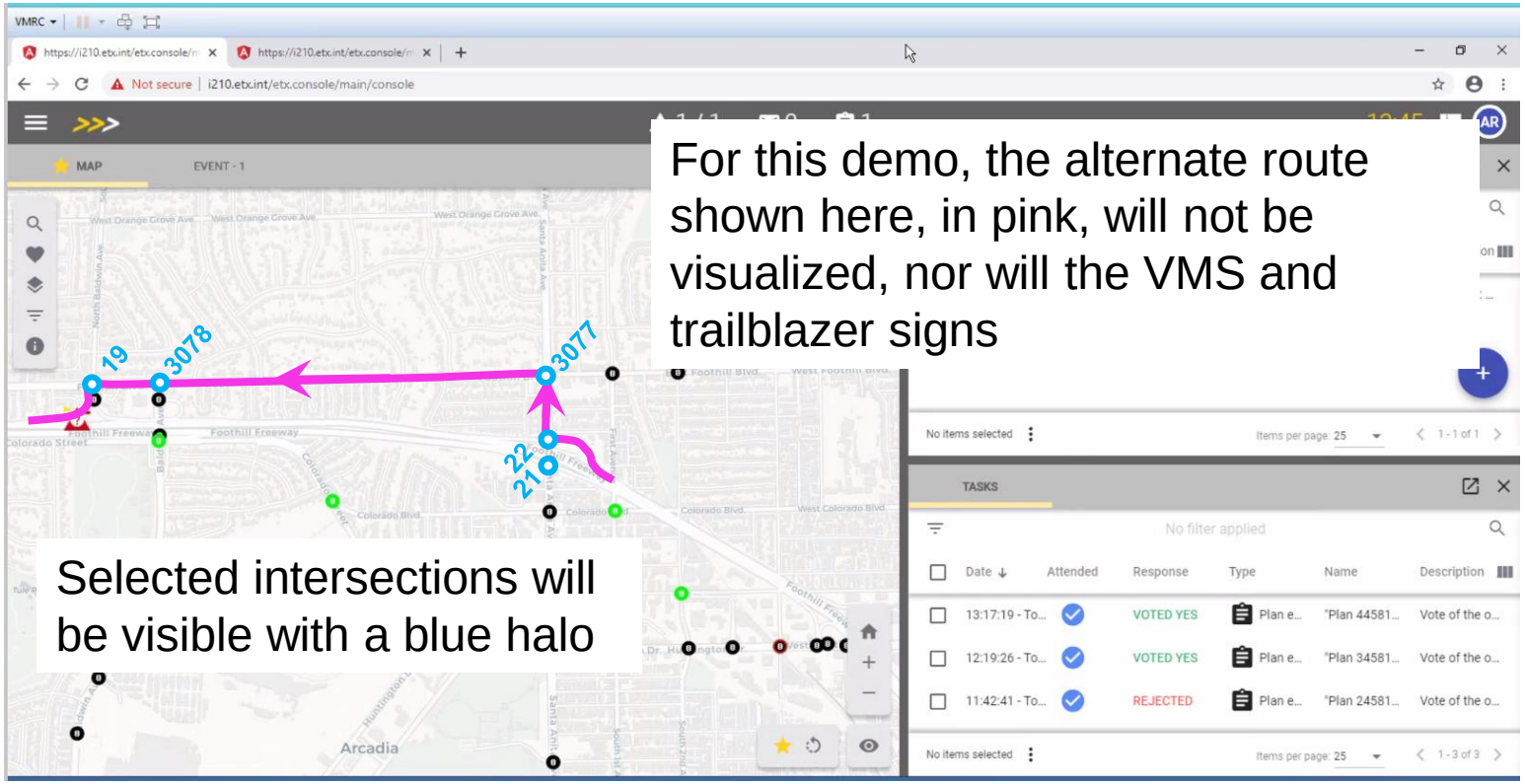
# Preview of Demo (3)





# Preview of Demo (4)





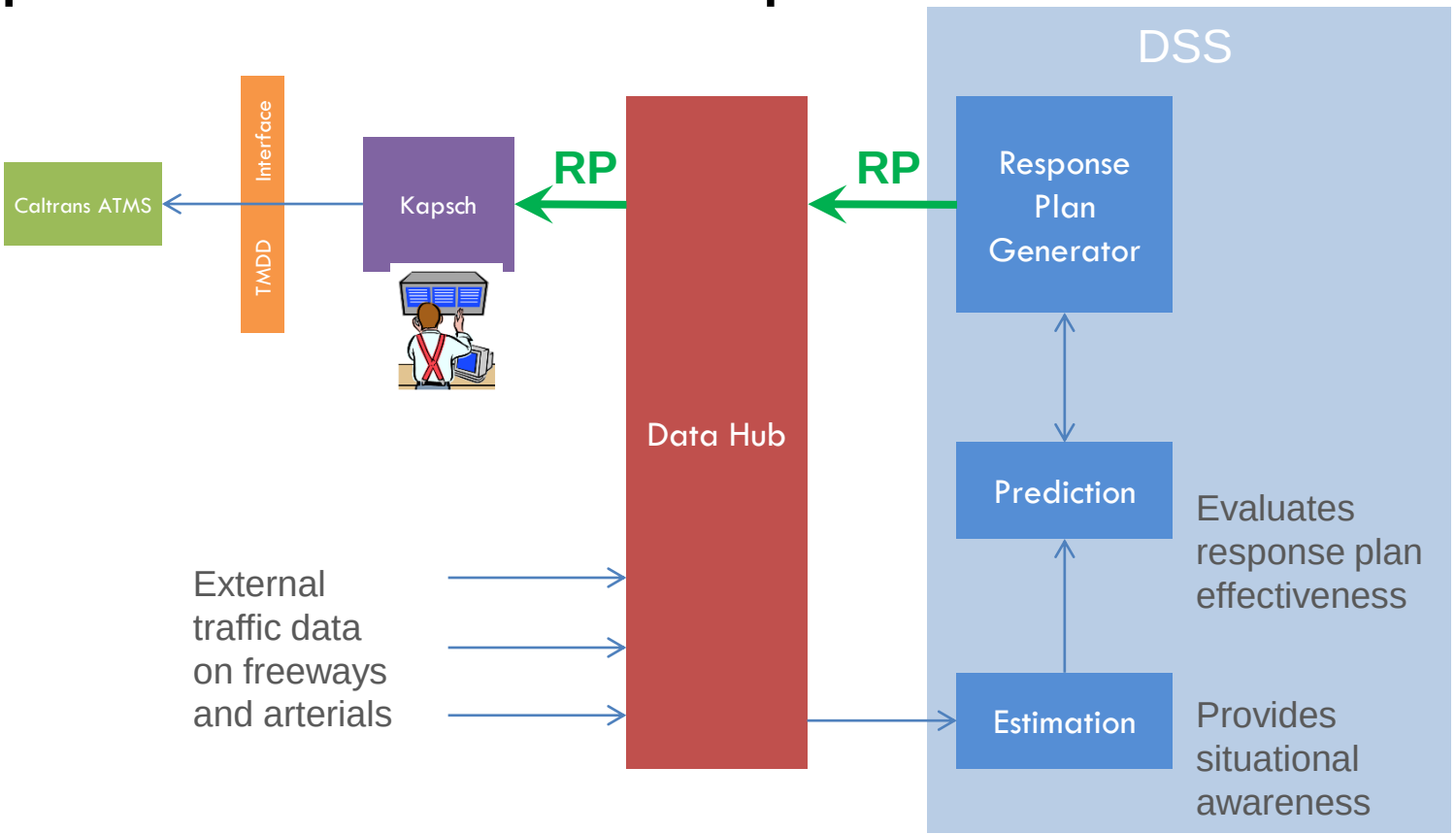
# Live Demonstration

# Conclusion

# Demo For Today



- **Response Plan communicated to Kapsch CMS**



# AMS Accomplishments



- **Integration with Kapsch CMS EcoTrafiX**
  - Developed and tested communication pathway to provide response plans from DSS to Kapsch CMS (through the Data Hub)
  - Ability to visualize response plan elements in CMS
  - Ability to perform approval/disapproval process (voting)
- **Analysis Modeling and Simulation (AMS)**
  - Implemented a filter for bad arterial data to improve estimation results
  - Improved processes for asset inventory change and data quality assessment

# AMS Next Steps



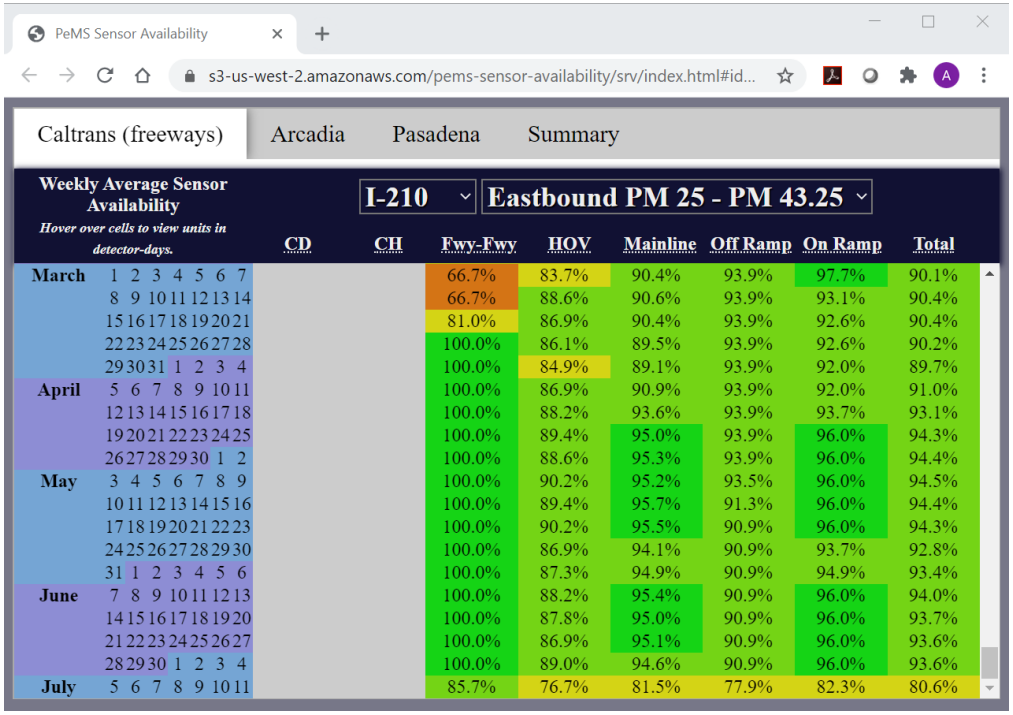
- Developing inventory of response plans with two routes, and rules for selection
- Working through details for CMS messages and trailblazer signs; all this must be coded into the rules
- Continue progress toward cloud deployment
- Exercising the model with incidents up and down the corridor to confirm scoring procedures for best initial response plans

# Data Quality

# I-210 – Freeway Data Quality



- **Excellent overall data availability on core I-210 and I-605**
- **SR-134 is under construction through June**



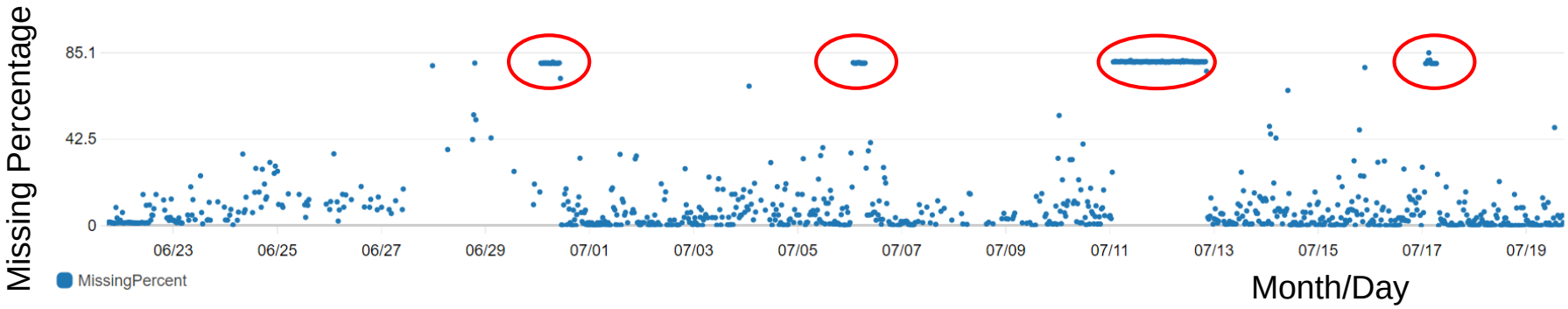

| | | CD | CH | Fwy-Fwy | HOV | Mainline | Off Ramp | On Ramp | Total |
|---|---|---|---|---|---|---|---|---|---|
| March | 1 2 3 4 5 6 7 | | | 66.7% | 83.7% | 90.4% | 93.9% | 97.7% | 90.1% |
| | 8 9 10 11 12 13 14 | | | 66.7% | 88.6% | 90.6% | 93.9% | 93.1% | 90.4% |
| | 15 16 17 18 19 20 21 | | | 81.0% | 86.9% | 90.4% | 93.9% | 92.6% | 90.4% |
| | 22 23 24 25 26 27 28 | | | 100.0% | 86.1% | 89.5% | 93.9% | 92.6% | 90.2% |
| | 29 30 31 1 2 3 4 | | | 100.0% | 84.9% | 89.1% | 93.9% | 92.0% | 89.7% |
| April | 5 6 7 8 9 10 11 | | | 100.0% | 86.9% | 90.9% | 93.9% | 92.0% | 91.0% |
| | 12 13 14 15 16 17 18 | | | 100.0% | 88.2% | 93.6% | 93.9% | 93.7% | 93.1% |
| | 19 20 21 22 23 24 25 | | | 100.0% | 89.4% | 95.0% | 93.9% | 96.0% | 94.3% |
| | 26 27 28 29 30 1 2 | | | 100.0% | 88.6% | 95.3% | 93.9% | 96.0% | 94.4% |
| May | 3 4 5 6 7 8 9 | | | 100.0% | 90.2% | 95.2% | 93.5% | 96.0% | 94.5% |
| | 10 11 12 13 14 15 16 | | | 100.0% | 89.4% | 95.7% | 91.3% | 96.0% | 94.4% |
| | 17 18 19 20 21 22 23 | | | 100.0% | 90.2% | 95.5% | 90.9% | 96.0% | 94.3% |
| | 24 25 26 27 28 29 30 | | | 100.0% | 86.9% | 94.1% | 90.9% | 93.7% | 92.8% |
| | 31 1 2 3 4 5 6 | | | 100.0% | 87.3% | 94.9% | 90.9% | 94.9% | 93.4% |
| June | 7 8 9 10 11 12 13 | | | 100.0% | 88.2% | 95.4% | 90.9% | 96.0% | 94.0% |
| | 14 15 16 17 18 19 20 | | | 100.0% | 87.8% | 95.0% | 90.9% | 96.0% | 93.7% |
| | 21 22 23 24 25 26 27 | | | 100.0% | 86.9% | 95.1% | 90.9% | 96.0% | 93.6% |
| | 28 29 30 1 2 3 4 | | | 100.0% | 89.0% | 94.6% | 90.9% | 96.0% | 93.6% |
| July | 5 6 7 8 9 10 11 | | | 85.7% | 76.7% | 81.5% | 77.9% | 82.3% | 80.6% |

Four months of good data

… until July

# Real-time I-210 Freeway Data Quality (New)






- **Recent outages more common, about once/week**
  - Lasting several hours or days
  - Less dispersed in time than in previous months
- **Data outages during the pilot will**
  - Reduce situational awareness
  - Reduce ability to make good decisions
  - Reduce ability to measure benefits

# Arcadia Data Quality



- **Updated Detector Inventory**
  - 676 detectors at 52 intersections
  - 354 of them (at 19 intersections) are on detour routes
- **Detector Health**
  - Overall detector health rate (on detour routes) in 90% range

# LACO, Monrovia and Duarte



- **Updated Detector Inventory**
  - Updated inventory: 115 detectors at 21 intersections
    - 54 from LACO, 39 from Monrovia, and 22 from Duarte
  - 107 of them (at 18 intersections) are connected to KITS and on detour routes
- **Detector health**
  - LACO Detector health at about 94%
  - Duarte Challenge with data delays has been fixed
  - Monrovia **Radio not operational at Huntington@Shamrock since March**

# Caltrans



- **ATMS TMDD Messages**
  - Stable. No update.
- **TSMSS detector data**
  - Detector inventory: 58 detectors at 13 intersections on detour routes
  - Detector health improved!
    - All detectors now reporting good data during daytime hours
    - **However, zero data is sent when intersection is in free mode**
  - Further improvements planned
    - October 2020 target
    - Requires system updates

# Stakeholder Progress

# Response Plans – Stakeholder Progress



- **Pasadena (80 CC Intersections)**
  - All intersections are programmed with Connected Corridors flush plans
- **LA County (6 CC Intersections)**
  - All 6 timing sheets completed and ready for implementation
- **Monrovia and Duarte (17 CC Intersections)**
  - 3 revised signal plans completed along Huntington

# Response Plans – Stakeholder Progress

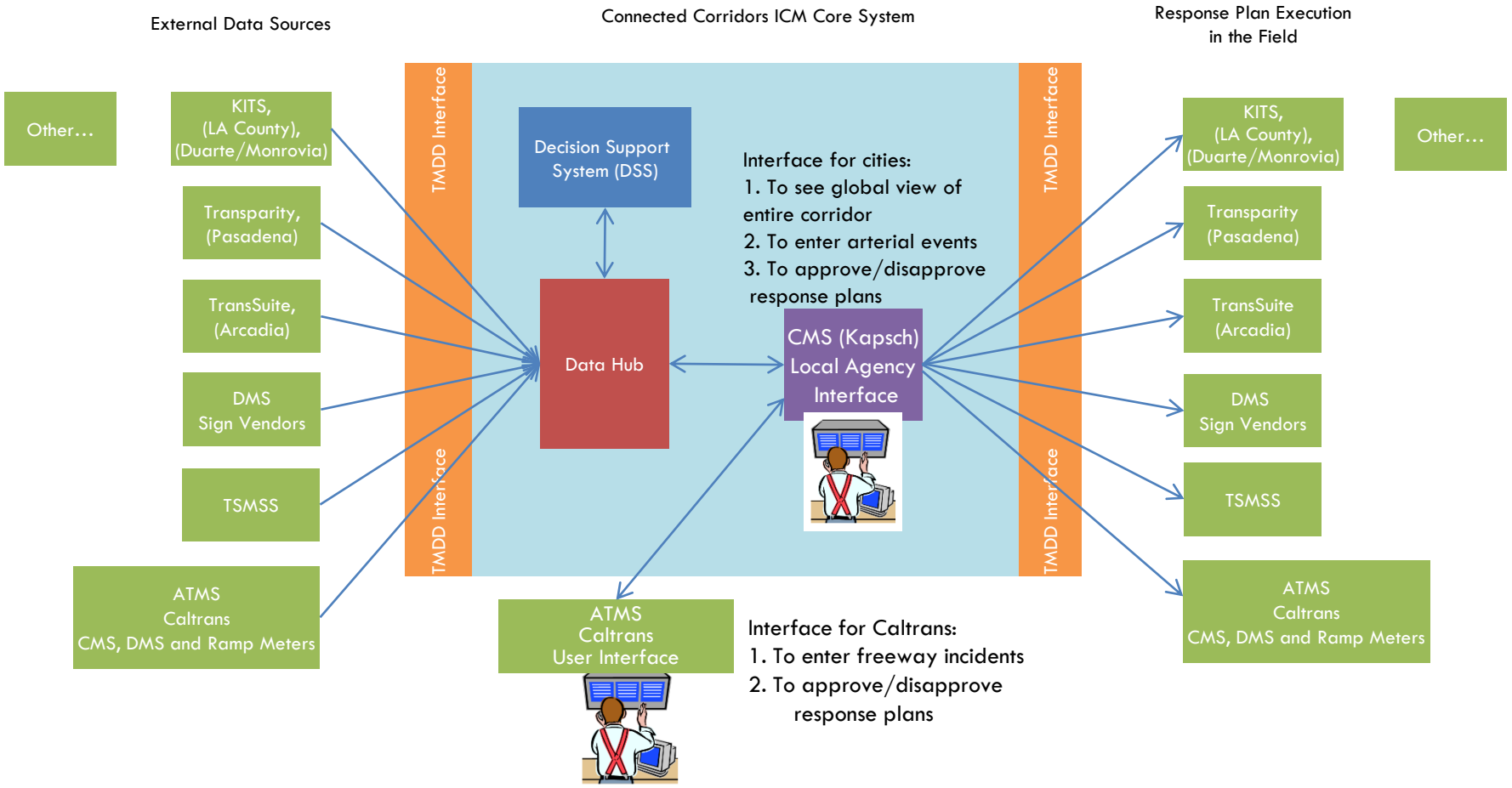


- **Arcadia (19 CC Intersections)**
  - 17 intersections are programmed with Connected Corridors flush plans on Huntington, Foothill, and Santa Anita
  - Two new 2070 controllers installed on Colorado
  - Timing database files received by PATH
- **Caltrans TSMSS (13 CC Intersections)**
  - All signal plans loaded onto controllers
  - Held several meetings to coordinate next steps for bench testing and testing of system communications

# Kapsch Update and Demo

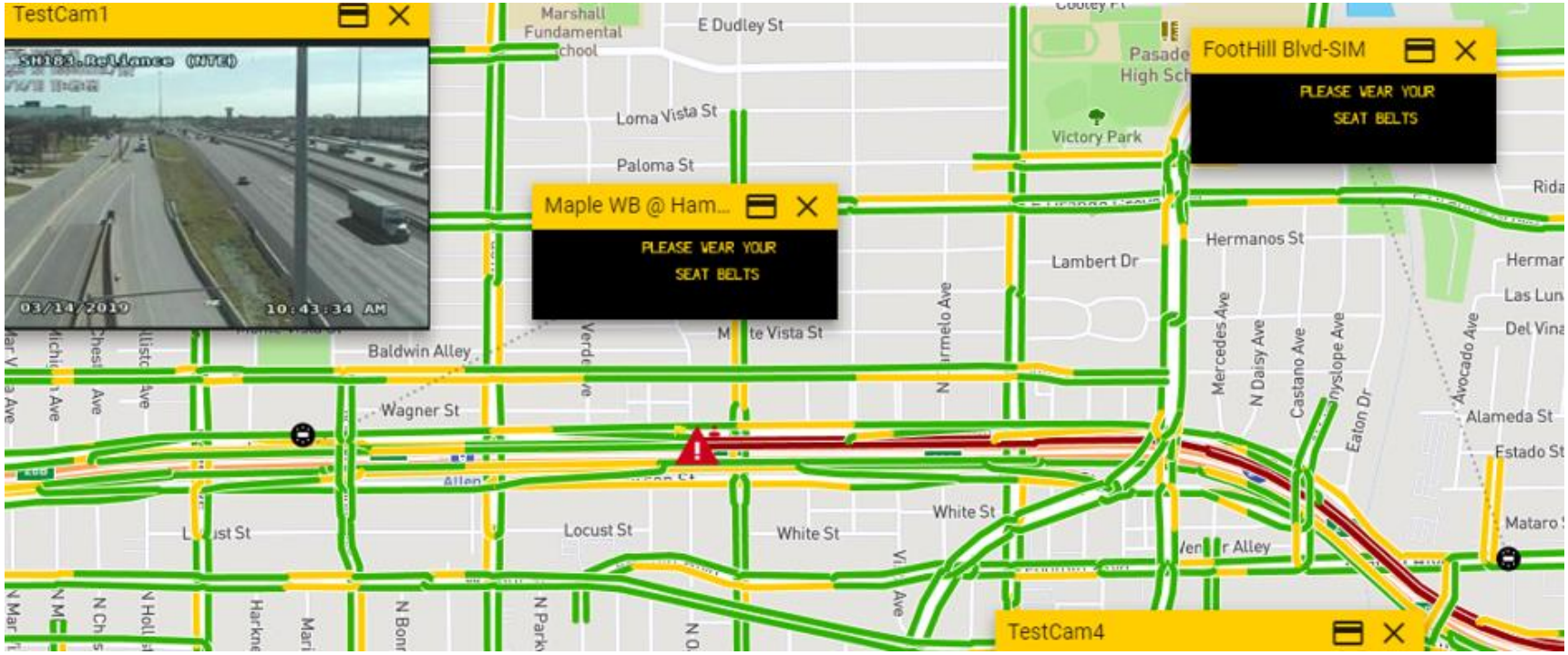
# CC ICM System Overview





# I-210 Integrated Corridor Management
# Kapsch Update





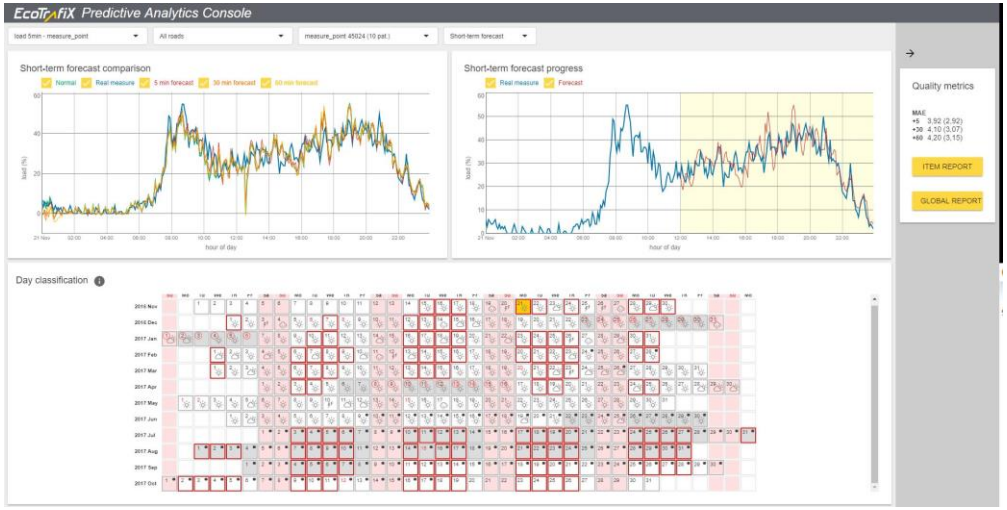

Tim O'Leary
July 21, 2020

# EcoTrafiX Product Status



- EcoTrafiX V3.2 was released in June 2020
- Available for deployment on future projects

- Key Features:
  - Improve roadway link incident creation
  - Waze integration
  - Regional Map device filters
  - Regional Map transparent layers



# EcoTrafiX Interface Status



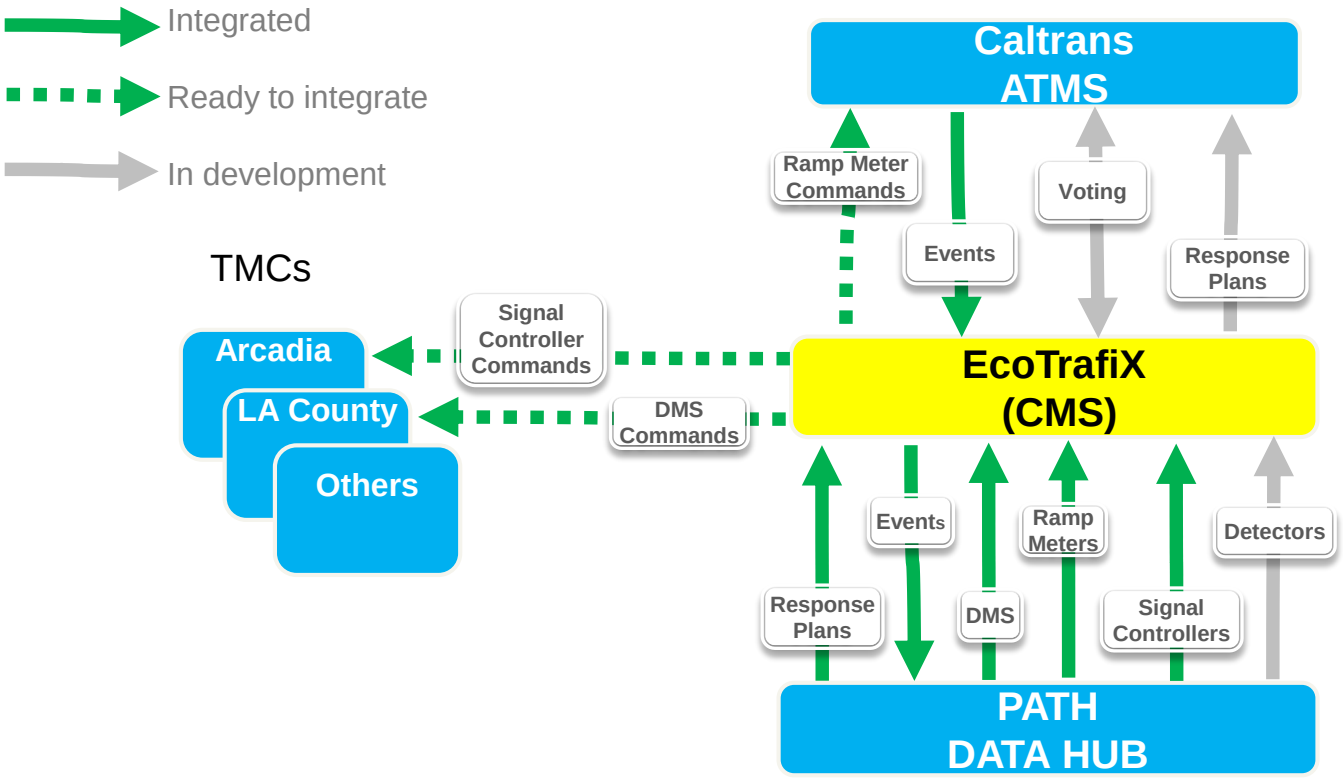
**Good progress:**

- EcoTrafiX continuing to integrate the reception of Response Plans from DSS
- EcoTrafiX receiving events from ATMS
- EcoTrafiX forwarding ATMS and ETX events to PATH's Data Hub
- EcoTrafiX deployed and running in production

# EcoTrafiX Interface Status



## Interface



# EcoTrafiX Status



## Next Steps

- Request TMCs execute device commands

# Thank You!



**Kapsch TrafficCom**

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# SMG Before-After Evaluation

# SMG Before-After Evaluation



## Purpose

- Assess the benefits of the ICM
- Learn about how the ICM impacts performance for different aspects
- Understand what works well and what not so well
- Help future ICM corridors and how ICM is designed

# What are touted ICM benefits (FHWA)



**FHWA**

- High benefit to cost ratio
- Reduce travel delays (VHT), fuel consumption, emissions, and incidents
- Improve travel time reliability and predictability
- Improves partnerships and collaboration

**I-80 ICM Study**

| Comparison Area | Performance Meaure | Impact of Smart Corridor |
|---|---|---|
| A. Demand Profile | *1. Freeway VMT* | ↓ |
| | *2. Selected Ramp Volumes* | ● |
| | *3. Selected San Pablo Avenue Volumes* | ● |
| B. Safety Comparisons | *Total Collisions* | ↑ |
| C. Mobility | *Travel Times and Speeds* | ↑ |
| D. Reliability | *Variability of Travel Time* | ↓ |

# ConOps - what is the problem to solve



- **Many major incidents on the I-210**
  - When incidents occur, significant **non-recurrent congestion**
  - When major incidents occur, **substantial diversions**
- **These diversions are not currently managed, causing chaos and congestion and gridlocks**
- **System is not efficient or effective across jurisdictions or different systems**

*To understand how the ICM is beneficial or successful, we must start with what the problem the ICM is intended to solve.*

# Hypotheses (all inter-related)



- ICM will improve **corridor-wide mobility, safety, and reliability**
- ICM will improve **mobility and productivity around an ICM response incident** (response facilities)
- ICM will improve **coordination and efficiencies across jurisdictions** and different control systems, improving circulation and reducing gridlocks
- ICM will have **effective response strategies** (signal timing, DMS, traveler information) in mobility and productivity
- ICM will improve **coordination and collaboration** among stakeholders

*To focus the evaluation, we need to understand the ICM benefit hypotheses specific to the I-210 corridor.*

# Before-After Evaluation: six focused areas



1. **Corridor-wide Performance**
   - How well does the ICM impact corridor
2. **Zone Performance**
   - Which zone(s) are the most critical, most effective, least impactful
3. **Incident Specific Performance**
   - How well does ICM manage incident traffic
4. **Incident Response Plan Strategies Performance**
   - How well did ICM do what it said it would do
5. **ICM System Operations Performance**
   - How effective was ICM process and strategy implementation
6. **Partnership Performance**

# Before-After Evaluation



## Corridor-wide Performance

*This performance evaluation is the commonly conducted Before/After assessment focusing on the corridor benefits.*

# Corridor-wide Performance (H1)



- **Performance Measures and Data Source:**

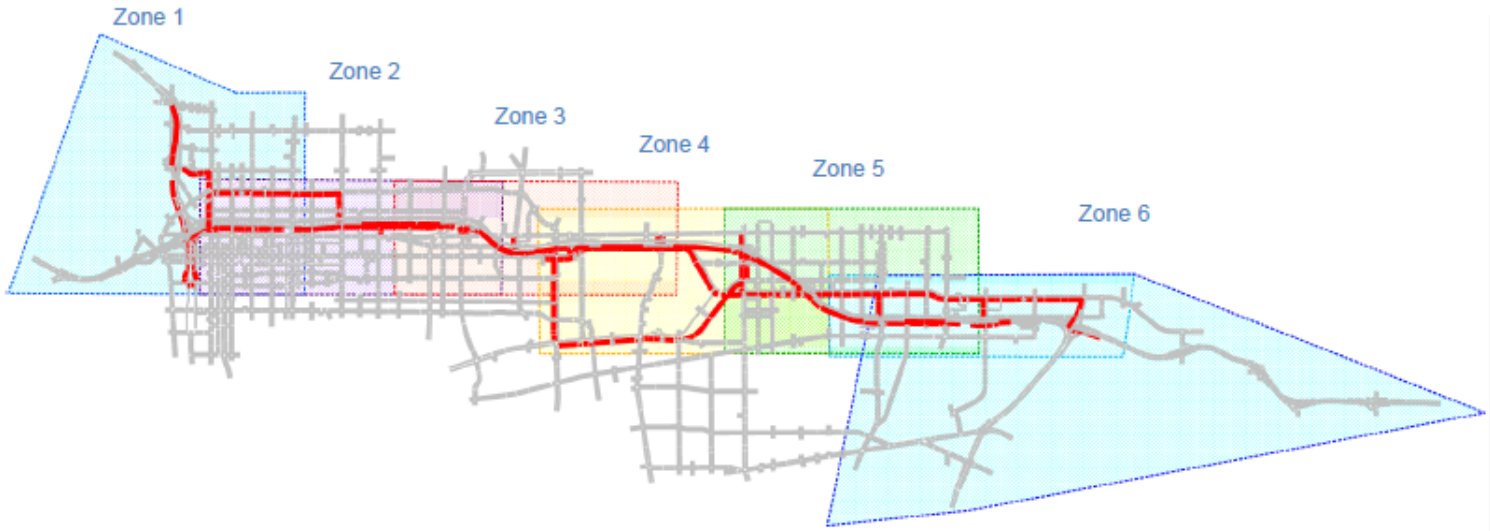
| Performance Measures | Data Sample | Time Slice | Source | Alternate |
|---|---|---|---|---|
| Freeway Travel Times and Speeds | 3 months | am, pm, midday, eve, night hour | PeMS | INRIX/ClearGuide |
| Freeway Congestion Delay | 3 months | daily weekday, Saturday, Sunday | PeMS | |
| Freeway Reliability - TT Variability | 3 months | am, pm, midday, eve, night hour | PeMS | INRIX/ClearGuide |
| Freeway Safety - Collisions | 3 months | total, type | TASAS | SWTRS |
| Freeway VMT (if needed) | 3 months | daily weekday, Saturday, Sunday | PeMS | |
| Arterials TT & Speeds | 3 months | am, pm, midday, eve, night hour | 210 CC | INRIX/ClearGuide |
| Arterials Congestion Delay | 3 months | daily weekday, Saturday, Sunday | 210 CC | |
| Arterials Reliability - TT Variability | 3 months | am, pm, midday, eve, night hour | 210 CC | INRIX/ClearGuide |
| Arterials Safety | 3 months | total, type | SWTRS | Local agency |
| Overall Network Mobility - VMT vs VHT | 3 months | daily weekday, Saturday, Sunday | PeMS/210 CC | |

# Before-After Evaluation



## Zone Performance

*Since the ICM system for the I-210 will prepare response plans by six zones (with model estimated performance), we should also assess before and after in zone performance. This will help to determine which zones are most effective and least effective.*



# Zone Performance (H2)



- **Performance Measures and Data Source:**

| Performance Measures | Data Sample | Time Slice | Data Source | Alternate Source |
|---|---|---|---|---|
| **Freeway Travel Times and Speeds** | 3 months | am, pm, midday, evening, night hours | PeMS | INRIX ClearGuide |
| **Freeway Congestion Delay** | 3 months | daily weekday, Saturday, Sunday | PeMS | |
| **Freeway Throughput Volumes** | 3 months | am, pm, midday, evening, night hours | PeMS | |
| **Arterials Travel Times and Speeds** | 3 months | am, pm, midday, evening, night hours | 210 CC | INRIX ClearGuide |
| **Arterials Congestion Delay** | 3 months | daily weekday, Saturday, Sunday | 210 CC | |
| **Arterials Throughput Volumes** | 3 months | am, pm, midday, evening, night hours | 210 CC | |
| **Freeway Travel Times and Speeds** | 3 months | am, pm, midday, evening, night hours | PeMS | INRIX ClearGuide |
| **Freeway Congestion Delay** | 3 months | daily weekday, Saturday, Sunday | PeMS | |
| **Freeway Throughput Volumes** | 3 months | am, pm, midday, evening, night hours | PeMS | |
| **Arterials Travel Times and Speeds** | 3 months | am, pm, midday, evening, night hours | 210 CC | INRIX ClearGuide |

*Zone performance can help to understand the benefits of a localized area. Performance can be diluted or diminished when only viewing corridor-wide.*

*For example, Arcadia could gets ICM benefits grade A while Duarte gets only grade C. Corridor-wide, it could get diluted to grade B.*

# Before-After Evaluation



## Incident Specific Performance

To truly understand the dynamics of an ICM benefit (or adverse) impacts, we need to evaluate at the incident specific level. We need to understand how circulation is improved, and how traffic responds to ICM response plans.

To date, this level of evaluation has not been done, large due to the lack of data needed for analysis.

# Incident Specific Performance (H3, H4)

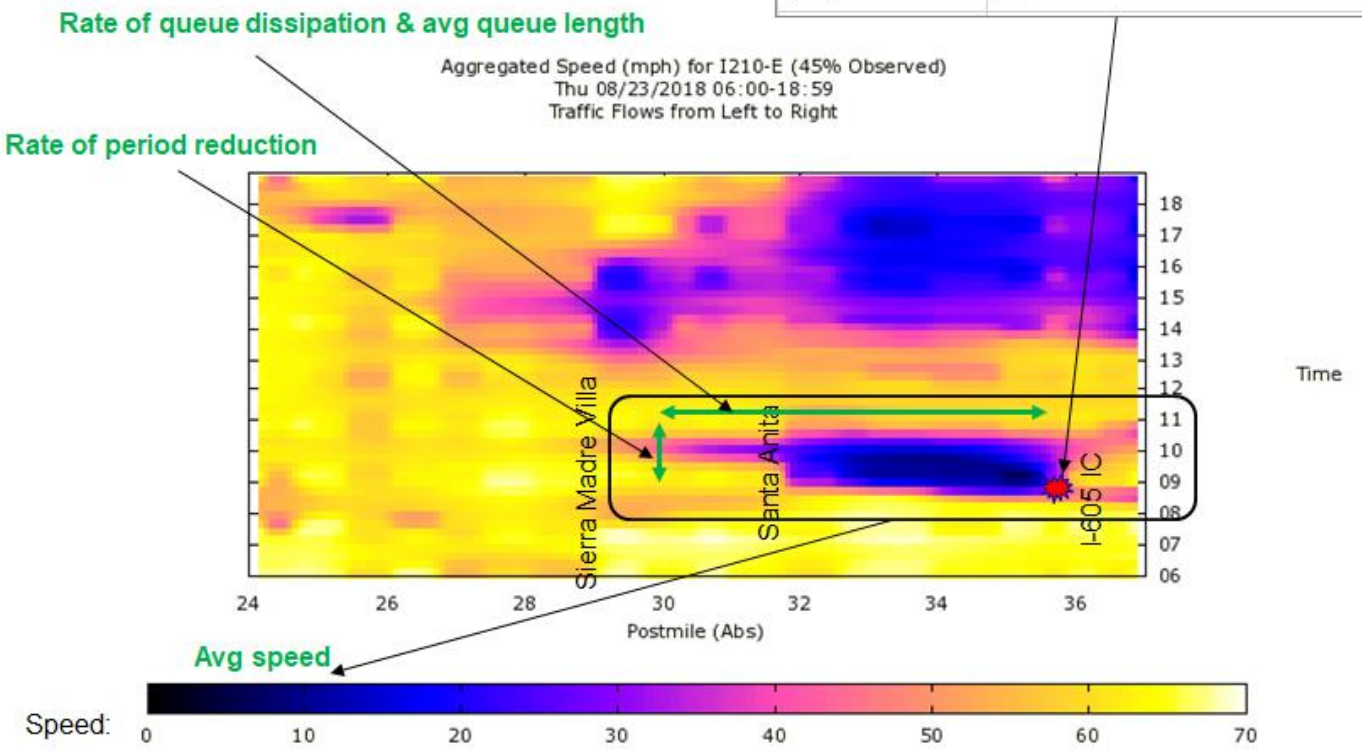


- Rate of incident congestion queue dissipation
- Rate of Incident congestion period reduction
- Average length of incident congestion queues
- Demand shift activity - upstream off-ramp(s) increased flow rates
- Demand shift activity - Downstream on-ramp(s) increased flow rates
- Improved circulation of response routes (I/S flows and LOS, and travel times)
- Signal coordination and progression – arrivals on green (and across jurisdiction)
- DMS response flows

# Incident Specific Performance (H3, H4)



| Date | Description |
|---|---|
| 8/23/2018 8:35 | [2] #1LN , STALLED WHI PU |
| 8/23/2018 8:36 | [1] 4 VEH TC - BLOCKING #1 and #2 LNS |



# Incident Specific Performance (H3, H4)



- **Performance Measures and Data Source:**

| Performance Measures | Data Sample | Time Slice | Source | Alternate |
|---|---|---|---|---|
| Freeway Congestion Dissipation Rate | 3 months | selected sample incident period | PeMS | INRIX/ClearGuide |
| Freeway Congestion Period Reduction Rate | 3 months | selected sample incident period | PeMS | INRIX/ClearGuide |
| Freeway Congestion Queue Length Avg | 3 months | selected sample incident period | PeMS | INRIX/ClearGuide |
| Demand Shift - Upstream Off-ramps Flows | 3 months | selected sample incident period | PeMS | 210 CC |
| Demand Shift - Downstream On-ramps Flows | 3 months | selected sample incident period | PeMS | 210 CC |
| Local Circulation - I/S Flows, LOS, & TT | 3 months | selected sample incident period | 210 CC | INRIX/ClearGuide |
| DMS Response Flows | 3 months | selected sample incident period | 210 CC | |
| Signal Coordination and Progression - AOG | 3 months | selected sample incident period | 210 CC | |

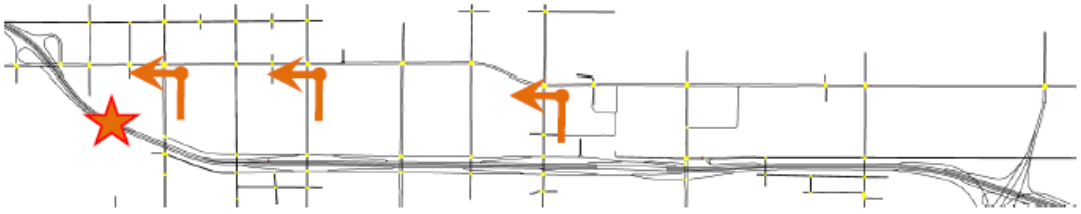
# Before-After Evaluation



## ICM Response Plan Strategies Performance

*This performance evaluation can be strictly for internal information only. It is to learn how well the different response plans were strategized. Did the traffic respond to the response plans as expected? Did the ICM pick the right response plan for the given conditions? Did the response plans do enough to make an impact?*

*The ICM is only as good as its strategies and response plans. Are they any good?*



# ICM Response Plan Strategies Performance (H4)



| Car Route Strategies | |
|---|---|
| Column | Definition |
| Route Name | Name of route in system |
| Signal Strategy A | Policy name from the Aimsun object |
| Signal Strategy B | Policy name from the Aimsun object |
| Ramp Meter Strategy A | Ramp meter overrides |
| Ramp Meter Strategy B | Ramp meter overrides |
| Wayfinding Strategy | Signage |

| Signal Strategies | |
|---|---|
| Column | Definition |
| Signal Strategy Name | Policy name from the Aimsun object |
| Signal Controller ID | Unique intersection identifier |
| Timing Plan | Human readable plan name including the favored movement |

| Signal Plans | |
|---|---|
| Column | Definition |
| Signal Controller ID | Unique intersection identifier |
| Plan ID | Human readable plan name including the favored movement |
| Target Plan ID | Coordination plan/pattern to be invoked in field element |

# ICM Response Plan Strategies Performance (H4)



- **Performance Measures and Data Source:**

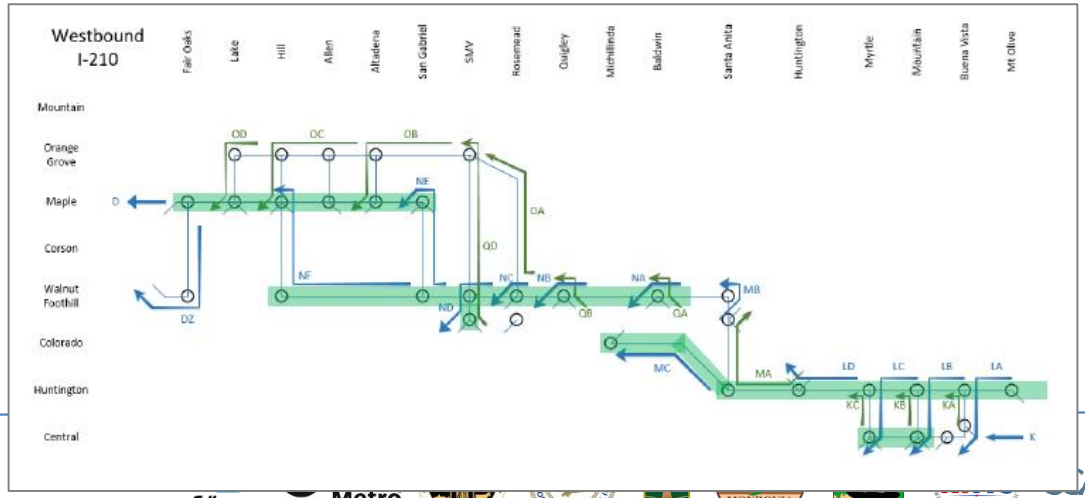
| Performance Measures | Data Sample | Time Slice | Source | Alternate |
|---|---|---|---|---|
| RP Strategies Route TT and Speeds | 3 months | model estimated, actual | 210 CC | INRIX/ClearGuide |
| RP Strategies Route Throughput Volumes | 3 months | model estimated, actual | 210 CC | |
| RP Strategies Route VMT and VHT | 3 months | model estimated, actual | 210 CC | INRIX/ClearGuide |
| RP Strategies Route DMS Response Flows | 3 months | model estimated, actual | 210 CC | |
| RP Strategies Traveler Information Messaging | 3 months | system uploads, hits | 210 CC | |

# Before-After Evaluation



## ICM System Operations Performance

This performance evaluation is to assess how well the ICM performed its functions. Did the ICM initiate the right sequence of actions? How well did the ICM system deploy control changes (fast enough, correctly, etc.)? Is the ICM system any good (is it a Ferrari or your grandfather's Oldsmobile that clunked its way to destination?)



# ICM Process Performance (H4)



- **Performance Measures and Data Source:**

| Performance Measures | Data Sample | Time Slice | Source | Alternate |
|---|---|---|---|---|
| ICM RP Initiated and Actual implemented | 3 months | initiated, actual implemented | 210 CC | INRIX/ClearGuide |
| ICM RP Traveler Information | 3 months | system uploads, actual implemented | 210 CC | |

# Before-After Evaluation



## Partnership Performance

This performance evaluation should be on-going, long after the Before-After evaluation. It has been highly touted for the “human ICM” aspect. Did this ICM operations translate into expected improved corridor operations collaboration among partners?

# Partnership Performance (H5)



- **Joint sessions attendance and participation**
- **Information sharing**
- **Trend analysis**
  - Demand versus delay growth rates
  - Collisions growth rates
  - Reliability rates
  - Throughput or speeds along residential streets during incidents
  - Other…
- **Performance Measures and Data Source:**

| Performance Measures | Data Sample | Time Slice | Source | Alternate |
|---|---|---|---|---|
| Joint Session Attendance & Participation | 3 months/On-going | attendance, agency reports shared | meeting minutes | |
| Trend Analysis | TBD | TBD | TBD | |

# I-210 Connected Corridors Face-to-Face Meeting: PARSONS UPDATE

Online Meeting
Tuesday, July 21, 2020
1:30 – 3:30 pm

# Agenda



- I-210 CC Arterial Systems Improvement Project System Consulting Services - Overview
- Status of 9 procurement packages
- Next Steps

# I-210 CONNECTED CORRIDORS ARTERIAL SYSTEMS IMPROVEMENT PROJECT SYSTEM CONSULTING SERVICES

## STATUS OVERVIEW

Jul 21, 2020

# Project Objective



- Assist Caltrans D7 to manage the execution of the 9 arterial ITS improvement projects

| # | Package Description | Contract # | Contract Status | Target |
|---|---|---|---|---|
| 1 | Bluetooth – Iteris Velocity | 07A4470 | Completed, Contract Closed | 5/31/2019 |
| 2 | Bluetooth – BlueToad | 07A4477 | Final System Testing Phase | 7/31/2020 |
| 3 | New Controller Cabinets | 07A4761 | Material Procurement | Q3-4,2020 |
| 4 | Communication Upgrades | 07A4479 | Completed, Contract Closed | 6/30/2020 |
| 5 | Firmware/Timing Plan Updates/Controller Upgrades | 07A4480 | Material Procurement | Q3-4,2020 |
| 6 | Video Detection System | 07A4481 | Completed, Contract Closed | 6/30/2020 |
| 7 | Data Communication Module and Video Detection Software Upgrade | 07A4755 | Material Inspection | Q3-4,2020 |
| 8-1 | DMS Procurement | 07A4792-3 | in Progress | Jul 2020 |
| 8-2 | DMS Integration | 07A4794 | Development Phase | Feb 2021 |
| 8-3 | DMS & Static Sign Installation | N/A | To be handled by stakeholders | Q3-4,2020 |
| 9 | Environmental Stations with Air Quality Sensors and Open Data Systems | 07A4388 | Development Phase | Q4,2020 |

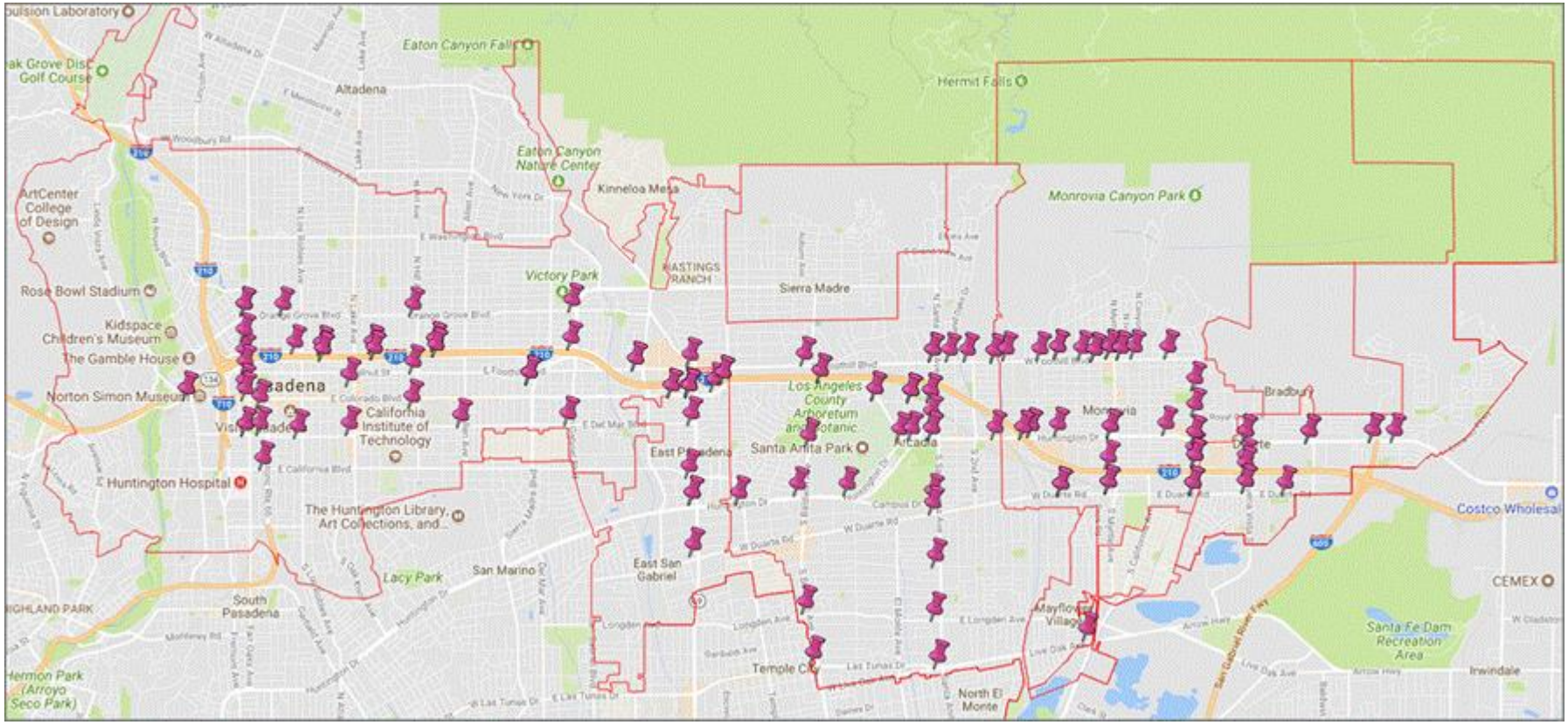
# Project Area



| # | Package Description | Contract # | Metro & Caltrans | City of Pasadena | City of Arcadia | City of Monrovia | City of Duarte | LA County | Foothill Transit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Bluetooth – Iteris Velocity | 07A4470 | √ | | √ | | | | |
| 2 | Bluetooth – BlueToad | 07A4477 | √ | √ | | √ | √ | √ | |
| 3 | New Controller Cabinets | 07A4761 | √ | √ | √ | | | | |
| 4 | Communication Upgrades | 07A4479 | √ | | √ | √ | √ | √ | |
| 5 | Firmware/Timing Plan Updates/Controller Upgrades | 07A4480 | √ | √ | √ | √ | | √ | |
| 6 | Video Detection System | 07A4481 | √ | √ | √ | √ | √ | √ | |
| 7 | Data Communication Module and Video Detection Software Upgrade | 07A4755 | √ | √ | √ | √ | √ | √ | |
| 8-1 | DMS Procurement | 07A4792-3 | √ | √ | | | | √ | |
| 8-2 | DMS Integration | 07A4794 | √ | √ | | | | √ | |
| 8-3 | 21 DMS Installation | Stakeholders | √ | √ | | | | √ | |
| | 11 Static Sign Installation | Stakeholders | √ | √ | √ | | √ | √ | |
| 9 | Environmental Stations with Air Quality Sensors and Open Data Systems (ODS) | 07A4388 | √ | √ | | | | | √ |

# Project Area (cont.)





# UPDATE ON

# PACKAGES 1-9

Jul 21, 2020

# Package Status – Pkg # 1



| Pkg. # | Pkg. | Contract # | Project Status |
|---|---|---|---|
| 1 | Bluetooth – Iteris Velocity | 07A4470 PTM | • NTP: 7/10/2018<br>• Kick-off Meeting: 7/30/2018<br>• Submittal Approved: 8/16/2018<br>• Installation & Testing Completed on 5/29 & 5/30/2019<br>• Accepted by Arcadia, Documents Submitted<br>• Completed |

# Package Status – Pkg # 2

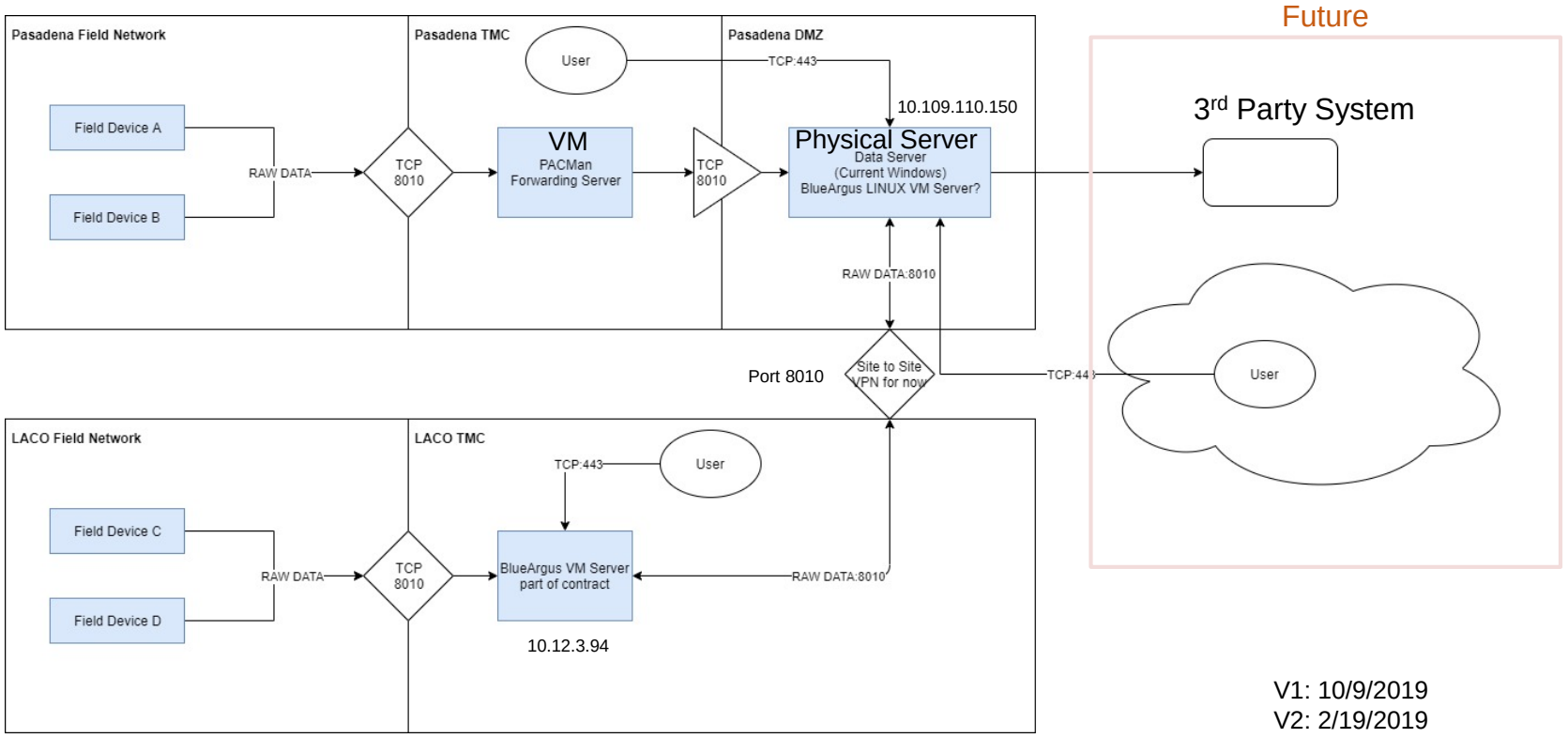


| Pkg. # | Pkg. | Contract # | Project Status |
|---|---|---|---|
| 2 | Bluetooth – BlueToad | 07A4477 DBX | • NTP: 7/10/2018<br>• Kick-off Meeting: 7/30/2018<br>• Submittal Approved: 10/12/2018<br>• Field Installation & Testing: Completed (May 2020)<br>  • LACo, Monrovia, Duarte:10 locations<br>  • Caltrans: 1 location without existing comms. Equipment delivered to LA County<br>  • Pasadena: 11 locations completed<br>• TMC Server Installation & Configuration: Completed (May 2020)<br>  • LACo TMC: completed<br>  • Pasadena TMC: completed<br>  • VPN connection between two TMCs: completed<br>• System Acceptance Testing & Training:<br>  • Pasadena: Troubleshooting communication issues at 2 locations<br>  • LA County, Monrovia, Duarte: received VPN, will conduct remotely<br>• Expected to be completed: 7/31/2020 (95%) |

# Package Status – Pkg # 2



- **P2 - BlueToad Travel Time System – Comm. Architecture**




V1: 10/9/2019
V2: 2/19/2019
V3: 6/11/2020

# Package Status – Pkg # 3



| Pkg. # | Package Name | Contract # | Project Status |
|---|---|---|---|
| 3 | New Controller Cabinets | 07A4761 Crosstown | • **Advertised: 9/26/19**<br>• Awarded: 2/11/2020<br>• NTP: 2/19/2020<br>• Kick-off Meeting: 2/25/2020<br>• Material Submittal Review<br>  • Arcadia (1 locations): Approved<br>  • Pasadena (7 locations): reviewing revised submittal (UPS, wall charging adaptor, signal monitor)<br>• Installation :<br>  • Arcadia: completed & tested<br>  • Used city-furnished controller, new equipment to be delivered to City<br>  • Pasadena: Layout plans are needed for 3 locations; Relocation plans are needed for 4 location on bridge<br>  • City and contractor conducted site investigation on 6/24/20<br>  • Contractor is preparing the plans and cost estimate<br>• Expected to be completed: Q3-Q4, 2020 |

# Package Status – Pkg # 4



| Pkg. # | Package Name | Contract # | Project Status |
|---|---|---|---|
| 4 | Communication Upgrades | 07A4479 Kanaan Construction | • NTP: 7/13/2018<br>• Kick-off Meeting: 7/30/2018<br>• Submittal & RFI Approved: 5/6/2019<br>• Equipment procured<br>• Installation of 35 locations: completed<br>• Testing & Acceptance: completed (1/13/2020 & 4/14/2020)<br>• Contract Closed: 6/30/2020 |

# Package Status – Pkg # 5



| Pkg. # | Package Name | Contract # | Project Status |
|---|---|---|---|
| 5 | Firmware/Timing Plan Updates/Controller Upgrades | 07A4480 CPE, Inc | • NTP: 7/17/2018<br>• Kick-off Meeting: 7/30/2018<br>• Changed hardware/firmware requirements per Stakeholder Comment; revised price estimate ($124,971) lower than original amount ($171,600) – reviewed & approved by stakeholders (Arcadia, Pasadena, LA County, Caltrans)<br>• Material<br>  • Submittals – approved<br>  • Materials Procurement - order placed, expect to deliver around 8/5/2020<br>• Installation<br>  • 3 locations in Monrovia: 3 D4 firmware licenses added to LACo license database on 7/15/2020, LACo is updating timing plan<br>  • 2 locations in Arcadia: City has installed spare controllers. New equipment to be delivered to City<br>  • Other locations: Aug – Oct 2020<br>• Expected to be completed: Q4, 2020 |

# Package Status – Pkg # 6



| Pkg. # | Package Name | Contract # | Project Status |
|---|---|---|---|
| 6 | Video Detection System | 07A4481 Traffic Loops Crackfilling, Inc | • NTP: 7/10/18<br>• Kick-off Meeting: 7/30/18<br>• 10/9/18: Conducted Site Survey<br>• 10/18/18: Submittal approved<br>• Installation: all 22 locations completed (Mar 2020)<br>• Installation (22 locations):<br>  • 22 locations: all completed<br>  • Installation of conduit: completed<br>• Acceptance Testing: Completed<br>• As-built & Test Reports: Completed<br>• Contract Closed: 6/30/2020 |

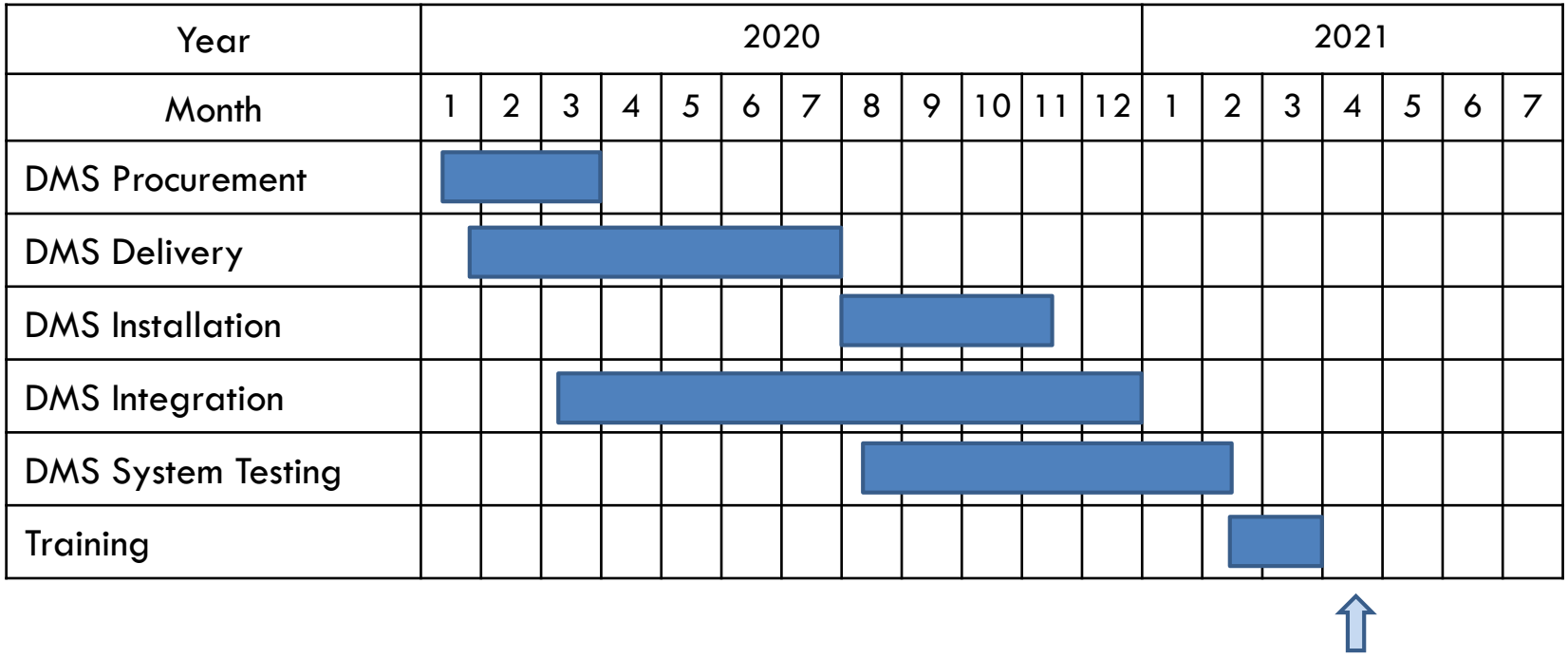
# Package Status – Pkg # 7



| Pkg. # | Package Name | Contract # | Project Status |
|---|---|---|---|
| 7 | Data Communication Module and Video Detection Software Upgrade | 07A4755 Crosstown | • Advertised: 1/2/2020<br>• Awarded: 2/11/2020<br>• NTP: 2/19/2020<br>• Kick-off Meeting: 2/25/2020<br>• Materials<br>  • LA County (4): approved<br>  • Duarte (1): approved<br>  • Monrovia (3): approved<br>  • Arcadia (14): approved<br>  • Pasadena (change from 8 to 6): approved<br>• Procurement: Completed<br>  • Materials Delivered: 7/10/2020<br>  • Material Inspection: in-progress<br>• Installation:<br>  • July – Oct 2020<br>• Expected to be completed: Q4 2020 |

# Package Status – Pkg # 8-1, 8-2, 8-3






April 2021, Hard Launch of I-210 CC System (Est.)

# Package Status – Pkg # 8-1



| Pkg. # | Package Name | Contract # | Project Status |
|---|---|---|---|
| 8-1 | Advanced Traveler Information Systems: DMS Procurement | 07A4792-3<br>Elan Moyal | • Advertised: 10/25/19<br>• Awarded: 12/2/ 2019<br>• Kickoff meeting: 12/19/2019<br>• Material Submittals & procurement: in progress<br>• Expected to be completed: July 2020 |

# Package Status – Pkg # 8-1



| Item | Total | Caltrans | LACO | Pasadena | Ordered | Delivery |
|---|---|---|---|---|---|---|
| DMS & Mounting Hardware | 21 | 2 | 2 | 17 | 3/27/20 | Late July 2020 (impacted by COVID19)<br>RFI-08: minor comments sent back to contractor |
| DMS Poles & Anchor Bolts | 19 | 0 | 2 | 17 | 2/21/20 | DMS Pole Source Inspection: 5/13/2020<br>2 delivered to LACO: 6/15/2020 (confirmed)<br>17 delivered to Pasadena: 6/15/2020 (confirmed)<br>Attached 1 green tag located (Pasadena)<br>DMS Anchor Bots Source Inspection: 7/7/2020<br>19 delivered to Pasadena: 7/9/2020 (confirmed)<br>Attached 1 orange tag located (Pasadena) |
| Pull boxes | 19 | 0 | 2 | 17 | 4/30/20 | 2 delivered to LACO: 5/21/2020 (confirmed)<br>17 delivered to Pasadena: 6/1/2020 (confirmed) |
| Power & Comm Cables | 11,000 ft | TBD | TBD | TBD | 4/23/20 | 11 boxes delivered to Pasadena: 6/4/2020 (confirmed) |
| Radios | 12 | 0 | 0 | 12 | 5/5/20 | Delivered to Pasadena: 6/1/2020 (confirmed) |
| Sign Control System with API | 3 | 1 | 1 | 1 | 3/27/20 | API v1.5 completed; testing environment in place<br>Est. Delivery Date: 8/14/2020 |
| Servers | 1 | 1 | 0 | 0 | Lead time: 1 week | LACo: VM has been set up<br>Pasadena: VM will be provided, will provide spec of additional resources needed<br>Caltrans: Physical Server (revised quote received) |

# Package Status – Pkg # 8-2

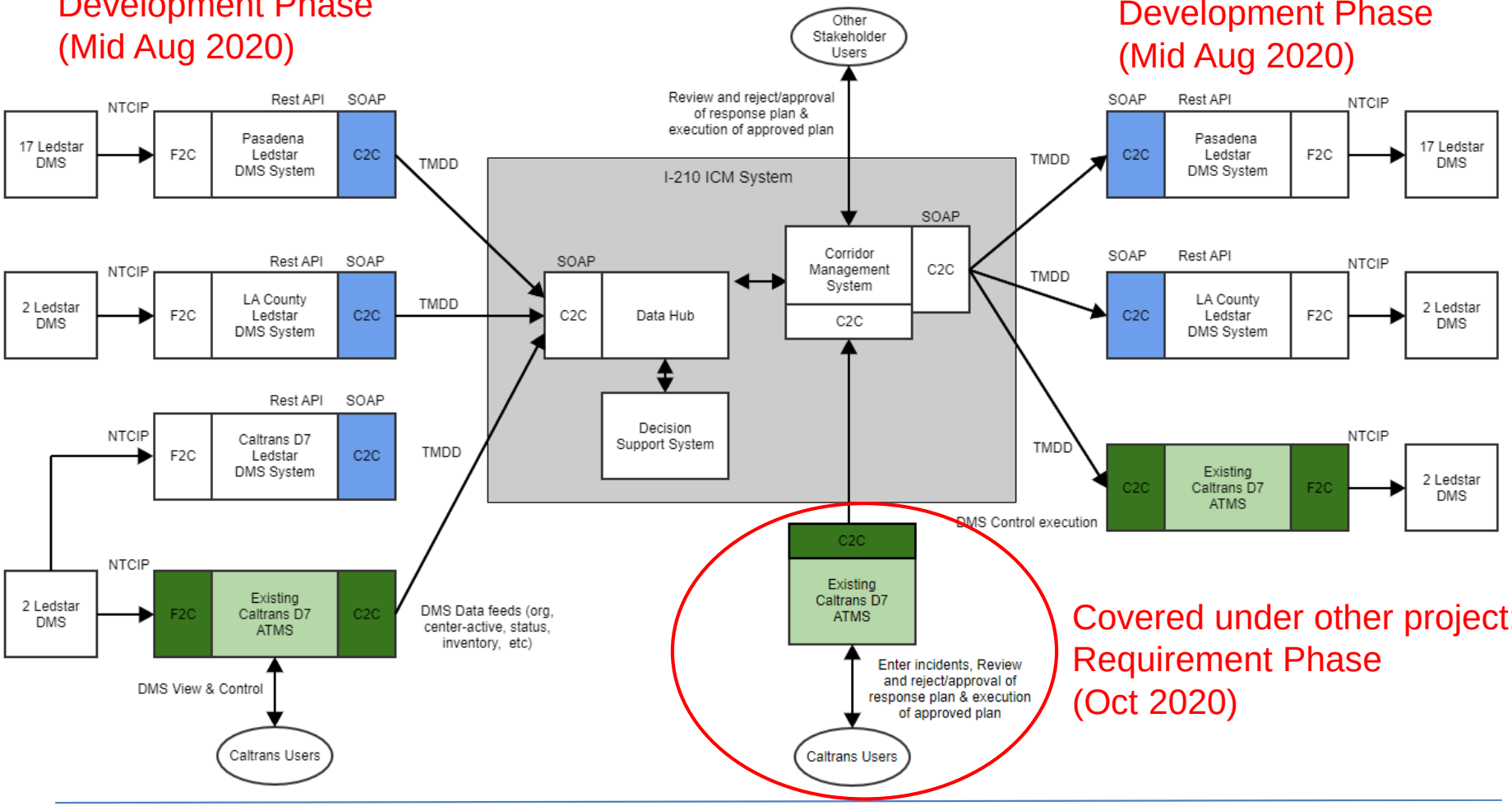


| Pkg. # | Package Name | Contract # | Project Status |
|---|---|---|---|
| 8-2 | Advanced Traveler Information Systems: DMS Integration | 07A4794 Parsons | • Advertised: 11/14/19<br>• Awarded: 1/3/ 2020<br>• Kickoff meeting: 1/14/2020<br>• Construction Support<br>  • Installation QC checklist v2 submitted<br>• DMS System Deployment<br>  • System Diagrams:<br>  • Overall, LA Co TMC, LARTMC - ready<br>  • Pasadena TMC – refining<br>  • C2C Interface Development & D7 ATMS Modification<br>  • Requirement v5 - approved<br>  • Design & Development – in progress, 8/14/20<br>• DMS System Integration<br>  • TMC installation & integration– starting middle Aug 2020<br>• DMS System Testing<br>  • C2C testing – starting Sep 2020<br>  • Field DMS & end-to-end integration – Oct-Nov 2020<br>• Expected to be completed: Q1, 2021 |

# Package Status – Pkg # 8-2



Development Phase
(Mid Aug 2020)




Development Phase
(Mid Aug 2020)

Covered under other project:
Requirement Phase
(Oct 2020)

# Package Status – Pkg # 8-2



- **Scheduling a stakeholder workshop**
  - Difference between existing D7 DMS and new DMS
  - Configuration Management Plan (CMP)
    - CM Items: Project document, Software, Hardware, Communications
    - Key Elements: System Change Request (SCR), Change Control Board (CCB)
    - Procedure
    - CCB Members and Roles
      - CM Manager
      - CM Administrator
      - Tech Lead
      - Stakeholders

# Package Status – Pkg # 8-3



| Pkg. # | Package Name | Contract # | Project Status |
|---|---|---|---|
| 8-3 | Advanced Traveler Information Systems: DMS & static sign Installation | N/A to be handled by Caltrans, LAPDW, & Pasadena | • Static Signs DMS Installation:<br>  • Installation QC Checklist distributed<br>  • Installation: handled by stakeholder<br>  • LA County: Est. Aug – Oct/Nov 2020<br>  • Pasadena: Est. Aug – Oct/Nov 2020<br>• Static Signs Installation:<br>  • Installation QC Checklist distributed<br>  • Ordered by Caltrans Maintenance Group: Jul. 2019<br>  • Arrived Caltrans Maintenance Shop: May 2020<br>  • Material Inspection: passed on 6/4/2020<br>  • Material Delivery: to be scheduled in July/Aug 2020<br>  • Installation: handled by stakeholder<br>• Expected to be completed: Q4, 2020 |

| Item | Total | Caltrans | Arcadia | Pasadena | Duarte | Monrovia | LA County |
|---|---|---|---|---|---|---|---|
| # of DMS | 21 | 2 | | 17 | | | 2 |
| DMS Locations | 21 | 2 | | 17 | | | 2 |
| # of Static Signs | 31 | 3 | 12 | 1 | 6 | 6 | 3 |
| Static Signs Locations | 11 | 3 | 4 | 1 | 1 | 1 | 1 |
| Installation | | Caltrans | Arcadia | Pasadena | Duarte | Monrovia | LA County |

# Package Status – Pkg # 9



| Pkg. # | Pkg. | Contract # | Project Status |
|---|---|---|---|
| 9 | Environmental Stations with Air Quality Sensors and Open Data Systems (ODS) | 07A4388 Cal Poly Pomona | • NTP: 6/29/18<br>• Kick-off Meeting: 7/12/18<br>• 3 Environmental stations<br>  • Field installation done – 6/7/19<br>  • Collect data and analyze data - ongoing<br>• ODS Development<br>  • Developed parser for transit data from Foothill Transit & Pasadena Transit<br>  • Developed parser for sample response plan (ICD v1.2)<br>  • Improving the program to match transit routes and diversion routes.<br>• ODS Configuration and Testing<br>  • Received Inventory of Road Network from PATH<br>  • Need Inventory of Signal ID & Ramp Meter ID<br>  • Coordinate with PATH to test automated data<br>• Expected to be completed: Q4 2020 (70%) – Q1 2021 (80%) |

# Next Steps



- General: Need all stakeholders' prompt response on RFIs & submittal reviews to keep the project on schedule.
- Package 2: Final System Acceptance Testing & Training
- Package 3: Submit layout plans & relocation plans; submit cost estimate
- Package 5: Track material delivery (July -Aug 2020), Start installation
- Package 7: Start installation
- Package 8-1: Complete procurement
- Package 8-2: Complete development, start TMC integration
- Package 8-3: Schedule static signs delivery
- Package 9: Get requested information; Coordinate testing

# Thank You and Questions?

# Thank You
# and
# Next Meeting
## (Suggest Tuesday September 1st @ Zoom)