Connected Corridors
(Virtual) Face-to-Face Meeting

Tuesday, December 8th, 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

Once in full screen and speaker view, please “hide thumbnails” by selecting the – from the options list.

Participant 1
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

1:55 – 2:10 PM – Incident Life Cycle Overview

2:10 – 2:20 PM - AMS Update

2:25 – 2:40 PM - Kapsch Status Update

2:45 – 3:00 PM – I-210 CC Environmental Station Data Preliminary Study

3:05 - 3:20 – Parsons Call for Projects Update

3:20 – 3:30 – Round Table and Closing

Next Meeting - Tuesday, February 2nd, 2021

Note: Meeting location sequence Monrovia, Duarte, LA Metro, Caltrans TMC, County, Arcadia, Pasadena
I-210 Pilot Implementation Project Progress Summary
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)** (conducted incremental releases with containers, further hardening as we go through the pilot) – May 2020
- **Estimation running in the cloud** (In the cloud with limited functionality. Not fully tested yet. Work sch. switched with Prediction.) – August <= December 2020
- **Complete ATMS Modifications** (Received Parsons updates for the Design doc. in resp. to comments. Date to be confirmed after the spec agreement.) – October 2020 -> January 2021
- **Complete McCain Transparity C2C interface** (Pasadena) (Code is ready to deploy to Prod. CT app deployed. City signals to follow; waiting for the network and SSL certs to be deployed.) – October 2020 -> January 2021
- **Prediction (Aimsun) running in the cloud** (In the cloud with limited functionality. Working on scalability, update and deployment automation and performance.) – November 2020
- **Rules Engine (Drools) running in the cloud** (Technology is running in the cloud with initial RP generation; Remains: workflow enhancements and hardening throughout the Pilot). – August <= October 2020
- **All ITS Elements Installed in Field** (See slides for Parsons DMS package #8-1,2,3 below). – Q3-Q4 2020 -> Dec-Jan 2021
Schedule – Till Launch (Page 2 of 2)

- **Integrate CT Lane Closure System** – *September 2020* -> *February 2021*
  
  *Integrate Local Lane Closure System* – *April 2021* (to confirm)
  
  (Rules engine has to know the info. May require LCS software modification.)

- **All data (except new arterial DMS signs) being received** – *November 2020* -> *January 2021* (to confirm)
  
  (i.e. all ITS elements are installed and sending data through their C2C interfaces. Per latest, P3 and P5 moved from Q4 2020 to April 2021)

- **Performance Management System Available** – *December 2020* -> (to confirm)
  
  (Data Hub is sending data out waiting for the connection.)

- **Complete C2C DMS Sign Interfaces** – *February* -> *March 2021*
  
  (See Call for Projects slides below; testing completion moved Feb->Mar 2021. Just started testing some dialogs with ATMS)

- **Version 1.0 System Production Deployment/Release** – *February* -> *2021*
  
  (Estimation, Prediction, Rules, CMS, etc. could be less than in May.)

- **System Operational Test and Validation, TMC/CT&Locals Operator Acceptance Testing** – *March-May 2021*
  
  **Before Study** – *March to May 2021*
  
  (Could be based on historic data due to Covid impact.)

- **CT and Local Agencies Operator Training** – *April to May 2021*

- **Launch Pilot** – *May 2021*

**Note:**
* Caltrans HQ IT involvement required. Both the Arterials (built for rail system) and state-wide Freeway LCSs exist and maintained by CT IT. Just recently received the info and started reviewing.
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
Planned Accomplishments for December 2020-January 2021

**Software Development**

- Expand capabilities of prediction in cloud DSS. Begin efforts to optimize prediction run times. Begin automation of model update build processes.
- Continue effort to capture state and local lane closure system data in Data Hub.
- Support networking and deployment of SSL and McCain Transparity update in Pasadena.
- Continue integration efforts for DMS signs, testing both ATMS and LedStar interfaces. Retest current freeway sign interfaces updated to add LedStar signs.
- Continue efforts with Parsons and D7 to update ATMS workflows and user interface.
- Complete command testing for Pasadena signals (McCain).

**Analysis Modeling and Simulation (AMS)**

- Complete testing of estimation components to handle more complicated intersection topologies in the CC network
- Add rules to handle queue information for response plan selection
- Integrate and test Response Plan Generator (RPG) working with queue estimation information
1-210 CC Pilot: Project Risks to Watch

1. PATH contract is being reevaluated by CT HQ.

2. The project needs to secure funding through the Pilot completion.

3. Timely completion of Kapsch CMS Integration.
   (Estimate to complete expected this week).

4. Timely completion of ATMS modifications.

5. Timely completion of DMS integration.

6. Timely completion of the Local and Freeway LCSs integration.
   (As we just recently were able to obtain the information and started reviewing it.)

7. Full readiness of the DSS.
   (Rules, estimation, prediction; including the initial RP, updates and termination.)

8. Data availability and quality.

Network and Center to Center Connectivity

- **C2C network connectivity issues**
  - Lost connectivity to TSMSS due its upgrade. Working with CT to reestablish connectivity so testing can resume.
  - Pasadena intersection signal connectivity not yet established (2 installations). Waiting for connectivity to verify installation for Caltrans signals. Verification of Pasadena signal interface to follow.
  - Test ATMS frequent down time is problematic. Often there is no notification.

- **New connectivity to be established**
  - Need test-only connectivity for DMS C2C dialog testing via LedStar interface
  - Pasadena and LACO dynamic message signs
  - Local LCS (needs a deployment target where the software will be hosted)
  - State LCS
Dev System C2C Connectivity Nov 19 – Dec 4

console.aws.amazon.com/cloudwatch/home?region=us-west-2#dashboards:name=DEV-UNHEALTHY-TARGETGROUPS;start=P14D
Production System C2C Connectivity Nov 19 – Dec 4

Dashboard showing metrics and graphs for different systems and locations, including D7ProdGreenBoxAtms-1, D7ProdGreenBoxTsmss-1, D7ProdGreenBoxLaCounty-1, D7ProdGreenBoxArcadia-1, D7ProdGreenBoxAtms-2, D7ProdGreenBoxTsmss-2, D7ProdGreenBoxLaCounty-2, and D7ProdGreenBoxArcadia-2.
C2C Connectivity Challenges

- TSMSS System has been offline in all environments since upgrade on November 10th
- Test ATMS system has been very unstable for somewhat longer
C2C Interface Implementations - Status

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

- **Pasadena**

- **Dynamic Message Signs – Pasadena, LACO, Caltrans**
  - Beginning interface testing of first dialogs with the CT ATMS. Other dialogs still in development. Awaiting networking to test Ledstar (Pasadena/LACO) C2C dialogs.

- **Caltrans**
  - Received updates of Parsons design for ATMS updates. Will review this week.

- **TSMSS**
  - Resolving connectivity to test fixes following last round of testing
Updates

- First cloud prediction capabilities developed. Working to add ability to scale beyond n=1. Have experienced a full integration of prediction, estimation, and rules within cloud DSS. Working to ensure local deployment support for AMS team simultaneously with cloud deployment.

- Completed first rules and estimation deployments to cloud. Currently working to improve rules and adding queue estimation to rules route/response plan creation.

- Fixed data pipeline bugs affecting reliability of pipelines.

- Implemented AWS security enhancements and implemented cost reduction activities for AWS expenses.

- Reviewed data from state LCS system. Developing custom interface in the Data Hub. *

- Local LCS system custom interface in development. Data received may have issues for system use. *

- Developed automated tests for incident workflow.

* Both LCS interfaces convert source LCS data to TMDD format for downstream standardized consumption
Incident Life Cycle Overview
Incident and RP Life Cycle

Phase 1
Initial Incident Response

Phase 2
Incident Response Adjustments

Phase 3
Post-Incident Response Adjustments

Phase 4
Incident Response Termination

Incident

ICM Activity
1st Incident Report

Field Actions
1st Response Plan Implemented

1st Incident Report

Response Plan Updates (if needed)

Incident Update

Termination Request

15-20 min

15-20 min

15-20 min

15-20 min

Termination Plan Implemented
Incident

- HOV + 2 left lane blocked at Myrtle on I-210 WB
To clear excess traffic on arterial streets, RP extends beyond end of freeway incident
First Incident Report

Phase 1
Before Response

- 2:15 PM – 10 min into incident

Simulated Density 1 (Color) (veh/mi)
- 0 to 20
- 20 to 39.9999
- 35,9999 to 60
- 60 to 80
- 80 to 100
- 100 to 120
- 120 to 140
- 140 to 150
- >= 150

No Incident

Incident
Phase 1: Initial Response

- Incident Occurs
- Incident Response Plan Implemented
- 1st Incident Report

Phase 2: Incident Response Adjustments

- Incident Cleared
- Incident Update

Phase 3: Post-Incident Response Adjustments

- Return to Normal

Phase 4: Incident Response Termination

- Termination Request
- Termination Plan Implemented
First Incident Report

- **Operator actions**
  - Enter incident information into ATMS
  - Request I-210 Connected Corridors Response Plan
An ATMS incident triggers response plan generation

First Incident Report Data Flow

- Freeway Incident
- Coltrans ATMS Interface
- Kapsch
- Data Hub
- Response Plan Generator
  - Prediction
  - Estimation
  - Evaluates response plan effectiveness
  - Provides situational awareness

External traffic data on freeways and arterials
Initial Response Plan

Still in Phase 1
Top pre-scored plans are evaluated based on available information.
Decision making process

- Plans are pre-scored based on traffic engineering judgement, results of simulation studies, and stakeholder preferences

- In addition, the rules take into consideration:
  - Incident attributes (e.g., location, time of day, lanes blocked)
  - Historical demand and queue forecast
  - Asset availability
  - Estimation results for queue length and initial state
  - Prediction scorecard

- If experiencing a data outage, estimation and prediction become impossible

- If experiencing a communications outage, a response cannot be deployed
Possible Responses

- **Single detour**
  - Central, Myrtle off-ramp → Myrtle on-ramp

- **Single detour**
  - Central, Mountain off-ramp → Myrtle on-ramp

- **Dual detours**
  - Central, Mountain off-ramp → Myrtle on-ramp
  - Huntington, Mount Olive → Huntington on-ramp
Approval of Response Plan

- Response Plan sent to Kapsch CMS and ATMS

DSS

Response Plan Generator

- Evaluates response plan effectiveness

Prediction

- Provides situational awareness

Estimation

External traffic data on freeways and arterials

Data Hub

Caltrans ATMS

RP

Kapsch

TMDD

RP

RP
First Response Plan Deployment

- **Operator actions**
  - Approve or disapprove plan in ATMS
  - Approve or disapprove plan in Kapsch CMS

- **If a plan is disapproved, the next ranked, available plan will be offered**

- **After time-out window, the plan is automatically approved**
What happens next?

- **Proceed to Phase 2**

- **System will maintain TOD operations if:**
  - No available response plan (no assets available)
  - All response plans rejected
  - TOD is the best plan (1 lane blocked at 2 am)
Response Plan Updates

Phase 2
Phase 2: Periodic Evaluation

Phase 1
Initial Incident Response

Incident Occurs

Phase 2
Incident Response Adjustments

Incident Cleared

Phase 3
Post-Incident Response Adjustments

Return to Normal

Phase 4
Incident Response Termination

Incident

1st Incident Report

1st Response Plan Implemented

ICM Activity

30 min

15-20 min

15-20 min

1st Incident Report

30 min

15-20 min

15-20 min

ICM Activity

Field Actions

Response Plan Updates (if needed)

Response Plan Updates (if needed)

Response Plan Updates (if needed)

Response Plan Updates (if needed)

Termination Plan Implemented

Response Plan Implemented

Response Plan Implemented

Response Plan Implemented

Termination Request

Response Plan Implemented

Response Plan Implemented

Response Plan Implemented

Termination Request
Response 1

- 2:30 – 25 min into incident / 10 minutes into response
Response 1

- 2:45 PM – 40 min into incident / 25 min into response

[Map showing incident and response areas with simulated density colors explained in a legend box]
Phase 2 Updates

- **ICM Actions**
  - Periodically offer better response plan(s) if available

- **Operator actions**
  - Update incident with new information (modify lanes blocked)
  - Approve or disapprove response plans
  - Request termination

- If a plan is disapproved, the next ranked, available plan will be offered

- After time-out window, the plan is automatically approved
What happens next?

- **If freeway lanes become clear**
  - Operator updates the incident → Phase 3

- **If something else changes**
  - Operator updates the incident → Phase 2

- **If plan cancellation is desired**
  - Operator requests termination → Phase 4
Response 2

- 2:45 PM – 40 min into incident / 25 min into response

![Map showing incident and response areas with color-coded density levels from 0 to 150 veh/mi.](image)
Response 2

- 3:00 PM – 55 min into incident / 40 min into response
Freeway Lanes Cleared

Phase 3
Phase 3: Post-Incident Plan

1st Incident Report
1st Response Plan Implemented
30 min
15-20 min
Response Plan Updates (if needed)
15-20 min
Post Incident Response Plan Implemented
15-20 min
Response Plan Updates (if needed)
Termination Request
Termination Plan Implemented
Incident Occurs
Incident Cleared
Return to Normal
Simulated Incident and RP Life Cycle

- To clear excess traffic on arterial streets, RP extends beyond end of freeway incident
Entering Phase 3

- Operator updates incident to inform ICM system that freeway lanes are no longer blocked
- ICM offers a new response plan deleting CMS alternate route
- If a plan is disapproved, the next ranked, available plan will be offered
- After time-out window, the plan is automatically approved
Phase 3 Updates: Same as Phase 2

- **ICM Actions**
  - Periodically offer better response plan if available

- **Operator actions**
  - Update incident with new information (modify lanes blocked)
  - Approve or disapprove response plans
  - Request termination

- **If a plan is disapproved, the next ranked, available plan will be offered**

- **After time-out window, the plan is automatically approved**
What happens next?

- If freeway lanes become blocked again
  - Operator updates the incident $\rightarrow$ Phase 2

- If something else changes
  - Operator updates the incident $\rightarrow$ Phase 3

- If plan cancellation is desired
  - Operator requests termination $\rightarrow$ Phase 4
Response 2

3:15 PM – 10 min after incident end / 55 min into response

Typical to observe significant arterial congestion after the freeway lanes are cleared.
Response 2

3:30 PM – 25 min after incident end

Typical to observe significant arterial congestion after the freeway lanes are cleared.
Response 2

- 3:45 PM – 40 min after incident end

Typical to observe significant arterial congestion after the freeway lanes are cleared.
Response 2

4:00 PM – 55 min after incident end

Simulated Density 1 (Color) (veh/mi)
- 0 to 20
- 20 to 39.9999
- 39.9999 to 60
- 60 to 80
- 80 to 100
- 100 to 120
- 120 to 140
- 140 to 150
- >= 150

Incident

Response 2
Excess Congestion Cleared

Phase 4
Phase 4: Termination Request

Phase 1
Initial Incident Response
- Incident Occurs
- 1st Incident Report
- 1st Response Plan Implemented

Phase 2
Incident Response Adjustments
- Incident - 15-20 min
- Response Plan Updates (if needed)
- 15-20 min

Phase 3
Post-Incident Response Adjustments
- Incident Cleared
- Post Incident Response Plan Implemented
- Response Plan Updates (if needed)
- 15-20 min

Phase 4
Incident Response Termination
- Return to Normal
- Termination Request
- Termination Plan Implemented
Entering Phase 4

- Operator requests termination
- ICM offers a new response plan that releases resources
- If the termination is disapproved, the current plan will remain in place and termination will not occur
- After time-out window, the termination is automatically approved
What happens next?

- **If termination plan is approved**
  - Resources are released and operations return to TOD

- **If termination plan is disapproved**
  - System returns to Phase 2 or Phase 3 as appropriate
Incident Closed
AMS Accomplishments
AMS Accomplishments

- **Prediction**
  - New snapshot of the simulation model in Aimsun 20 was completed
  - Aimsun prediction is running in the cloud (with cloud license)

- **Response Plan Generator (RPG)**
  - Updated to consume asset inventories and states from the data feeds. This is important to disqualify response plans that require unavailable assets
  - Methods to rectify changes in inventory IDs are implemented. This is important so that response plans in all parts of the DSS, model, and system can be maintained, and synchronized
AMS Accomplishments

- **Estimation**
  - Completed testing of real-time queue estimation
  - Arterial estimation is being upgraded to handle intersections with more complicated topology. Coding has been completed and testing is on schedule

- **Integration**
  - Integrating queue estimation results with rules, so that the RPG can use the freeway back of queue conditions to select the response plans

- **Lane closure systems (LCS)**
  - Began initial tasks to review data structures and the mapping of fields
Freeway Queue Estimation Tested

Afternoon peak Sept 15 2020 at 16:50
Queue threshold is 66 veh/mile/lane
AMS Next steps

- Focus on Response Plan Generator (Rules)
- Add rules to handle queue information for plan selection
- Integrate and test RPG working with queue estimation information
- Complete testing of estimation components to handle more complicated intersection topologies in the CC network
Data Quality
I-210 – Freeway Data Quality

- Excellent overall data availability on core I-210
- SR-134 and I-605 have had some construction
- Real-time feeds are mostly stable, despite sporadic, short-lived outages
- PeMS outages in September and October were quickly resolved
# Data Readiness Grid

<table>
<thead>
<tr>
<th>Agency</th>
<th>System</th>
<th>Asset Type</th>
<th>Critical for Launch?</th>
<th>Ready for Launch?</th>
<th>Comment</th>
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<tr>
<td>Caltrans</td>
<td>PeMS</td>
<td>PeMS Data</td>
<td>Yes (as a workaround for ATMS)</td>
<td>Yes</td>
<td>Minor sporadic outages</td>
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<td>ATMS</td>
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<td>Freeway Detector Messages</td>
<td>No (workaround available)</td>
<td>NA</td>
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<tr>
<td></td>
<td></td>
<td>Ramp Meter Messages</td>
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<td>Almost</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>DMS Messages</td>
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<td></td>
<td>TSMSS/TransSuite</td>
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<td>Not yet</td>
<td>Fix in process to enable software update</td>
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<td></td>
<td>Intersection Signal</td>
<td>Workaround available</td>
<td>NA</td>
<td>Will likely use same workaround as Arcadia</td>
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<td>Arcadia</td>
<td>TransSuite</td>
<td>Intersection Detector</td>
<td>Yes</td>
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<td>Workaround available</td>
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<tr>
<td></td>
<td></td>
<td>Intersection Signal</td>
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<tr>
<td>LACO</td>
<td>KITS</td>
<td>Intersection Detector</td>
<td>Yes</td>
<td>Almost</td>
<td>Workarounds not yet implemented</td>
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<tr>
<td></td>
<td></td>
<td>Intersection Signal</td>
<td>Requires workarounds</td>
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<td></td>
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<tr>
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<td>Intersection Detector</td>
<td>Yes</td>
<td>Almost</td>
<td>Workarounds not yet implemented</td>
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<tr>
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<td>Intersection Signal</td>
<td>Requires workarounds</td>
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<td></td>
<td>Intersection Signal</td>
<td>Requires workarounds</td>
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<td>McCain</td>
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<td>Intersection Signal</td>
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Stakeholder Progress
DMS Signage Discussions (Trailblazer)

- Discussions held to discuss sign messages and style
CMS Signage Discussions (Freeway)

- **Constraints**
  - 1 phase: 3 lines
  - 2 phase: 2 lines
  - 16 characters per line

<table>
<thead>
<tr>
<th>Freeway Messaging - Detour 1</th>
<th>CMS 1</th>
<th>CMS 2</th>
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<tr>
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<td>INCIDENT SIERRA MADRE VILLA XX LANES CLOSED</td>
<td>INCIDENT SIERRA MADRE VILLA XX LANES CLOSED</td>
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Response Plans – Stakeholder Progress

- **Pasadena**
  - Consensus achieved on operations and maintenance of intersections within the City of Pasadena, but owned by Caltrans
  - All signal timing plans have been deployed

- **LA County**
  - Discussion of response plan library and proposed DMS messages in trailblazer signs

- **Monrovia**
  - Equipment replaced at Huntington & Shamrock

- **Duarte**
  - No update
Response Plans – Stakeholder Progress

- **Arcadia**
  - No update

- **Caltrans**
  - Discussion of response plan library
  - Initial bench testing reveals that updates to TSMSS server and software are both critical for continued progress
  - TSMSS server has been updated but networking challenges remain
CC ICM System Overview

External Data Sources

- KITS, (LA County), (Duarte/Monrovia)
- Transparity, (Pasadena)
- TransSuite, (Arcadia)
- DMS Sign Vendors
- TSMSS
- ATMS Caltrans CMS, DMS and Ramp Meters
- Other...

Connected Corridors ICM Core System

- Decision Support System (DSS)
- Data Hub
- CMS (Kapsch) Local Agency Interface

Interface for cities:
1. To see global view of entire corridor
2. To enter arterial events
3. To approve/disapprove response plans

Response Plan Execution in the Field

Interface for Caltrans:
1. To enter freeway incidents
2. To approve/disapprove response plans

ATMS Caltrans CMS, DMS and Ramp Meters

KITS, (LA County), (Duarte/Monrovia)
Transparity (Pasadena)
TransSuite (Arcadia)
DMS Sign Vendors
TSMSS
ATMS Caltrans CMS, DMS and Ramp Meters
Other...
I-210 Integrated Corridor Management
Kapsch Update

Tim O’Leary
December 8, 2020
EcoTrafiX Product Status

- EcoTrafiX V3.2 was released and operating well.

- 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 Hub
- EcoTrafiX deployed and running in production
EcoTrafiX Interface Status

Interface

- Integrated
- Ready to integrate
- In development

TMCs

Arcadia

LA County

Others

Caltrans ATMS

EcoTrafiX (CMS)

PATH HUB

Ramp Meter Commands

Voting

Response Plans

Events

Ramp Meters

Detectors

Signal Controllers

DMS

Response Plans

Signal Controller Commands

DMS Commands
Next Steps

- Continue EcoTrafiX Development
- Develop Cost Analysis for Project Completion
- Continue to support I-210 Pilot with available Resources
Air Quality Evaluation Before-N-After the COVID-19 Safer@Home Order on I-210

Xinkai Wu, Ph.D.; Xudong Jia, Ph.D., PE; Cal Poly Pomona
Lianyu Chu, Ph.D.; CLR Analytics Inc.
Allen Chen, PE; Leila Sy; Giovanni Magana, Caltrans District 7

Oct.20, 2020
Background – Task 9

• Task 9: Evaluate the air quality before-N-after the deployment of the CC project

• Covid-19 Safer@Home order provides a unique opportunity to observe the impact of the significantly reduced traffic on air quality.
Background: iAQBox

- iAQBox (Intelligent Air Quality Box)
- A Roadside Air Quality Measurement Device, customized from **CLR Analytics Inc.**
- Collect air quality data:
  - Emissions (CO, NO, NO2, O3, CO2)
  - Particulates (PM2.5, PM10)
  - Meteorological data (temp. and RH)
- Portable
- Low-cost
Field Installation - Mount iAQBox on CCTV Poles

✓ Electricity Power Support
✓ Networking Support
Two Field Installations

Location 1: #27
I-210WB/Carmelo
FT452/PM28.1

Location 2: #37
I-210EB W/O Myrtle Ave
CCTV-455/PM33.3
Online Data: [http://opendatasym.com](http://opendatasym.com)
10 Weekdays Comparison

Before-N-after the Safer@Home order
Warnings:

• We are presenting LOTS of Data (Could be very boring 😊).

• We might be the first to present vehicle emission data in such high resolution.

• We only present preliminary results (purely observations).
Traffic Data from PeMS

Before-N-after the Safer@Home order
Total Traffic Volume B-N-A Safer@Home Order

Before: Blue lines;   After: Orange lines
Total Truck Volume B-N-A Safer@Home Order
Hourly Speed B-N-A Safer@Home Order

Before: Blue lines;  After: Orange lines
Observations: Air Quality Before-N-After Safer@Home Order
Observation 1: **More flow / VMT leads to more CO2.**

- More CO2 emission at low speed
- Factors, such as sunshine, lead to the decrease of CO2.

**Background:**
- Vehicles are now America's biggest CO2 source [1].
- Vehicles emit higher CO2 during traffic congestion [2].
- Roughly a third of America’s carbon dioxide (CO2) emissions come from moving people or goods, and 80 percent of these emissions are from cars and trucks [3].

References:


The highest CO2 emission happens during the AM peak hour.

Traffic flow drop after Safer@Home order leads to the significant reduction of CO2 emission.
CO2 emission per vehicle is higher during congestion but total CO2 is not high since traffic flow is lower.
Observation 2: **Traffic is not the major PM source**

- Many factors contribute to PM2.5 other than traffic (refer to mountain fire case).

**Background**
- Traffic-related PM2.5 exposure varies greatly depending upon city [1].
- The highest PM concentrations occur in congested traffic or when driving behind a heavy diesel-driven vehicle [1].
- Heavy-duty trucks may generate a lot of PM2.5 [2][3].

**References:**


Many factors contribute to PM2.5 other than traffic (refer to mountain fire case)
Heavy Duty Truck could be one source of PM2.5.
Observation 3: **Heady Duty Truck is a source of CO.**

- More CO when the flow is high, especially when truck flow is high.
- CO is low when speed is low.

**Background:**

- Carbon monoxide (CO) is a highly toxic, colorless, and odorless gas that is produced through the incomplete burning of fuels. In fact, one of the most common sources of CO exposure is the internal combustion engine — a primary component of gasoline and diesel fueled trucks [1].

- While diesel fuel combustion engines typically produce lower CO concentrations than engines powered by gas, their emissions are enough to generate lethal concentrations, particularly if the engine is not tuned properly, and particularly in a closed cab of an idling vehicle suffering from exhaust issues and leaks.

References:

More CO emission during the daytime.
Heavy Duty Truck is a source for CO.
CO is low when speed is low.
Observation 4: **Heavy Duty Truck is a major source of NO.**

- NO’s peak and magnitude are similar before-N-after the Safer@Home Order.
- Heavy-duty truck volume may be similar before-N-after the Safer@Home Order.
- PeMS provides an estimate of truck flow but does not have ability to estimate Heavy duty truck flow.

**Background:**
- Diesel engines are the largest source of nitrogen oxides (NOx) emissions nationally.
- NO are produced from fuel combustion in mobile and stationary sources. The combustion of gasoline in automobiles emit NO into the atmosphere (mobile source). Stationary emissions come from coal fired power plants, electric power plant boilers. [1]
- Excess NO may cause respiratory ailments, hematologic side effects, metabolic disorders, low blood pressure, nausea, vomiting and diarrhoea. [1]

**References:**

Heavy Duty Truck is a major source of NO.
Observation 5: **NO2 is lower during the daytime, especially with Heavy Duty Trucks and sunlight.**

- **NO2 involves in the chemical reaction to produce O3 when there is sunlight.**

**Background:**
- Light-duty trucks emits 8 times more NOx than passenger cars [1].
- Heavy-duty diesel trucks and buses as a major NOx source since NOx emissions from passenger cars and light-duty trucks have become increasingly controlled [2].
- Breathing in high levels of NO2 can increase the likelihood of respiratory problems: wheezing, coughing, colds, flu and bronchitis. [3]
- NO2 is a primary pollutant, it is also a contributing component for secondary pollutants formed from a chemical reaction, e.g., O3. [3]
- Heavy-duty truck generates more NOx (NO + NO2) at higher speed [4].
- NO2/NOx is lower when speed is higher [4].

References:
NO2 is lower during the daytime.
NO2 is lower with the presence of sunlight and heavy-duty trucks.
Observation 6: More O3 was produced by reaction between NO2 and O2 with sunlight.

• O3 is a secondary pollutant produced by reaction between nitrogen dioxide (NO2)

Background:

• When NOx reacts with other pollutants in the presence of sunlight, it forms ozone [1].
• More O3 after COVID-19 is because more NO2 was used to form O3.

References:


More O3 after Safer@Home order is because of more sunlight.
The correlation values of CO, NO, and NO2 with truck volume increase compared to those with total flow. Strong correlation between O3 and NO2.

Truck, but NOT heavy duty truck!
Mountain Fire
Closer to the fire.

Without fire:
- PM2.5: 15 u/m³
- PM10: 6 u/m³

With fire:
- PM2.5: 800 u/m³
- PM10: 1000 u/m³
- SO₂: 250 u/m³
- CO: 13 u/m³

Without fire:
- SO₂: 6 u/m³

With fire:
- CO: 6 u/m³
With fire:
- PM2.5: 270 u/m³
- PM10: 330 u/m³
- SO²: 100 u/m³
- CO: 6 u/m³

Without fire:
- PM2.5: 15 u/m³
- PM10: 6 u/m³
- SO²: 6 u/m³
- CO: 6 u/m³
Conclusions

• Six observations that can be explained by existing literature
  o 1: More flow / VMT leads to more CO2.
  o 2: Many factors (e.g., mountain fire) contribute to PM2.5 other than traffic.
  o 3: Heavy Duty Truck is a source of CO.
  o 4: Heavy Duty Truck is a major source of NO.
  o 5: NO2 involves in the chemical reaction to produce more O3 when there is sunlight.
  o 6: More O3 was produced by reaction between NO2 and O2 with sunlight.

• Only preliminary study
  o Need to analyze more data.
  o Need more data collection locations.
  o Need vehicle classification technologies (i.e. signature loop detector) to provide heavy-duty truck data.
Open Data System (ODS)

Xinkai Wu, Ph.D.; Xudong Jia, Ph.D., PE; Cal Poly Pomona
Lianyu Chu, Ph.D.; CLR Analytics Inc.
Allen Chen, PE; Leila Sy; Giovanni Magana, Caltrans District 7

Dec.03, 2020
An Open Data System (ODS)

• Bridge Caltrans Decision Support System (DSS) with Foothill/Pasadena Transit Operation Center by providing real-time incidents/events/detour messages
• Provide a visualized platform to publish real-time information
• Support potential big data analysis
ODS Flowchart

LA RTMC → RIITS

CCTV → ATMS

DSS → DH

ODIS: Air Quality Information System

CTS: Connected Transit System
Universal Tools Developed for ODS

- GTFS data parser
  - Work with more transit agencies

- TMDD data parser
  - Roadway inventory from UC Berkeley
  - Response Plan
Transit GTFS Data Parser (General Transit Feed Specification)
- TMDD Data (Response Plan, Network Inventory) Parser
Network Inventory Data (in TMDD format)
Response Plan Data (in TMDD format)

3.8.2.10. ResponsePlan Class
This is a new class to handle response plan objects.

3.8.2.10.1. ResponsePlanDetails
This is a new object representing each developed response plan and termination plan.

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Type/Element</th>
<th>Reference</th>
<th>Description</th>
<th>CC Required</th>
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<tbody>
<tr>
<td>Response-Plan-Request-Header</td>
<td>Type: ResponsePlanRequestHeader</td>
<td>Custom type; see &quot;Proposed Response Plans&quot; layer</td>
<td>Time when response planning activities were initiated.</td>
<td>Yes</td>
</tr>
<tr>
<td>Response-Plan-Header</td>
<td>Type: ResponsePlanHeader</td>
<td>Custom type; see &quot;Proposed Response Plans&quot; layer</td>
<td>Time when response planning activities were initiated.</td>
<td>Yes</td>
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<td>Activity-Start-Time</td>
<td>Type: DateTimeZone</td>
<td>TMDD 3.3.10.1 System Requirements spec B.7.1.6</td>
<td>Time when response planning activities were initiated.</td>
<td>Yes-when applicable</td>
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      "event-id" : "1262245",
      "response-plan-id" : "5507078",
      "plan-type" : "",
      "evaluation-cycle" : 0,
      "response-plan-rank" : 0
    },
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      "date" : "20200302",
      "time" : "14444888389",
      "offset" : "-0800"
    },
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      "detour" : { 
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        "route-id" : "EB_Art_Colorado-Huntington_Huntington-Monrovia_MontOlive",
        "route-link-id-list" : { 
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        },
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        "route-name" : "EB_Art_Colorado-Huntington_Huntington-Monrovia_MontOlive",
        "route-length" : 0
      },
      "network-name" : "I-210 Pilot Aimsun TMDD Network v04",
      "route-id" : "EB_Art_Evergreen_Myrtle_Myrtle",
      "route-link-id-list" : { 
        "link" : [ "00000" ]
      },
      "route-type" : "Art",
      "route-name" : "EB_Art_Evergreen_Myrtle_Myrtle",
      "route-length" : 7049
    }
  } 
} 
```
o Affected Transit Routes
User Interface: Affected Transit Routes by Response Plan Detour Routes
Thank You!
Questions?

Dr. Xinkai Wu: xinkaiwu@cpp.edu
Dr. Lianyu Chu: lchu@clr-analytics.com
Parsons – Call for Projects Update
Update on Packages 1-9

Tuesday, December 8th, 2020
## Project Objective

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

<table>
<thead>
<tr>
<th>#</th>
<th>Package Description</th>
<th>Contract #</th>
<th>Contract Status</th>
<th>Target</th>
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<tbody>
<tr>
<td>1</td>
<td>Bluetooth – Iteris Velocity</td>
<td>07A4470</td>
<td>Completed, Contract Closed</td>
<td>5/31/2019</td>
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<tr>
<td>2</td>
<td>Bluetooth – BlueToad</td>
<td>07A4477</td>
<td>Final System Testing Phase</td>
<td>10/31/2020</td>
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<tr>
<td>3</td>
<td>New Controller Cabinets</td>
<td>07A4761</td>
<td>Permit Application</td>
<td>Apr 2021</td>
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<td>4</td>
<td>Communication Upgrades</td>
<td>07A4479</td>
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<td>5</td>
<td>Firmware/Timing Plan Updates/Controller Upgrades</td>
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<td>Material Delivery/Testing</td>
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<td>Video Detection System</td>
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<td>07A4755</td>
<td>Installation</td>
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<td>8-2</td>
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<td>07A4388</td>
<td>Development Phase</td>
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## Project Stakeholders

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<th>City of Pasadena</th>
<th>City of Arcadia</th>
<th>City of Monrovia</th>
<th>City of Duarte</th>
<th>LA County</th>
<th>Foothill Transit</th>
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### Additional Integration contracts – not part of the 9 Packages

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<th>#</th>
<th>Package Description</th>
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<th>Metro &amp; Caltrans</th>
<th>City of Pasadena</th>
<th>City of Arcadia</th>
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Project Area (cont.)
# Package Status – Pkg # 1

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<td>07A4470 PTM</td>
<td>• NTP: 7/10/2018</td>
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<td>Iteris Velocity</td>
<td></td>
<td>• Kick-off Meeting: 7/30/2018</td>
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<tr>
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<td></td>
<td>• Submittal Approved: 8/16/2018</td>
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<td></td>
<td>• Installation &amp; Testing Completed on 5/29 &amp; 5/30/2019</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Accepted by Arcadia, Documents Submitted</td>
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<tr>
<td></td>
<td></td>
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<td>• Completed</td>
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## Package Status – Pkg # 2

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<td>2</td>
<td>Bluetooth</td>
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<tr>
<td></td>
<td>BlueToad</td>
<td>DBX</td>
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</table>

- NTP: 7/10/2018
- Kick-off Meeting: 7/30/2018
- Submittal Approved: 10/12/2018
- Site Installation & Site Acceptance:
  - LA County (4), Monrovia (4), Duarte (2): completed
  - Caltrans (1 location without existing comms): Equipment delivered to LA County (confirmed)
  - Pasadena (11): completed
- TMC Server Installation & Configuration: Completed (5/2020)
- LA Co <-> Pasadena Server Communications: configured & tested
- **System Acceptance Testing & Training**
  - Pasadena:
    - All 11 locations online; final acceptance test & training completed on 11/13/2020
  - LA County, Monrovia, Duarte:
    - 9 locations online, final acceptance test & training completed on 12/14-17/2020
    - Foothill@Mytle: radio communication issue – need support from LA Co & Monrovia
- Expected to be completed: 12/31/2020 (95%)
Package Status – Pkg # 2

- P2 - BlueToad Travel Time System – Comm. Architecture

11 locations

Field Device A
Field Device B

TCP 8010
RAW DATA

Pasadena Field Network

VM
PAOMan Forwarding Server

User

Passadena TMC

TCP 8010

Physical Server
Data Server
(Curent Windows)
BlueArgus LINUX VM Server?

10.109.110.150

10.12.3.94
Port 8010

3rd Party System

10 locations

Field Device C
Field Device D

TCP 8010
RAW DATA

LACO Field Network

LACO TMC

TCP 443

User

V1: 10/9/2019
V2: 2/19/2019
V3: 6/11/2020
Package Status – Pkg # 2
# Package Status – Pkg # 3

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Package Name</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
</table>
| 3      | New Controller Cabinets | 07A4761 Crosstown | • Advertised: 9/26/19  
• Awarded: 2/11/2020  
• NTP: 2/19/2020  
• Kick-off Meeting: 2/25/2020  
• Material Submittal Review: Approved  
• Installation:  
  • Arcadia (1 site): completed & tested  
  • Used city-furnished controller, new equipment to be delivered to City  
  • Pasadena (7 sites): Additional underground work to be conducted by the City due to cabinet relocation at 6 locations.  
  • City and contractor conducted site investigation on 6/24/20, submitted the plans on 8/28/20; P3 & P5 contractors, the City & Caltrans agree on scope, sequence, and schedule; Layout sketches approved on 11/10/20;  
  • Permit Application to be approved but City Moratorium Period will be in effect from 12/15/20-1/5/21  
  • 1 location: Jan 2021; 6 locations: Apr 2021  
  • Expected to be completed: Apr 2021 |
## P3 & P5 Coordination – 6 Pasadena Locations

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2021</th>
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<tbody>
<tr>
<td>Month</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>0.</td>
<td>Apply construction permit for 7 intersections</td>
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<tr>
<td>1.</td>
<td>Install 6 new cabinet at 6 new locations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Install &amp; turn on 1 new cabinet at 1 existing location</td>
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</tr>
<tr>
<td>2.</td>
<td>Conduct underground work, provide comm. &amp; power to the new cabinets</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Deliver &amp; test new controllers to Pasadena</td>
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</tr>
<tr>
<td>4.</td>
<td>Install new controllers in new cabinets, update timing plan</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Turn on 7 new controllers</td>
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</tr>
<tr>
<td>6.</td>
<td>Turn on 6 new cabinets at 6 new locations</td>
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<tr>
<td>7.</td>
<td>Remove 6 existing cabinet &amp; restore the sidewalk</td>
<td></td>
</tr>
</tbody>
</table>

- **P3 Contractor – Install New Cabinet**
- **P5 Contractor – Install New Controller**
- **Pasadena City Resource – Provide Infrastructure to new Cabinet Location**
# Package Status – Pkg # 4

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

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Package Name</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Firmware/ Timing Plan Updates/C Controller Upgrades</td>
<td>07A4480 CPE, Inc</td>
<td></td>
</tr>
</tbody>
</table>

- **NTP: 7/17/2018**
- **Kick-off Meeting: 7/30/2018**
- **Changed hardware/firmware requirements per Stakeholder Comment; revised price estimate ($124,971) lower than original amount ($171,600) – reviewed & approved**
- **Material - approved & ordered**
  - Pasadena: 7 controllers delivered (11/24/2020)
  - Arcadia: 4 controllers delivered (11/4/2020)
  - Monrovia: 3 D4 firmware delivered; 4 controllers expected Dec 2020
- **Installation**
  - 3 locations in Monrovia (related to Metro Gold Line project):
    - spare 1C module (Arcadia) used to test firmware upgrade
    - Timing: completed for 1 intersection, pending testing
    - Installation: started in early Oct 2020; Est. Completion: Dec 2020
  - 2 locations in Arcadia: Done
  - 4 locations in Monrovia: Jan-Feb 2021
  - 7 locations in Pasadena: Apr 2021
- **Expected to be completed: Apr 2021**
## Package Status – Pkg # 6

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

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Package Name</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
</table>
| 7      | Data Communication Module and Video Detection Software Upgrade | 07A4755 Crosstown | • Advertised: 1/2/2020  
• Awarded: 2/11/2020  
• NTP: 2/19/2020  
• Kick-off Meeting: 2/25/2020  
• Materials  
  • LA County (4): approved  
  • Duarte (1): approved  
  • Monrovia (3): approved  
  • Arcadia (14): approved  
  • Pasadena (change from 8 to 6): approved  
  • Procurement: Completed 7/10/2020  
  • Installation:  
    • 25 out of 30 locations: completed  
    • Working on 5 locations in Pasadena (previously est. Dec 2020, could be adjusted to Jan 2021 due to Moratorium Period)  
  • Expected to be completed: Dec 2020 – Jan 2021 |
## Package Status – Pkg # 8-1, 8-2, 8-3

<table>
<thead>
<tr>
<th>Item</th>
<th>Total</th>
<th>Caltrans</th>
<th>Arcadia</th>
<th>Pasadena</th>
<th>Duarte</th>
<th>Monrovia</th>
<th>LA County</th>
</tr>
</thead>
<tbody>
<tr>
<td># of DMS</td>
<td>21</td>
<td>2</td>
<td></td>
<td>17</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td># of Static Signs</td>
<td>31</td>
<td>3</td>
<td>12</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

### Yearly Progress

<table>
<thead>
<tr>
<th>Month</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>1</td>
</tr>
</tbody>
</table>

### Key Dates

- **May 2021, Hard Launch of I**

(Est.)
I-210 CC DMS, CMS, Static Signs

- Existing CMS: 6 along I-210 WB, 4 along I-210 EB
- New Static Detour Sign: 11 locations
- New Detour DMS: 19 locations
# Package Status – Pkg # 8-1

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Package Name</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
</table>
| 8-1    | Advanced Traveler Information Systems: DMS Procurement | 07A4792-3 Elan Moyal | • Advertised: 10/25/19  
• Awarded: 12/2/2019  
• Kickoff meeting: 12/19/2019  
• Material Submittals & procurement: in progress  
• Expected to be completed: Jan 2021 |
## Package Status – Pkg # 8-1

<table>
<thead>
<tr>
<th>Item</th>
<th>Total</th>
<th>Caltrans</th>
<th>LACO</th>
<th>Pasadena</th>
<th>Ordered</th>
<th>Delivery</th>
</tr>
</thead>
</table>
| DMS & Mounting Hardware                   | 21    | 2        | 2    | 17       | 3/27/20 | 17 delivered to Pasadena (confirmed)  
2 delivered to LA County (confirmed)  
2 delivered to Caltrans (confirmed)  
Mounting Hardware (submittal to be distributed for stakeholder review) |
| DMS Poles & Anchor Bolts                  | 19    | 0        | 2    | 17       | 2/21/20 | 2 delivered to LACO: 6/15/2020 (confirmed)  
17 delivered to Pasadena: 6/15/2020 (confirmed)  
2 delivered to LACO: 8/18/2020 (confirmed)  
17 delivered to Pasadena: 7/9/2020 (confirmed) |
| Pull boxes                                | 19    | 0        | 2    | 17       | 4/30/20 | 2 delivered to LACO: 5/21/2020 (confirmed)  
17 delivered to Pasadena: 6/1/2020 (confirmed) |
| Power & Comm Cables                       | 11,000 ft | TBD     | TBD  | TBD      | 4/23/20 | 9 boxes delivered to Pasadena: 6/4/2020 (confirmed)  
1 box delivered to LA County: 8/18/2020 (confirmed)  
1 box delivered to Caltrans: 8/18/2020 (Parsons) |
| 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 | Delivered to Caltrans: 9/29/2020 |
| Servers                                   | 1     | 1        | 0    | 0        | Lead time: 3 weeks | LACo: VM has been set up  
Pasadena: RAM cards received, VM to be set up  
Caltrans: Physical Server to be procured in separate PO (temporary VM has been set up) |
## Package Status – Pkg # 8-2

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Package Name</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
</table>
| 8-2    | Advanced Traveler Information Systems: DMS Integration | 07A4794 Parsons | **Advertised:** 11/14/19  
**Awarded:** 1/3/2020  
**Kickoff meeting:** 1/14/2020  
**Construction Support**  
  • Installation QC checklist v2 submitted  
**DMS System Development**  
  • System Diagrams: completed  
  • Development Requirements: (v6) completed  
  • Design & Development: completed  
**DMS System TMC & C2C Integration & Testing**  
  • LA CO TMC: setting up comms. to central system  
  • Caltrans LARTMC: Initial E2E testing ongoing  
  • Pasadena: Dec 2020 - Jan 2021  
**DMS System E2E Integration & Testing**  
  • Dec 2020 – Mar 2021  
**Training**  
  • DMS workshop: 9/9/2020  
  • Device & Software training sessions: Jan - Mar 2021  
  • Expected to be completed: Mar 2021 |
Package Status – Pkg # 8-2

Integration Phase

Development & Testing Phase (Dec 2020)
## Package Status – Pkg # 8-3

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Package Name</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-3</td>
<td>Advanced Traveler Information Systems: DMS &amp; static sign Installation</td>
<td>N/A to be handled by Caltrans, LAPDW, &amp; Pasadena</td>
<td></td>
</tr>
</tbody>
</table>

- **DMS**: delivered on 9/28/2020
  - Installation QC Checklist & location info distributed
  - Installation
    - LA County (2): Est. Oct-Dec 2020 *(mounting brackets)*
    - Pasadena (17): Est. Oct-Nov 2020 *(mounting brackets & Moratorium Period)*
    - Caltrans (2): will not be installed before May 2021; existing 2 DMS in close proximity can be used. *(Discussion: Can static signs be installed?)*
  - Installation support: information provided

- **Static Signs**: delivered on 8/18/2020
  - Installation QC Checklist & location info distributed
  - Installation:
    - LA County: starting from week of 10/19/2020
    - Pasadena: done
    - Arcadia: done
    - Duarte: done
    - Monrovia: target 12/30/2020
  - Expected to be completed: Dec 2020 – Jan 2021
## Package Status – Pkg # 9

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Pkg.</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Environmental Stations with Air Quality Sensors and Open Data Systems (ODS)</td>
<td>07A4388</td>
<td>Cal Poly Pomona</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NTP: 6/29/18</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kick-off Meeting: 7/12/18</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Environmental stations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Field installation done – 6/7/19</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Collect data and analyze data - ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ODS Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Developed parser for transit data from Foothill Transit &amp; Pasadena Transit</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Developed parser for sample response plan (ICD v1.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Improving the program to match transit routes and diversion routes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ODS Configuration and Testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Received Inventory of Road Network from PATH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Need Inventory of Signal ID &amp; Ramp Meter ID</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Coordinate with PATH to test automated data</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Coordinate with Transit agencies</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Expected to be completed: Q1 2021 (85%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 for LA County
- Package 3: Get construction permit and start stage 1 installation
  - Package 5: Deliver remaining controllers, schedule installation
- Package 7: Complete installation
- Package 8-1: Deliver mounting brackets
- Package 8-2: System integration for LA Co TMC & Pasadena TMC; E2E testing for Caltrans LARTMC
- Package 8-3: Track installation status
- Package 9: Coordinate testing
Thank You
and
Next Meeting
(Suggest Tuesday February 2nd, 2021 @ Zoom)