Connected Corridors
(Virtual) Face-to-Face Meeting

Tuesday, September 1st, 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.
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 ICM System Design Overview
- 2:15 – 2:35 PM - CC ICM System Demo
- 2:40 – 2:50 PM - AMS Update
- 2:55 – 3:05 PM - Kapsch Status Update
- 3:10 - 3:20 – Parsons Call for Projects Update
- 3:20 – 3:30 – Round Table and Closing
  - Next Meeting - Tuesday October 20th

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 and reviewing the design spec. Date to be confirmed after the spec agreement.) – October 2020
- Complete McCain Transparity C2C interface (Pasadena) (Code is ready to deploy to Prod.; just waiting for the network and SSL certs to be worked out.) – October 2020
- Prediction (Aimsun) running in the cloud (Last to be used. Implement in Linux instead of Windows.) – July => 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 (20200819_SLD_I210ASI_MonthlyStatusMeeting_v1.0_PARSONS.pptx and slide for p. #8-1,2,3 below; ok if Pasadena installs in Dec) – Q3-4 2020
Schedule – Till Launch (Page 2 of 2)

- Integrate Lane Closure Systems* – September 2020
  (Per HQ waiting for Mike J. to come back. Rules engine has to know info. Risk!)

- 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)

- Performance Management System Available – December 2020

- Complete C2C DMS Sign Interfaces – February -> March 2021
  (See Call for Projects slide below; testing completion moved Feb->Mar 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. Both the Arterials (built for rail system) and state-wide Freeway LCSs exist and maintained by CT IT.
## Schedule – Pilot Launch to Pilot Completion

<table>
<thead>
<tr>
<th>Task</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pilot Launch</strong></td>
<td>May 2021</td>
</tr>
<tr>
<td><strong>Kapsch</strong></td>
<td>May 2021 – September 2021</td>
</tr>
<tr>
<td><strong>Parsons</strong></td>
<td>September 2021 – January 2022</td>
</tr>
<tr>
<td><strong>Interim Benefits Analysis</strong></td>
<td>January 2022</td>
</tr>
<tr>
<td><strong>Telegra</strong></td>
<td>January 2022 – May 2022</td>
</tr>
<tr>
<td><strong>After Study</strong></td>
<td>March to April 2022</td>
</tr>
<tr>
<td><strong>Kapsch</strong></td>
<td>June 2022 – September 2022</td>
</tr>
<tr>
<td><strong>Documentation Completed</strong></td>
<td>September 2022</td>
</tr>
<tr>
<td><strong>Procurement of CMS system</strong></td>
<td>August 2022</td>
</tr>
<tr>
<td><strong>Procurement of Aimsun</strong></td>
<td>August 2022</td>
</tr>
<tr>
<td><strong>Pilot complete</strong></td>
<td>September 2022</td>
</tr>
</tbody>
</table>
Main Planned Accomplishments for September 2020

- **Software Development**
  - Complete testing of estimation in DSS
  - Complete design sign-off for ATMS fixes
  - Begin integration efforts for DMS signs
  - Support/complete deployment of SSL and Transparity in Pasadena. Begin verification of production data

- **Analysis Modeling and Simulation (AMS)**
  - Design updates for response plan selection using the real-time queue information from estimation
  - Refine estimation to handle exceptional arterial intersection topologies
  - Improve integration of DSS components, Data Hub and Kapsch CMS
Networking and Center to Center Connectivity

- **Caltrans C2C network connectivity for Data Readers**
  - *Pending new release in Production*: Monitoring to be introduced to detect network connection problems involving production VPC

- **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 September
  - Working to implement SSL/TLS encryption in communication

- **Recent short-lived D7 VPN outages**
  - Even short outages can be disruptive

- **Ongoing weekly meetings between RIITS and PATH**
  - D7 Caltrans continues to be available as needed
C2C Connectivity since last Face-to-Face

AWS plots reflect “unhealthy” connections.
Jenkins and Reader Chart Legend: Green – OK, Yellow – Down, Blue – Untested.
Pasadena connection has not been completed yet.
C2C Connectivity mostly good

- **Plots show connectivity** *
  - Some history only available for last 2 weeks due to shift to using monitoring from network load balancer.
  - Only minor blips in connectivity

- **System architecture and monitoring have changed**
  - Most plots use AWS provided monitoring for Network Load Balancers
    - These plots reflect 0 “unhealthy” connections
  - Other plots (Jenkins and PeMs Reader) are as before
    - These plots show 100% “OK” connections

* Monitoring of the network connections at the load balancers in front of the readers in Dev. Load balancers are not yet deployed in production so no such monitoring in Prod.
C2C Interface Implementations - Status

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

- **Pasadena**
  - McCain/Transparity C2C interface – Dialog testing complete. Expect command execution dialog testing completion shortly. Expect to be deploying to Pasadena in September with a production data review to follow. Networking and SSL security still in work.

- **Dynamic Message Signs – Pasadena, LACO, Caltrans**
  - Awaiting interface development. Expect first interface integration efforts to start in September.

- **Caltrans**
  - Reviewing Parsons design for ATMS updates.
Systems Development

- **Production system initial stand-up**
  - CMS – working with Kapsch to integrate initial response plan generation workflow.

- **Updates**
  - Completed automated deployment of test DSS estimation and response plan development to AWS. Working to complete prediction in November.
  - Completed deployment of response plan generation without prediction. Tested and released to integration.
  - Working to address some data pipeline bugs affecting reliability of pipelines.
  - Implementing AWS security enhancements.
ICM System Design Overview
Highest Level Design
Design Objectives

- **Real time operation**
  - Fast data processing
  - High data volume capability
  - DSS speed to decision

- **Flexibility for future/regional needs**
  - Add or subtract capabilities to fit future needs

- **Highly Scalable**
  - Scalable for increased demand
  - Scalable for added services/capabilities/data sources
Design Objectives (continued)

- **Secure**

- **Futureproof**
  - Able to adapt and grow to handle data demands of the future
  - Able to add features and capabilities with minimal change to existing system

- **Fault tolerant**
  - Able to recover from any core system hardware failure automatically
  - Able to continue operation with limited degradation upon external system failure

- **Limit IT support requirements**
  - Automated deployment and recovery
  - No core system locally hosted components – Cloud based system
Primary Design Patterns

- **Distributed, independent services connected by messaging**
  - Scalability
  - Fault tolerance, reliability

- **NoSQL databases**
  - Scalability
  - Performance

- **Data standardization (TMDD)**
  - Portability, Componentization
Primary Design Patterns

- **Configuration based design**
  - Services are generic and provided operation specific information via configuration
  - Configuration at 3 levels – build-time, deploy-time, run-time

- **100% Cloud-based**
  - Deployment automation
  - Scalability automation
  - Security automation
  - Recovery automation
  - High availability, fast recovery

- **No-touch production operation**
  - More secure, more locked down
A Little Deeper
What is Today’s Demonstration

Data Flows
- Arcadia
- ATMS (Test)
- TSMSS
- LACO

Incident Mgt
- Incident
- Response Plan
- Reject and Approve
Analysis Modeling & Simulation and ICM
System Demo
CC ICM System Overview

External Data Sources

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

Connected Corridors ICM Core System

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

Response Plan Execution in the Field

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

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

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

- This is the map that illustrates data flows

Reports freeway incident → Caltrans ATMS Interface → Kapsch → Data Hub → DSS

- Response Plan Generator
  - Generates response plans and scorecards for review

- Prediction
  - Evaluates response plan effectiveness

- Estimation
  - Provides situational awareness

External traffic data on freeways and arterials → Data Hub
Estimation was demonstrated previously

- Reports freeway incident
  - Caltrans ATMS Interface
  - Kapsch

Data Hub

- Response Plan Generator
  - Generates response plans and scorecards for review
- Prediction
  - Evaluates response plan effectiveness
- Estimation
  - Provides situational awareness

External traffic data on freeways and arterials
An ATMS incident triggers response plan generation

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

External traffic data on freeways and arterials
Automatic scorecard generation

- External traffic data on freeways and arterials
- Evaluates response plan effectiveness
- Provides situational awareness

Caltrans ATMS Interface

Kapsch

Data Hub

Response Plan Generator

Response Plans & Scorecard

DSS

Prediction

Estimation
Approval of one Response Plan (Last Time)

- **Response Plan sent to Kapsch CMS** (RP reviewed and approved)

![Diagram]

- Data Hub
  - Predicts
  - Estimates
  - Evaluates response plan effectiveness
  - Provides situational awareness

- Response Plan Generator

- External traffic data on freeways and arterials

- Integration with Kapsch and Caltrans ATMS

- TMDD Interface
Demo For Today

- Demonstration of workflow between Data Hub and Kapsch CMS

- External traffic data on freeways and arterials

On the surface, this demo will appear similar to last time, but is in fact profoundly different.
Important Points about Today’s Demo

**New things since last time**
- DSS now running in the AWS cloud, not on my laptop(s)
- New plumbing behind the scenes using the Netflix Conductor workflows
- The demonstration will show the process to reject the first response plan and approve the second response plan
- Behind the scenes this process requires communication back and forth between Kapsch CMS and the Data Hub

**For today’s demo**
- Response plans are generated based on rules only (bypassing the Estimation and Prediction)
- We will not focus on the details of the response plans, but rather on the process for rejecting and approving them
- The incident will be manually entered as if it came from the ATMS. We are using the Kapsch CMS to illustrate the view of the cities and county
...and things to look for
Interface shown as Arcadia

Indicates the user, in this case Arcadia.
Incident location on I-210 WB near Baldwin
Incident entered as if arriving from ATMS

A clone of an incident has been preloaded into the Kapsch CMS
Incident activated

When status is changed to confirmed, the incident will be sent to the Data Hub. The workflow is started.
First response plan

Details of first response plan shown here
Rejection of first response plan

Arcadia disapproves
Second response plan for consideration

Arrival of second response plan
Approval of second plan

Arcadia approval
Plan prevented from being implemented in the field, because the launch is not until next year

Approval of all stakeholders
Live Demonstration
Conclusion
Demo For Today

- Demonstration of workflow between Data Hub and Kapsch CMS

- External traffic data on freeways and arterials

- Caltrans ATMS

- Kapsch

- TMDD

- Data Hub

- DSS

- Response Plan Generator

- Prediction

- Estimation

- Evaluates response plan effectiveness

- Provides situational awareness

On the surface, this demo will appear similar to last time, but is in fact **profoundly** different
Accomplishments

- **Demonstrated progress**
  - Response Plan Generator processes updated and running in the Integration environment in the cloud! Further functionality enhancements to continue
  - Continued progress on integration with Kapsch CMS and Data Hub: Ability to reject and accept response plans
  - Ability to bypass estimation and prediction – returning response plan in seconds
Accomplishments

- **Analysis Modeling and Simulation (AMS)**
  - All estimation components now run in the Integration environment in the cloud! The next step is to complete testing.
  - All recent signal timing plans have been updated in the Aimsun model and testing has been successful in the new version of Aimsun 20.
  - Finished coding of real-time queue estimation for use with rules (for better RPG decision to narrow down the list of RPs).
Next Steps

- Design updates for response plan selection using the real-time queue information from estimation
- Refine estimation to handle exceptional arterial intersection topologies
- Continue to migrate software components to the cloud
- Improve integration of DSS components, Data Hub and Kapsch CMS
Data Quality
- Excellent overall data availability on core I-210
- SR-134 is under construction
- Replaced controller on I-605
- Improved real-time availability of data in August
- Configuration changes to URMS have improved stability

<table>
<thead>
<tr>
<th>Caltrans (freeways)</th>
<th>Arcadia</th>
<th>Pasadena</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Average Sensor Availability</td>
<td>I-210</td>
<td>Eastbound PM 25 - PM 43.25</td>
<td></td>
</tr>
<tr>
<td>Heaver ever cells in view units in detector-days</td>
<td>CD</td>
<td>Fwy/Fwy</td>
<td>HOV</td>
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<tr>
<td>May</td>
<td>19 20 21 22 23 24 25</td>
<td>26 27 28 29 30 1 2</td>
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<tr>
<td>June</td>
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<td>10 11 12 13 14 15 16</td>
<td>100.0%</td>
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<tr>
<td>July</td>
<td>17 18 19 20 21 22 23</td>
<td>24 25 26 27 28 29 30</td>
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<tr>
<td>August</td>
<td>31 1 2 3 4 5 6</td>
<td>7 8 9 10 11 12 13</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
## Data Readiness Grid

### Asset Data and Status Weekly Report (08/31/2020)

<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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<tbody>
<tr>
<td>Caltrans</td>
<td>PeMS</td>
<td>PeMS Data</td>
<td>Yes (as a workaround for ATMS)</td>
<td>Yes</td>
<td></td>
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<tr>
<td></td>
<td>ATMS</td>
<td>Freeway Detector Messages</td>
<td>No (workaround available)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ramp Meter Messages</td>
<td>Yes</td>
<td>Almost</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DMS Messages</td>
<td>Yes</td>
<td>Almost</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSMSS/TransSuite</td>
<td>Intersection Detector</td>
<td>Yes</td>
<td>No</td>
<td>Awaiting software update in October</td>
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<tr>
<td></td>
<td></td>
<td>Intersection Signal</td>
<td>Workaround available</td>
<td>NA</td>
<td>Will likely use same workaround as Arcadia</td>
</tr>
<tr>
<td>Arcadia</td>
<td>TransSuite</td>
<td>Intersection Detector</td>
<td>Yes</td>
<td>Almost</td>
<td>Workaround available</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>Workaround available</td>
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<td>Duarte</td>
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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>
<td></td>
<td></td>
<td>Intersection Signal</td>
<td>Requires workarounds</td>
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<td></td>
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<tr>
<td>Monrovia</td>
<td>KITS</td>
<td>Intersection Detector</td>
<td>Yes</td>
<td>No</td>
<td>Service request issued</td>
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<tr>
<td></td>
<td></td>
<td>Intersection Signal</td>
<td>Requires workarounds</td>
<td>No</td>
<td>Workarounds not yet implemented</td>
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<tr>
<td>Pasadena</td>
<td>McCain</td>
<td>Intersection Detector</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Intersection Signal</td>
<td>Workaround possibility depends on intersection data</td>
<td>No</td>
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</tbody>
</table>
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 intersections are programmed with Connected Corridors flush plans

- **Monrovia and Duarte (15 CC Intersections)**
  - All intersections are programmed with Connected Corridors flush plans
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
  - A controller has been configured for bench testing and made available to PATH
Kapsch Update
CC ICM System Overview

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

**Connected Corridors ICM Core System**
- Data Hub
- Decision Support System (DSS)

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

**Interface for Caltrans:**
1. To enter freeway incidents
2. To approve/disapprove response plans
I-210 Integrated Corridor Management
Kapsch Update

Tim O’Leary
September 1, 2020
EcoTrafiX Product Status

- EcoTrafiX V3.3 Scheduled for released November 2020
- Available for deployment on future projects

- Key Features:
  - Advanced Response Plan Editing
  - Complex Response Plan Scheduling
  - Advanced Signal Control Features
EcoTrafiX Interface Status

Good progress:

- EcoTrafiX integrated with DSS Response Plans in AWS environment
- EcoTrafiX integrated agency voting with DSS in AWS environment
EcoTrafiX Interface Status

Interface

- Integrated
- Ready to integrate
- In development

TMCs

- Arcadia
- LA County
- Others

Caltrans ATMS

- Ramp Meter Commands
- Events
- Voting
- Response Plans

EcoTrafiX (CMS)

- Ramp Meters
- Signal Controllers
- DMS Commands
- Response Plans
- Events

PATH HUB
EcoTrafiX Status

Next Steps

- Request TMCs execute device commands
- EcoTrafiX send Response Plans to ATMS
- EcoTrafiX exchange Voting with ATMS
Thank You!

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Parsons – Call for Projects Update
Agenda

- I-210 CC Arterial Systems Improvement Project
  System Consulting Services - Overview
- Status of 9 procurement package
- Next Steps
I-210 CONNECTED CORRIDORS ARTERIAL SYSTEMS IMPROVEMENT PROJECT SYSTEM CONSULTING SERVICES

STATUS OVERVIEW
## 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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<td>2</td>
<td>Bluetooth – BlueToad</td>
<td>07A4477</td>
<td>Final System Testing Phase</td>
<td>9/4/2020</td>
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<td>3</td>
<td>New Controller Cabinets</td>
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<td>Material Procurement</td>
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<td>6/30/2020</td>
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<td>Video Detection System</td>
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<td>Data Communication Module and Video Detection Software Upgrade</td>
<td>07A4755</td>
<td>Material Inspection</td>
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<td>8-1</td>
<td>DMS Procurement</td>
<td>07A4792-3</td>
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<td>Sep 2020</td>
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<td>DMS Integration</td>
<td>07A4794</td>
<td>Development Phase</td>
<td>Q1, 2021</td>
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<td>8-3</td>
<td>DMS &amp; Static Sign Installation</td>
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<td>To be handled by stakeholders</td>
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<td>9</td>
<td>Environmental Stations with Air Quality Sensors and Open Data Systems</td>
<td>07A4388</td>
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## Project Area

<table>
<thead>
<tr>
<th>#</th>
<th>Package Description</th>
<th>Contract #</th>
<th>Metro &amp; Caltrans</th>
<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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<td>✓</td>
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<td>2</td>
<td>Bluetooth – BlueToad</td>
<td>07A4477</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>New Controller Cabinets</td>
<td>07A4761</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Communication Upgrades</td>
<td>07A4479</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Firmware/Timing Plan Updates/Controller Upgrades</td>
<td>07A4480</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Video Detection System</td>
<td>07A4481</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Data Communication Module and Video Detection Software Upgrade</td>
<td>07A4755</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>8-1</td>
<td>DMS Procurement</td>
<td>07A4792-3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-2</td>
<td>DMS Integration</td>
<td>07A4794</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-3</td>
<td>21 DMS Installation</td>
<td>Stakeholders</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Environmental Stations with Air Quality Sensors and Open Data Systems (ODS)</td>
<td>Stakeholders</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

07A4388
Project Area (cont.)
UPDATE ON

PACKAGES 1-9
## Package Status – Pkg # 1

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Pkg.</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bluetooth –</td>
<td>07A4470</td>
<td>• NTP: 7/10/2018</td>
</tr>
<tr>
<td></td>
<td>Iteris Velocity</td>
<td>PTM</td>
<td>• Kick-off Meeting: 7/30/2018</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Submittal Approved: 8/16/2018</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Installation &amp; Testing Completed on 5/29 &amp; 5/30/2019</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Accepted by Arcadia, Documents Submitted</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Completed</td>
</tr>
</tbody>
</table>
# Package Status – Pkg # 2

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Pkg.</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
</table>
| 2      | Bluetooth – BlueToad | 07A4477 DBX | • NTP: 7/10/2018  
• Kick-off Meeting: 7/30/2018  
• Submittal Approved: 10/12/2018  
• Field Installation & Testing: Completed (May 2020)  
  • LACo, Monrovia, Duarte: 10 locations  
  • Caltrans: 1 location without existing comms. Equipment delivered to LACo Pasadena: 11 locations completed  
• TMC Server Installation & Configuration: Completed (May 2020)  
• LA Co <-> Pasadena Server Communications: configured & tested  
• System Acceptance Testing & Training:  
  • Pasadena: Completed 8/27/2020  
  • LA County, Monrovia, Duarte: Troubleshooting communications to 4 locations  
• Expected to be completed: 9/4/2020 (95%) |
P2 - BlueToad Travel Time System – Comm. Architecture

11 locations

Field Device A
Field Device B

TCP 9010
RAW DATA

Field Device C
Field Device D

TCP 9010
RAW DATA

TCP 443

10.109.110.150

Port 8010

3rd Party System

10 locations

V1: 10/9/2019
V2: 2/19/2019
V3: 6/11/2020
# 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:** 2/11/20  
• **NTP:** 2/19/2020  
• **Kick-off Meeting:** 2/25/2020  
• **Material Submittal Review**  
  • Arcadia (1 locations): Approved  
  • Pasadena (7 locations): Approved  
• **Installation:**  
  • Arcadia: completed & tested  
    • Used city-furnished controller, new equipment to be delivered to City  
  • Pasadena: Layout plans are needed for 3 locations; Relocation plans are needed for 4 location on bridge  
    • City and contractor conducted site investigation on 6/24/20  
    • Contractor will submit the plans and cost estimate  
• **Expected to be completed:** Q3-Q4, 2020 |
# Package Status – Pkg # 4

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

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Package Name</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
</table>
| 5      | Firmware/Timing Plan Updates/Controller Upgrades | 07A4480 CPE, Inc | • 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 by stakeholders (Arcadia, Pasadena, LA County, Caltrans)  
• Material  
  • Submittals – approved  
  • Materials Procurement - order placed, Estimated Date of Delivery (EDD) end of Sep 2020 (original EDD 8/5/2020)  
• Installation  
  • 3 locations in Monrovia:  
    • 3 D4 firmware licenses added to LACo license database on 7/15/2020, LACo is updating timing plan  
    • spare 1C module in LA County or Arcadia can be used to test firmware upgrade  
  • 2 locations in Arcadia: City has installed spare controllers. New equipment to be delivered to City  
  • Other locations: Oct – Nov 2020  
• Expected to be completed: Q4, 2020 |
# 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>Traffic Loops</td>
<td></td>
<td>• Kick-off Meeting: 7/30/18</td>
</tr>
<tr>
<td></td>
<td>Crackfilling, Inc</td>
<td></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:  
  • 85% done  
  • 1 Arcadia Location: scheduling site investigation & preparing cost estimate  
• Expected to be completed: Oct 2020 |
Package Status – Pkg # 8-1, 8-2, 8-3

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>DMS Procurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS Delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS Installation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS Integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS System Testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
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</tr>
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</table>

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

<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>DMS Locations</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>
<tr>
<td>Static Signs Locations</td>
<td>11</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Installation</td>
<td></td>
<td>Caltrans</td>
<td>Arcadia</td>
<td>Pasadena</td>
<td>Duarte</td>
<td>Monrovia</td>
<td>LA County</td>
</tr>
</tbody>
</table>
## 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: Sep 2020 |
# 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>
<tbody>
<tr>
<td>DMS &amp; Mounting Hardware</td>
<td>21</td>
<td>2</td>
<td>2</td>
<td>17</td>
<td>3/27/20</td>
<td>Mid Sep 2020 (impacted by COVID19)</td>
</tr>
<tr>
<td>DMS Poles &amp; Anchor Bolts</td>
<td>19</td>
<td>0</td>
<td>2</td>
<td>17</td>
<td>2/21/20</td>
<td>DMS Pole Source Inspection: 5/13/2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 delivered to LACO: 6/15/2020 (confirmed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17 delivered to Pasadena: 6/15/2020 (confirmed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DMS Anchor Bolts Source Inspection: 7/7/2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19 delivered to Pasadena: 7/9/2020 (confirmed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Green tag &amp; Orange tag to Caltrans: 8/18/2020 (Parsons)</td>
</tr>
<tr>
<td>Pull boxes</td>
<td>19</td>
<td>0</td>
<td>2</td>
<td>17</td>
<td>4/30/20</td>
<td>2 delivered to LACO: 5/21/2020 (confirmed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17 delivered to Pasadena: 6/1/2020 (confirmed)</td>
</tr>
<tr>
<td>Power &amp; Comm Cables</td>
<td>11,000 ft</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>4/23/20</td>
<td>9 boxes delivered to Pasadena: 6/4/2020 (confirmed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 box delivered to LA County: 8/18/2020 (confirmed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 box delivered to Caltrans: 8/18/2020 (Parsons)</td>
</tr>
<tr>
<td>Radios</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>5/5/20</td>
<td>Delivered to Pasadena: 6/1/2020 (confirmed)</td>
</tr>
<tr>
<td>Sign Control System with API</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3/27/20</td>
<td>API v1.5 being updated to address comments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Est. Delivery Date: 9/11/2020</td>
</tr>
<tr>
<td>Servers</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>Lead time: 3 weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LACo: VM has been set up</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pasadena: VM will be provided, provided spec of additional resources needed (price quote received)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Caltrans: Physical Server (revised quote received)</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Delivery dates and statuses are subject to change based on current conditions.*
## 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: completed  
    • Development: in progress 9/11/2020  
    • Virtual end-to-end testing: in progress  
  • DMS System Integration  
    • TMC installation & integration: LA CO TMC – 9/18/2020  
  • DMS System Testing  
    • C2C testing – starting late Sep 2020  
    • Field DMS & end-to-end integration – Oct-Nov 2020  
  • Training  
    • DMS workshop – scheduled on 9/9/2020  
  • Expected to be completed: Q1, 2021 |
Package Status – Pkg # 8-2

Development Phase (early Sep 2020)

Covered under other project: Resign Phase (Oct 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>• Static Signs DMS Installation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Installation QC Checklist &amp; location info distributed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Material Delivery: mid Sep 2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Installation: handled by stakeholder</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• LA County: Est. Oct-Dec 2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Pasadena: Est. Oct-Dec 2020 (to be discussed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Installation Support:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Ledstar will provide telephone/videocall support during installation,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>along with installation and hook-up instructional documentation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• On-site assistance can be purchased</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Expected to be completed: Q4 2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Static Signs Installation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Installation QC Checklist &amp; location info distributed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Ordered by Caltrans Maintenance Group: Jul 2019</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Arrived Caltrans Maintenance Shop: May 2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Material Inspection: passed on 6/4/2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Material Delivery: 8/18/2020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Installation: handled by stakeholder</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Expected to be completed: Q4, 2020</td>
</tr>
</tbody>
</table>
## Package Status – Pkg # 9

<table>
<thead>
<tr>
<th>Pkg. #</th>
<th>Pkg.</th>
<th>Contract #</th>
<th>Project Status</th>
</tr>
</thead>
</table>
| 9      | Environmental Stations with Air Quality Sensors and Open Data Systems (ODS) | 07A4388 Cal Poly Pomona | - NTP: 6/29/18  
- Kick-off Meeting: 7/12/18  
- 3 Environmental stations  
  - Field installation done – 6/7/19  
  - Collect data and analyze data - ongoing  
- ODS Development  
  - Developed parser for transit data from Foothill Transit & Pasadena Transit  
  - Developed parser for sample response plan (ICD v1.2)  
  - Improving the program to match transit routes and diversion routes.  
- ODS Configuration and Testing  
  - Received Inventory of Road Network from PATH  
  - Need Inventory of Signal ID & Ramp Meter ID  
  - Coordinate with PATH to test automated data  
- Expected to be completed: Q1 2021 (85%) |
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
- Package 7: Complete installation
- Package 8-1: Complete procurement
- Package 8-2: Complete development, start integration at LA Co TMC
- Package 8-3: Track installation status
- Package 9: Get requested information; Coordinate testing
Thank You and Questions?
Thank You
and
Next Meeting
(Suggest Tuesday
October 20th @ Zoom)