Connected Corridors
Face-to-Face Meeting

Tuesday, May 22nd, 2018
1:30 – 3:30 pm
District 7 - Downtown
Agenda

- 1:30-2:10 - Summary of program - Joe
- 2:10-2:30 – MOU - Mort
- 2:30-2:40 – Call for Projects update - Parsons
- 2:40-2:50 – Update on communications - Kali
- 2:50-3:00 – System Partitioning – Joe
- 3:00-3:15 – System Testing - Joe
- 3:15-3:30 – Closing
  - Next Meeting at Arcadia – July 17th
Systems Engineering Next Steps

- **Design Documents**
  - Details of interfaces and implementations

- **Hardware/Software**
  - Building the system

- **Integration**
  - Subsystems will come on line this year
Updated Schedule

Launch July 8, 2019

1. Project Management
   10/1/13 - 6/30/20
2. Outreach & Communications
   10/1/13 - 6/30/21
3. Concept Exploration / User Needs
   11/1/13 - 12/26/14
4. Corridor Preparation
   12/2/13 - 6/30/19
5. AMS - Phase 1
   1/6/14 - 5/29/15
5a. AMS - Phase 1
   1/6/14 - 5/29/15
5b. AMS - Phase 2
   6/1/15 - 6/30/19
5c. AMS - Phase 3
   7/1/18 - 6/30/21
6. SEMP Updates
   7/2/15 - 6/30/16
7. ConOps
   1/2/14 - 5/20/15
8. System Requirements
   4/23/15 - 7/29/16
8a. System Requirements
   4/23/15 - 7/29/16
9. Validation & Verification Plans
   8/1/16 - 6/30/18
8b. Validation & Verification Plans
   8/1/16 - 6/30/18
10. Technical Design
    7/1/16 - 9/30/16
11. Component Development
    8/15/16 - 3/31/19
12. System Integration
    6/1/18 - 5/31/19
13a. Institutional Design
    1/2/17 - 6/30/19
13b. Institutional Operations
    7/1/19 - 6/30/21
14. System Deployment
    1/1/19 - 6/30/19
15. Training
    5/1/19 - 6/30/21
16. Validation and Acceptance
    1/1/19 - 12/31/20
17. System Operations and Maintenance
    7/8/19 - 6/30/21
18. Pre Evaluation
    1/1/19 - 12/31/19
18a. Pre Evaluation
    1/1/19 - 12/31/19
18b. Post-Deployment Evaluation
    1/1/20 - 6/30/21
19. Migration to Production
    1/1/21 - 6/30/21
20. Metrolink
    4/1/20 - 6/30/21
21. Lessons
    1/1/21 - 6/30/21
22. Caltrans
    4/1/20 - 6/30/21
23. Operation
    1/1/21 - 6/30/21

Start 10/1/13
2014 1st Half | 2nd Half
2015 1st Half | 2nd Half
2016 1st Half | 2nd Half
2017 1st Half | 2nd Half
2018 1st Half | 2nd Half
2019 1st Half | 2nd Half
2020 1st Half | 2nd Half
2021 1st Half | 2nd Half
5 Summary
Timing Plans
- We have created over 400 plans (out of 1000)
- They are being loaded into Aimsun for testing
- Already finding small adjustments that need to be made
- Would like to meet with stakeholders for review in August

- We are gathering data from the recent big rig accident that went over the barrier so we can analyze exactly what traffic diversions occurred

- We are using the model to estimate delay for a proposed truck barrier installation on the 210
Communication

- **Amazon Cloud to/from Caltrans – Working Well**
- **Close to having VPN connection to Arcadia**
- **In discussions with Pasadena and County**
  - PATH to setup meeting with McCain and Pasadena to discuss network data path
- **Kali to discuss later in the presentation**
TMDD Interfaces to Data Hub

- **Traffic Control Systems**
  - TransCore – Arcadia and Caltrans
    - Going well
    - Installation in Arcadia now scheduled for late June
    - Installation at Caltrans scheduled for July
  - McCain - Pasadena
    - Kick off meeting three weeks ago, follow up meeting last Wednesday
    - Goal is to be done by end of year
    - PATH to setup meeting with McCain to provide specs and begin the development process
  - Kimley Horn – LA County, Monrovia and Duarte
    - Kick off tomorrow
    - Goal is to be done by end of year

- **ATMS – Caltrans (CMS Signs, Ramps)**
  - On track for a July delivery
  - We are focusing on ensuring we can accurately characterize an incident
  - We are in discussions on the test plan – Want to make sure the C2C interface is well tested
COTS (Purple Box) - ICMS

- Kapsch – Effort is officially underway
- Telegra – Planning to participate in testing of Transcore and ATMS interfaces
- Parsons – Awaiting results of Transcore testing
C2C Interface Implementations - Status

- KITS
- Transparity
- TransSuite
- Sign Vendor
- Caltrans ATMS
- TMDD Tested Interface
- DSS
- Data Hub
- TSS Model Interface (Optional)
- Kapsch
- Parsons
- Telegra
- TMDD Tested Interface
- KITS
- Transparity
- TransSuite
- Sign Vendor
- Caltrans ATMS
Data Hub and DSS Software

- **Focus on the all the C2C interfaces**
  - Management
  - Design, test, deployment discussions
  - Building out of the data pipelines to support testing
  - Refinement of response plan TMDD structure

- **Automated release 0.1 completed**

- **Continuing work on DSS and its interfaces**
  - Can now incorporate Greg’s spreadsheets
Design and Construction

- 210 TMS Upgrade - Allen
- Call for Projects (ITS Elements) – Parsons to discuss
- Call for Projects – Signs and Sign Software
  - In processing at Caltrans
  - Contract should be released for procurement soon
Set Date for Design Review

- Set date for the design review by Brian Peterson
PEMS

Held a good meeting to discuss the PEMS requirements in late April

Awaiting refinement of requirements before next steps
Call for Projects
Parsons
Agenda

- I-210 CC Arterial Systems Improvement Project
  - System Consulting Services – Scope
- Status of 9 procurement package
- Project Progress
  - Current Status
  - On-going Tasks
  - 30-Day Look Ahead
I-210 CONNECTED CORRIDORS ARTERIAL SYSTEMS IMPROVEMENT PROJECT
SYSTEM CONSULTING SERVICES

SCOPE OF WORK

Apr 10th, 2018
Project Objective

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

<table>
<thead>
<tr>
<th>#</th>
<th>Package Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Bluetooth – Iteris Velocity</td>
</tr>
<tr>
<td>2</td>
<td>Bluetooth – BlueToad</td>
</tr>
<tr>
<td>3</td>
<td>New Controller Cabinets</td>
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<tr>
<td>4</td>
<td>Communication Upgrades</td>
</tr>
<tr>
<td>5</td>
<td>Firmware/Timing Plan Updates/Controller Upgrades</td>
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<tr>
<td>6</td>
<td>Video Detection System</td>
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<tr>
<td>7</td>
<td>Data Communication Module and Video Detection Software Upgrade</td>
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<tr>
<td>8</td>
<td>Advanced Traveler Information Systems</td>
</tr>
<tr>
<td>9</td>
<td>Environmental Stations with Air Quality Sensors and Open Data Systems (ODS)</td>
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Project Area
UPDATE ON

PROCUREMENT PACKAGES 1-9

Apr 10th, 2018
# Update on Procurement Packages

## Timeline

<table>
<thead>
<tr>
<th>Event</th>
<th>Status</th>
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<tbody>
<tr>
<td>Procurement Packages</td>
<td>In Progress</td>
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<tr>
<td>Advertisement</td>
<td>Mid June 2018</td>
</tr>
<tr>
<td>Awarding</td>
<td>Jul – Aug 2018</td>
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# Current Status

## Stakeholder Outreach and Coordination

### Points of Contact

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>General</th>
<th>Permit Request Submission</th>
<th>Installation</th>
<th>Inspection</th>
<th>Comms. Connection</th>
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<td>Kevin Merrill</td>
<td>Jennifer Nishida</td>
<td>Kevin Merrill</td>
<td>Kevin Merrill</td>
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<td></td>
<td><a href="mailto:Kmerrill@arcadiaca.gov">Kmerrill@arcadiaca.gov</a></td>
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<tr>
<td>Duarte</td>
<td>Teresa Renteria</td>
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<tr>
<td>Monrovia</td>
<td>Alex Tachiki</td>
<td>Christian Cabrales,</td>
<td>Manny Garcia,</td>
<td>Richard Cortez,</td>
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<td></td>
<td><a href="mailto:Atachiki@ci.monrovia.ca.us">Atachiki@ci.monrovia.ca.us</a></td>
<td>626-932-5536</td>
<td>626-256-8202</td>
<td>626-932-5572</td>
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<td><a href="mailto:mgarcia@ci.monrovia.ca.us">mgarcia@ci.monrovia.ca.us</a></td>
<td><a href="mailto:rcorz@ci.monrovia.ca.us">rcorz@ci.monrovia.ca.us</a></td>
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<td>Pasadena</td>
<td>Arnold Dichosa</td>
<td>Bob Sulistio,</td>
<td>Assigned Public Works</td>
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<tr>
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<td>626-744-4265</td>
<td>(PW) Inspector</td>
<td>Inspector</td>
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Permit Info - City of Arcadia

- **Equipment**
  - City needs to review the equipment’s specifications
  - Waterproofing of the Bluetooth antenna installation is critical.

- **Permit for this project**
  - A no-fee permit combining Encroachment Permit and Traffic Flow Interference Permit

- **Combined Permit Application - Required Documents**
  - City of Arcadia Permit Application Form (provided)
  - Valid City of Arcadia Business License
  - Valid Contractor’s License (State of California Issued)
  - Certificate of Liability Insurance (General, Auto, Workers Compensation & Employer’s Liability, & Additional insured)
  - Proposed Work Description
  - Construction Plan/Design Plan
  - Proposed Work Schedule
  - Proposed Traffic Control Plan if lane/road closure on city streets are required (Where lane closures are not necessary, contractor shall follow the WATCH manual for traffic control measures)
  - Additional information based on potential work impacts and street closure (could be required in the review process)
 Permit Info - City of Duarte

- **Equipment**
  - City needs to review the equipment's specifications/cut sheets

- **Permit for this project**
  - ROW Permit for the field investigation phase
  - POW Permit for the construction phase

- **Permit Application - Required Documents**
  - Basic Contract Information
    - Contractor Name, License, Insurance
  - ROW Permit for the field investigation phase
    - Plan Submittal/Map showing the locations of field investigation
    - Work to be expected (boring, survey, lane closures, etc.)
  - ROW Permit for the construction phase
    - Work Plan
    - Spec/Cutsheet for Equipment to be installed
Permit Info - City of Pasadena

- **Equipment**
  - All equipment must have submittals approved by the City prior to ordering

- **Permit for this project**
  - Construction Permit

- **Construction Permit Application - Required Documents**
  - Shall schedule an appointment for pre-inspection online: [https://egov1.cityofpasadena.net/apps/pwappt/](https://egov1.cityofpasadena.net/apps/pwappt/)
  - Valid Contractor’s License (State of California Issued)
  - Certificate of Liability Insurance (General, Auto, Workers Compensation & Employer’s Liability, & Additional insured)
  - City of Pasadena Insurance Form: the “City of Pasadena” shall be included as an additional insured on a separate endorsement page, as well as the waiver of subrogation page.
  - Approved Construction Plans/Design Plan
  - Coordination with the Public Works Inspectors
Equipment
- All equipment must have submittals approved by the City prior to ordering

Encroachment/Construction Permit Application - Required Documents
- Certificate of Liability Insurance (General, Auto, Workers Comp, & Additional insured page)
- Contractor’s License
- Business License
- Maintenance of Traffic (MOT) (if any) crew License (C-31)
- Proposed Work Description
- Construction Plan/Design Plan
- Proposed Work Schedule
- Proposed MOT Plan
  - If MUTCD Compliant – a print out of the MOT Plan
  - If not MUTCD compliant – signature of a licensed engineer
- Additional information based on potential work impacts and street closure (could be required in the review process)
Permit Info - LA County

- **Equipment**
  - All equipment must have submittals approved by the County prior to ordering

- **Encroachment Permit Application - Required Documents**
  - Certificate of Liability Insurance (General, Auto, Workers Comp, & Additional insured page)
  - Contractor’s License
  - Proposed Work Description
  - Construction Plan/Design Plan
  - Proposed Work Schedule
  - Conform to LA County Road Permit Standard Provisions
  - If the proposed work is being installed in structures or facility owned by a utility company, an approval letter or permit from the corresponding agency authorizing the installation of those devices on their facilities/structures.
30-Day Look Ahead

- Continue Collecting Information from Cities and County
  - Permit
  - Communication Network Connection Guide/POC
- Prepare written agency coordination guide for future contractors
- Review of final bidding documents for 9 packages once they are ready
Thank You and Questions?
Communication
Kali
Status Update

- **VPN between City of Arcadia and Caltrans**
  - Draft IP management plan completed
  - Physical fiber connections statement of work draft
  - Review IP plan and complete VPN connection

- **VPN between City of Pasadena and Caltrans**
  - Complete VPN connection once Arcadia completed

- **Connection between County of Los Angeles and Caltrans**
  - Complete VPN and/or physical connection design

- **Start furnish and install procurement for network equipment**
CC System Components
ICM Subsystems

ICM In AWS

- Data Hub
- Decision Support System (DSS)
- Corridor Management System (CMS)

Data Sources/TMCs

Control Targets/TMCs

PEMS
Clarity on role of subsystems

- After the PEMS meeting PATH was told that there was some lack of clarity regarding the roles of the central system components

- The components are:
  - DSS
  - Data Hub
  - Purple Box
  - PEMS
Data Hub

- Receives data from all external sources (purple box also receives some information regarding confirmation of command receipt and incident/response plan (ATMS))
- Stores all data that needs to be stored – but only for 90 days
- Manages the flow of data and control requests between system components
- Performs basic data quality analysis, standardization, metrics
- Manages communications with external data providers
Decision Support

- Uses Rules and information from data hub (ITS element status for example) to generate response plans
- Can assess response plans performance impacts using corridor traffic model
- Ranks response plans based on model results or other criteria
- Provides response plans to data hub for distribution to purple box
- Imports rules spread sheets
- Performs traffic state estimation based on information from the data hub and provides traffic state estimation metrics
Purple Box

- The main User Interface for the System – (Note that Caltrans ATMS has some overlap re UI)

- Manages incident life-cycle for the system
  - Incidents are created in this system (or sent to this system by the ATMS)
  - Asks data hub for a response plan by providing an incident
  - Receives Data hub response with response plan
  - Manages response plan approvals
  - Executes the response plan by sending messages to stakeholder systems
  - Manages response plan termination

- Provides map based information on ITS Elements and response plans (reroutes for example)

- Provides near term metrics reporting (device up-time, traffic estimation metrics, etc.)
PEMS

- Long term storage of data
- Analysis and reports using long term corridor data
- User Interface for daily and long term reporting
- Daily presentation of corridor events and resulting response plans and estimated savings (if modeling is done)
CC Testing
Software/System Testing

- Unit Test
- Integration Testing
- System Testing
- Acceptance Testing
We Test in all Environments

- **Testing Hierarchy**
  - Unit
  - Functional Subsystem
  - Communication Subsystem
  - Integration
  - System
  - Acceptance

- **Environment Hierarchy**
  - Development – developers
  - Testing – Access to simulated ITS elements, simulated date, test users,
  - Production – Access to real date, field ITS elements and regular users
Keys to Ensuring Success

- All components of a system need to be tested. This includes Core ICM and extended ICM components through the entire dev, test, production deployment cycle.
- This testing must involve ITS field elements
- This testing must involve production systems and real data
- We cannot have the first "test" of the system be running a response plan during an incident. We need a phased testing process that ensures all the individual parts function as expected, and all of the parts work together as expected.
Thank You
and
Next Meeting
(Suggest July 17th in Arcadia)