Connected Corridors
Face-to-Face Meeting

Tuesday, Sept 13th, 2016 – 1:30 – 3:30 pm
Caltrans D7 HQ
Agenda

- Introductions
- Schedule Update
- Outreach
- Presentation by Lyft
- High Level Design
- Lane Closure System Demo
- Infrastructure and Partner projects
- (AMS) - Modeling and Response Plans
- Action Items and Closing
Our Corridor: The I-210
Systems Engineering Next Steps

- **Systems Requirements** – What should the ICM system do
- **Design Documents** – How will the requirements be met
Next Face to Face is Special – AMS Review

- FHWA is paying for a review of CC Analysis, Modeling and Simulation (AMS)
- Review is by
  - Vassili Alexiadis from Cambridge Systematics – A true expert in this area
  - Alex Skabardonis from Berkeley may attend – Helped write the highway manual
  - Several personnel from FHWA will also attend
- Agenda for Tuesday Oct 25th
  - 9:00-12:00 – In depth review of our modelling and analysis – Traffic engineers interested in modeling are encouraged to attend
  - 12:00-1:30 – Lunch Provided. Review of the lessons learned from other ICM efforts in the US
  - 1:30-3:30 – Our normal Face-to-Face
  - Still discussing where it will be held (here or in the Corridor)
  - Who do we see attending (there maybe others not normally in this meeting who would like to attend)
6 Schedule Update
8 Outreach and Communications
UPDATE

Lots of changes have happened over the summer for the Connected Corridors Pilot. Ron Schuler and Caltrans Headquarters and Dave Deshpande at Caltrans District 7 both retired. Rick Combs has been promoted to Chief of Office of Strategic Development and Allen Chen has been assigned to fill both roles related to CC. A very special thanks to Ian and Sue for their decades of service to the state of California and specifically for spearheading and funding the Connected Corridors Pilot since its inception. Readers can learn more about Allen Chen’s vision for the CC-Pilot on page 6. Reza Shafiei has also joined the team as the Acting System Management Principal.

The requirements phase of the Pilot is nearing completion, and work has proceeded into the high-level design and system planning phases. More information on the progress made in this phase is on page 25.

Caltrans’ detector health is improving, and the team is starting to receive more sensor data. The 1-210 corridor-wide traffic simulation model is up and running with over 650 interactions. We will discuss this model in our next newsletter.

IT SERIES: CC IN THE CLOUD

This new series will focus on best practices and emerging technologies used and their relevance to the Connected Corridors program. For this first edition, Greg Merritt with PATH highlights cloud computing.

The formula for success for Connected Corridors includes the use of corridor-scale data analytics and real-time traffic simulation to support analysis and management of the corridor. To no surprise, then, that Integrated Corridor Management requires some heavy-duty computing horsepower.

Connected Corridors has chosen a cloud computing strategy to meet these computing needs. Cloud computing is an umbrella term used to describe a wide variety of computing services, rather than any particular sort of computer equipment. Why is this distinction important?

Not long ago, individuals and organizations could only meet computing needs by purchasing, configuring, and maintaining their own computer equipment. Whether used to provide file storage, web-site hosting, database services, or simulation environments, this expensive physical infrastructure had to be sized to meet peak demand to avoid service interruptions when demand exceeded capacity.

Continued on page 2
Project Charter Amendment

• Background, documents approved, meetings held, funding secured

• Primary Changes
  • Updated contacts
  • Review/approval of the System Requirements
  • Ownership/operations of the Call for Projects improvements
  • Execution of additional agreements, as needed

• Comments?
SCAG Regional Transportation Plan

**FOCUS**

**BENEFITS OF TRANSPORTATION SYSTEMS MANAGEMENT/TRANSPORTATION DEMAND MANAGEMENT (TSM/TDM)**

- **Enhanced Incident Management**
  - Reduces incident-related congestion, which is estimated to represent half of the total congestion in urban areas.

- **Transit Automatic Vehicle Location**
  - Enables monitoring of transit vehicles and enhances on-time performance.

- **Advanced Ramp Metering**
  - Alleviates congestion and reduces collisions at on-ramps and highway-to-highway interchanges.

- **Traffic Signal Synchronization**
  - Minimizes wait times at traffic signals and therefore reduces travel time.

**Improved Data Collection**
- Allows implementing agencies and operators to monitor system performance and optimize the impact of transportation investments.

**Advanced Traveler Information**
- Provides real-time traffic conditions and alternative routing, allowing the public to make more informed travel decisions.

**Universal Transit Fare Cards (Smart Cards)**
- Reduces time required to purchase transit tickets and allows interoperability among transit providers.

**Case Study: Interstate 210 Pilot Project**

Historically, efforts to reduce congestion have focused solely on individual networks, in which underutilized capacity in parallel highway lanes, arterial lanes, and transit services were often not considered. In recent years, TSM and TDM strategies have been developed to increase efficiency through the use of technologies. The application of these technologies, such as intelligent transportation systems (ITS), and a commitment by Caltrans and its partners in the SCAG region, have the potential to transform the way that communities are currently operated.

In 2012, Caltrans, with assistance from Metro and California Partners for Advanced Transportation Technology (PATH) at UC Berkeley, developed the Integrated Corridor Management (ICM) pilot project within the SCAG region along the Interstate 210 B-20 corridor. The purpose of the pilot is to look at all opportunities to move people and goods in the most efficient manner possible, to ensure the greatest potential gains in operational performance. This includes seeking ways to improve the arterial, highways, transit and parking systems work in conjunction with one another.

Strategies to be considered as part of the project include:
- Integration of ramp metering and arterial signal systems
- Traffic signal coordination
- Traffic re-routing due to incidents or events
- Transit signal prioritization and arterial and on-ramps
- Parking management (e.g., smart parking—locating available parking spaces at transit stations and private parking parcels)
- Variable lane configuration systems
- Telematics communication (e.g., variable message signs, 511, radio, social networks, mobile app, and traffic conditions, transit services, parking, alternate route/ride options)
- System coordination for communication between Caltrans and local jurisdictions
- The pilot is still under development, but it has already changed the way that state and local transportation agencies work together in managing transportation systems. Caltrans aims to eventually expand the application of ICM concepts to other corridors over the next ten years. In this context, the Interstate 210 Pilot test bed is designed to demonstrate how an ICM project can be developed, implemented, and built consensus among corridor stakeholders, to address congestion in the betterment of an entire network.
Lyft and Connected Corridors

Nadir Vissanjy
Chief of Staff, Lyft Government, Education & Health Team
Nadir@Lyft.com  916-316-5555
Our Vision
To reconnect people and communities through better transportation

Our Mission
Uniting humanity and technology to make everyday rides welcoming, affordable, and memorable
Ridesharing’s market share is growing

Source: Certify SpendSmart Report, Q4 2015
High Level Design
High Level Design

- All Requirements
  - Hardware and Software
    - Technical Design
    - Technical Requirements
  - Individual and Group
    - Organizational Design
    - Operational Roles and Responsibilities
  - Service Level Agreements
  - MOUs
Organizations and Personnel
Job Descriptions and Duties/Tasks

I-210 Pilot System Requirements:

Job Descriptions and Duties/Tasks

September 8, 2016

• Corridor Champions
• Corridor Manager
• Corridor Technical Manager
• Corridor Data Analyst
• Traffic Engineers
• Data Analysts
• Software Engineers
• Electrical Engineers
• Database Administrators
• Stakeholders
• Maintenance Staff
• Information Technology Support
• Information Technology Security
• TMS/TCS Operators
• Transit Field Supervisors
• Public Information Officers
• First Responders
• Outreach and Communications Manager
Institutions, Organizations and Personnel

- Completed draft containing a subset of the I-210 System Requirements document
  - Job Descriptions and Duties/Tasks
  - Focused on requirements for Connected Corridors
  - Not on all duties related to Corridor Management

- We envision these being integrated into the “Inventory of Required Knowledge, Skill Sets and Abilities” being provided by the KH contract

- Lisa will begin working on system engineering design and test documents related to these institutional, organizational and personnel requirements
  - Will need to work with each of you to determine implementation and test plans
  - While there may be overlap with the KH contract we are responsible for ensuring that our requirements are met and that our system engineering process is followed so we cannot relinquish responsibility to the other contract
Updates

- **Requirements being broken apart into technical components**
  - Detailed review
  - Sequence diagrams
  - Definition of exactly what goes in each box
  - Preparation for Proof of Concept

- **Engagement with Caltrans IT**
  - POC – Mike Nguyen
  - Meeting 9/16/16 with IT Managers to review CC Architecture
  - Short tour of Berkeley Computer Science labs to be provided

- **Engagement with possible “purple box” vendors**
  - Telegra and Kapsich
  - More to come
Updates

- Data Hub architecture effort starting
- Freeway estimation accuracy is being improved
- Meeting (as we speak) with TSS to get Aimsun model running in the cloud
- Met with companies that help manage Amazon cloud infrastructure
- Attended Cassandra conference
- Working with Amazon to obtain free cloud training for Caltrans and others
With the capture of an incident or event complete the following:
- Confirm the incident
- Determine if response plans should be developed
- Develop those response plans
- Evaluate all response plans (including do-nothing)
- Recommend a response plan
- Obtain approval for the response plan
- Execute the response plan
Connected Corridors: I-210 Pilot
Integrated Corridor Management System

Validation Plan

September 12, 2018
# Validation Matrix

<table>
<thead>
<tr>
<th>ID</th>
<th>User Need</th>
<th>Corridor Monitoring</th>
<th>Data Processing</th>
<th>System Setup and Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Collect and Process Multimodal Data Characterizing Corridor Operational Performance</td>
<td>⬤</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2</td>
<td>Collect and Process Multimodal Corridor Travel Demand Data</td>
<td>⬤</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3</td>
<td>Monitor Asset Availability</td>
<td>⬤</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4</td>
<td>Decision-making Assistance</td>
<td></td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

**System Monitoring**

- 1 Collect and Process Multimodal Data Characterizing Corridor Operational Performance
- 2 Collect and Process Multimodal Corridor Travel Demand Data
- 3 Monitor Asset Availability

**Decision Support**

- 4 Decision-making Assistance
Partner Projects
Partner Projects

- I-210 SHOPP Project
- Metro Call for Projects
- ATMS
- TSMSS
- PEMS
- Lane Closure System
- IEN
- RIITS
- 511
- COTS POC
- CC State Wide Rollout
I-210 Pilot – SHOPP Project Update

- EA 30640 – Freeway Improvements (SHOPP Project)
  - Finish Construction July, 2018
- Awaiting a CPM schedule from contractor to determine when work up to the 605 will be completed
- Includes communication, signal upgrades, cameras, etc.
<table>
<thead>
<tr>
<th><strong>I-210 Connected Corridor - Pilot Project</strong></th>
<th><strong>Task Execution</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>County</td>
<td></td>
</tr>
<tr>
<td>Communication Improvements - IEN Upgrade</td>
<td>$400,000</td>
</tr>
<tr>
<td>Caltrans</td>
<td></td>
</tr>
<tr>
<td>New Traffic Signal</td>
<td>$300,000</td>
</tr>
<tr>
<td>Controller Firmware/Communication Upgrades</td>
<td>$735,600</td>
</tr>
<tr>
<td>Traffic Detection Improvements</td>
<td>$1,753,000</td>
</tr>
<tr>
<td>Communication Improvements</td>
<td>$200,000</td>
</tr>
<tr>
<td>Advanced Traveler Information Systems</td>
<td>$912,500</td>
</tr>
<tr>
<td>Environmental Stations</td>
<td>$24,000</td>
</tr>
<tr>
<td>Bluetooth Devices</td>
<td>$110,950</td>
</tr>
<tr>
<td>Total Caltrans</td>
<td>$4,036,050</td>
</tr>
<tr>
<td>Total (County + Caltrans)</td>
<td>$4,436,050</td>
</tr>
<tr>
<td>Contingency (15%)</td>
<td>$605,408</td>
</tr>
<tr>
<td>Design</td>
<td>$800,000</td>
</tr>
<tr>
<td>Construction Support (Does this include inspection?)</td>
<td>$600,000</td>
</tr>
<tr>
<td>Total (Contingency, Design, Construction Support)</td>
<td>$2,005,408</td>
</tr>
<tr>
<td>$2,005,408</td>
<td>$2,005,408</td>
</tr>
<tr>
<td>Percentage of total for Cont, Design, Con)</td>
<td>0.310627754</td>
</tr>
<tr>
<td>$6,441,458</td>
<td>$6,441,458</td>
</tr>
<tr>
<td><strong>Budget</strong></td>
<td><strong>$6,455,983</strong></td>
</tr>
<tr>
<td><strong>$14,526</strong></td>
<td></td>
</tr>
</tbody>
</table>
Call for Projects ITS List

- Have list and now need design details
- Metro awaiting request for funding
- Caltrans personnel are now the lead
- Caltrans personnel unsure how to resource or approach
Met with Allen and Amahayes
- Interface not integration
- TMC Operator is to validate corridor conditions and monitor implementation of preapproved plan

Identified high level requirements

Provided draft list of requirements for review

Next Steps:
- Finalize requirement
- Initiate PID
- Submit to SHOPP
Spoke with Caltrans HQ

Indicated that we should have a test interface in 1-3 months

Metro/LA County requested that CC access TSMSS through IEN
PEMS

- Decision made to use PEMS
  - Must resolve different information received from Sandag and Iteris
  - Funding and ongoing support

- Corridor PEMS will be expanded to the I-210

- Must determine level of integration of Corridor PEMS with COTS interface
  - UI
  - Algorithms
Lane Closure System

- Demonstration by Mike Jenkinson
LA County – IEN

- **Agreed to meet basic CC requirements in the following areas**
  - Signal Control and Detection
  - CMS Control and Detection (CC must determine CMS control software)
  - Travel Time – Will provide travel time between two points

- **Schedule Risk**
  - In February 2017, LA County will indicate schedule for IEN upgrades
  - If County cannot deliver functions in time for CC launch
    - CC will use IEN for reading of data
    - CC will develop interfaces/software for
      - Requesting signal plans
      - CMS signs
      - Travel Time
  - We all hope County will be able to meet CC launch schedule
RIITS will provide:
- Transit information from Metro, Foothill and Pasadena Transit
- Waze information
- Here information

We would work to provide Environmental data to RIITS
- RIITS may be willing to cover the maintenance for our two environmental stations

Video Sharing
- RIITS has expressed interest in becoming the video sharing solution
- However LA County also has a video sharing solution

We agreed that RIITS would handle parking information but this was not a high priority at this time

We agreed that more discussion was required on:
- Incident and event information
- Exactly how ramp metering information will work
We will send information to 511 describing our reroutes. This will include a general message and a specific message for I-210 commuters.

We will also send update at least once every 15 minutes.

We will send this using RIITS APIs.

We should be able to test this out beginning in January of 2017.

We decided that we would not send forecast/prediction information.

Agreed to provide call box locations for environmental sensors.
COTS POC

- Have spoken with Telegra and Kapsich
- Both have an indicated an interest
- Need to speak with others
- Need to define functionality and interfaces
- Need to understand legal framework
- Need to understand scope of work for PATH as part of this
CC State Wide Roll Out

State Wide CC

Funding
- Internal
- External

Legal
- MOUs
- TSM&O
- Planning
- TMS

Synergies
- Interagency Responsibilities
- Off right of way funding agreements

Management
- High Level Briefings
- Incentives
- Schedules
- Common Tools (DSS, DQ, ETC)
- Architecture
- Data Hub
- Organizational Structure
- KSA
- BCPs

Technical
- Management
- Personnel

Enablement Assistance
- Relationships
- Process

Training
- HQ Personnel
- Districts
- Stakeholders

Knowledge
- New Curriculum
- New Skill Requirements
- Inclusion of Consultants
- Input from Districts
- Input from HQ organizations
- Input from Regional Agencies
- Media
- Legislative
- Executive
- Directors Directives
- Templates
- Methodology
- Quality Assurance

Outreach
- Pilots
- Vision
- Cultural Change and Turnover
- Advanced Decision Support

Process
- Research
Data Quality
### Freeway data quality

#### Weekly Average Data Quality

<table>
<thead>
<tr>
<th>Loops in Category</th>
<th>Fwy-Fwy</th>
<th>HOV</th>
<th>Mainline</th>
<th>Off Ramp</th>
<th>On Ramp</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul3-9</td>
<td>66.7%</td>
<td>70.0%</td>
<td>79.2%</td>
<td>70.0%</td>
<td>89.3%</td>
<td>77.4%</td>
</tr>
<tr>
<td>Jul10-16</td>
<td>64.3%</td>
<td>78.0%</td>
<td>87.1%</td>
<td>68.6%</td>
<td>92.3%</td>
<td>83.4%</td>
</tr>
<tr>
<td>Jul17-23</td>
<td>47.6%</td>
<td>81.2%</td>
<td>87.7%</td>
<td>71.4%</td>
<td>93.5%</td>
<td>84.4%</td>
</tr>
<tr>
<td>Jul24-30</td>
<td>61.9%</td>
<td>75.1%</td>
<td>80.2%</td>
<td>60.0%</td>
<td>74.4%</td>
<td>76.0%</td>
</tr>
<tr>
<td>Jul31-Aug06</td>
<td>33.3%</td>
<td>77.6%</td>
<td>82.2%</td>
<td>64.3%</td>
<td>82.7%</td>
<td>78.2%</td>
</tr>
<tr>
<td>Aug07-Aug13</td>
<td>33.3%</td>
<td>82.9%</td>
<td>87.7%</td>
<td>70.0%</td>
<td>92.3%</td>
<td>84.0%</td>
</tr>
<tr>
<td>Aug14-Aug20</td>
<td>33.3%</td>
<td>78.4%</td>
<td>85.8%</td>
<td>71.9%</td>
<td>87.5%</td>
<td>81.9%</td>
</tr>
<tr>
<td>Aug21-Aug27</td>
<td>33.3%</td>
<td>86.5%</td>
<td>90.5%</td>
<td>78.6%</td>
<td>92.9%</td>
<td>87.3%</td>
</tr>
<tr>
<td>Aug28-Sept3</td>
<td>33.3%</td>
<td>86.5%</td>
<td>91.1%</td>
<td>78.1%</td>
<td>92.3%</td>
<td>87.5%</td>
</tr>
<tr>
<td>Sept4-Sept10</td>
<td>33.3%</td>
<td>84.5%</td>
<td>90.5%</td>
<td>73.8%</td>
<td>91.1%</td>
<td>86.2%</td>
</tr>
</tbody>
</table>

| Loops in Category | 6       | 35    | 148    | 30      | 24      | 243   |

#### Eastbound I-210 PM 25 to PM 43.25

<table>
<thead>
<tr>
<th>Loops in Category</th>
<th>Fwy-Fwy</th>
<th>HOV</th>
<th>Mainline</th>
<th>Off Ramp</th>
<th>On Ramp</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul3-9</td>
<td>75.0%</td>
<td>60.2%</td>
<td>72.1%</td>
<td>77.0%</td>
<td>86.7%</td>
<td>72.3%</td>
</tr>
<tr>
<td>Jul10-16</td>
<td>75.0%</td>
<td>65.0%</td>
<td>76.5%</td>
<td>77.0%</td>
<td>88.3%</td>
<td>75.8%</td>
</tr>
<tr>
<td>Jul17-23</td>
<td>85.7%</td>
<td>63.2%</td>
<td>73.0%</td>
<td>74.7%</td>
<td>82.1%</td>
<td>72.9%</td>
</tr>
<tr>
<td>Jul24-30</td>
<td>100.0%</td>
<td>63.9%</td>
<td>72.0%</td>
<td>71.4%</td>
<td>73.0%</td>
<td>71.4%</td>
</tr>
<tr>
<td>Jul31-Aug06</td>
<td>100.0%</td>
<td>66.9%</td>
<td>75.3%</td>
<td>74.7%</td>
<td>77.6%</td>
<td>74.7%</td>
</tr>
<tr>
<td>Aug07-Aug13</td>
<td>100.0%</td>
<td>75.2%</td>
<td>83.2%</td>
<td>83.9%</td>
<td>91.3%</td>
<td>83.2%</td>
</tr>
<tr>
<td>Aug14-Aug20</td>
<td>100.0%</td>
<td>73.3%</td>
<td>80.2%</td>
<td>81.1%</td>
<td>86.7%</td>
<td>80.3%</td>
</tr>
<tr>
<td>Aug21-Aug27</td>
<td>100.0%</td>
<td>72.6%</td>
<td>78.3%</td>
<td>84.3%</td>
<td>84.2%</td>
<td>79.2%</td>
</tr>
<tr>
<td>Aug28-Sept3</td>
<td>100.0%</td>
<td>71.8%</td>
<td>78.4%</td>
<td>86.2%</td>
<td>83.2%</td>
<td>79.2%</td>
</tr>
<tr>
<td>Sept4-Sept10</td>
<td>100.0%</td>
<td>72.6%</td>
<td>79.6%</td>
<td>86.2%</td>
<td>85.7%</td>
<td>80.3%</td>
</tr>
</tbody>
</table>

| Loops in Category | 8       | 38    | 160    | 31      | 28      | 266   |

#### Westbound I-210 PM 25 to PM 43.25

<table>
<thead>
<tr>
<th>Loops in Category</th>
<th>Fwy-Fwy</th>
<th>HOV</th>
<th>Mainline</th>
<th>Off Ramp</th>
<th>On Ramp</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul3-9</td>
<td>75.0%</td>
<td>60.2%</td>
<td>72.1%</td>
<td>77.0%</td>
<td>86.7%</td>
<td>72.3%</td>
</tr>
<tr>
<td>Jul10-16</td>
<td>75.0%</td>
<td>65.0%</td>
<td>76.5%</td>
<td>77.0%</td>
<td>88.3%</td>
<td>75.8%</td>
</tr>
<tr>
<td>Jul17-23</td>
<td>85.7%</td>
<td>63.2%</td>
<td>73.0%</td>
<td>74.7%</td>
<td>82.1%</td>
<td>72.9%</td>
</tr>
<tr>
<td>Jul24-30</td>
<td>100.0%</td>
<td>63.9%</td>
<td>72.0%</td>
<td>71.4%</td>
<td>73.0%</td>
<td>71.4%</td>
</tr>
<tr>
<td>Jul31-Aug06</td>
<td>100.0%</td>
<td>66.9%</td>
<td>75.3%</td>
<td>74.7%</td>
<td>77.6%</td>
<td>74.7%</td>
</tr>
<tr>
<td>Aug07-Aug13</td>
<td>100.0%</td>
<td>75.2%</td>
<td>83.2%</td>
<td>83.9%</td>
<td>91.3%</td>
<td>83.2%</td>
</tr>
<tr>
<td>Aug14-Aug20</td>
<td>100.0%</td>
<td>73.3%</td>
<td>80.2%</td>
<td>81.1%</td>
<td>86.7%</td>
<td>80.3%</td>
</tr>
<tr>
<td>Aug21-Aug27</td>
<td>100.0%</td>
<td>72.6%</td>
<td>78.3%</td>
<td>84.3%</td>
<td>84.2%</td>
<td>79.2%</td>
</tr>
<tr>
<td>Aug28-Sept3</td>
<td>100.0%</td>
<td>71.8%</td>
<td>78.4%</td>
<td>86.2%</td>
<td>83.2%</td>
<td>79.2%</td>
</tr>
<tr>
<td>Sept4-Sept10</td>
<td>100.0%</td>
<td>72.6%</td>
<td>79.6%</td>
<td>86.2%</td>
<td>85.7%</td>
<td>80.3%</td>
</tr>
</tbody>
</table>

<p>| Loops in Category | 8       | 38    | 160    | 31      | 28      | 266   |</p>
<table>
<thead>
<tr>
<th>Weekly Data Quality (%)</th>
<th>Detour Routes</th>
<th>Not Detour Routes</th>
<th>All Detectors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Bad</td>
<td>No Data</td>
</tr>
<tr>
<td>05-Jun-2016 To 11-Jun-2016</td>
<td>52.07</td>
<td>41.94</td>
<td>5.99</td>
</tr>
<tr>
<td>12-Jun-2016 To 18-Jun-2016</td>
<td>47.00</td>
<td>47.00</td>
<td>5.99</td>
</tr>
<tr>
<td>19-Jun-2016 To 25-Jun-2016</td>
<td>49.05</td>
<td>44.96</td>
<td>5.99</td>
</tr>
<tr>
<td>26-Jun-2016 To 02-Jul-2016</td>
<td>51.38</td>
<td>42.63</td>
<td>5.99</td>
</tr>
<tr>
<td>03-Jul-2016 To 09-Jul-2016</td>
<td>51.91</td>
<td>42.10</td>
<td>5.99</td>
</tr>
<tr>
<td>10-Jul-2016 To 16-Jul-2016</td>
<td>49.84</td>
<td>44.17</td>
<td>5.99</td>
</tr>
<tr>
<td>17-Jul-2016 To 23-Jul-2016</td>
<td>50.53</td>
<td>43.48</td>
<td>5.99</td>
</tr>
<tr>
<td>24-Jul-2016 To 30-Jul-2016</td>
<td>51.32</td>
<td>42.69</td>
<td>5.99</td>
</tr>
<tr>
<td>31-Jul-2016 To 06-Aug-2016</td>
<td>50.99</td>
<td>43.02</td>
<td>5.99</td>
</tr>
<tr>
<td>07-Aug-2016 To 13-Aug-2016</td>
<td>51.42</td>
<td>42.59</td>
<td>5.99</td>
</tr>
<tr>
<td>14-Aug-2016 To 20-Aug-2016</td>
<td>55.92</td>
<td>38.08</td>
<td>5.99</td>
</tr>
<tr>
<td>21-Aug-2016 To 27-Aug-2016</td>
<td>56.98</td>
<td>37.03</td>
<td>5.99</td>
</tr>
<tr>
<td>28-Aug-2016 To 03-Sep-2016</td>
<td>53.59</td>
<td>40.42</td>
<td>5.99</td>
</tr>
<tr>
<td>04-Sep-2016 To 10-Sep-2016</td>
<td>52.47</td>
<td>41.54</td>
<td>5.99</td>
</tr>
</tbody>
</table>
Corridor Data

- **Freeway**
  - Good progress being made on configuration and basic hardware issues on freeway
  - Weekly hour-long meeting
  - Tracking of reasons for challenges in data quality

- **All cities and LA County have agreed to start sharing their traffic data for analysis**
  - Arcadia showing improvement
  - Dates for others?
Response Plans
Response Plan Meetings

- We held a half-day response plan and model review meeting in Arcadia on August 23rd
  - Validated alternate routes
  - Discussed inputs into rerouting decisions
  - Discussed inputs into timing plan decisions
  - Reviewed Corridor (Micro/Meso) Model
  - Ran Simulations
  - Discussed thresholds for severity and determination of corridor impact
  - Discussed metrics to use in making decisions
300 preliminary (i.e. possible) alternate routes were identified between Lake and Buena Vista on the approved arterial network.

This set of 300 alternate routes is our “menu” of choices for alternate routes to support an incident at a given location.
Alternate Routes for Incidents at Specific Locations

- We proposed sets of specific alternate routes to support incident management for thirty locations along the I-210.
- We reviewed a number of these in detail on August 23rd.
Response Plan Meetings

- We held separate follow-up meetings on August 28-29 to review specific alternate route details and wayfinding sign installation logistics with...
  - Pasadena
  - Arcadia
  - Monrovia
  - L.A. County

- This feedback helped refine the list of wayfinding sign installations
Simulation Modeling
Aimsun Model

- Modeling of roadways, transit services, and basic control elements complete
Aimsun Model – Current Activities

- **Demand modeling**
  - Received 2012 SCAG travel demand data two weeks ago – currently processing the data for inclusion in the model
  - Adding traffic count data into the model – to be used for origin-destination demand modeling and calibration

- **Driver behavior calibration**
  - Tweaking driver behavior parameters to better reproduce traffic dynamics at freeway merge, weaving areas, and other bottlenecks
    - Lane changing aggressiveness
    - Acceleration/deceleration
    - Spacing between vehicles
    - Influence of slower traffic on adjacent lanes
Aimsun Model – Current Activities

- **Routing behavior calibration**
  - Evaluating alternate trip cost formulas to ensure realistic route choices under dynamic scenarios

Cost = Travel Time
= Travel Time + Distance
= Travel Time + 0.5 * Distance + Ramp Meter Costs
Aimsun Model – Next Steps Activities

- Development of Origin-destination matrices based on
  - 2012 SCAG data
  - Information extracted from Pasadena’s VISUM model
  - Available traffic counts

- Calibration of freeway flow performance for AM and PM peaks
  - Location and extent of bottlenecks
  - Observed speeds

- October 25: Critique of model by Cambridge Systematics as part of a USDOT funded effort
Capstone Project at Berkeley

- **One year Masters of Engineering project for four highly motivated experienced students**
  - 1-5 Years Business experience
  - Ages 22-27

- **Solving DTA for the I-210 under various incentives**

- **Would like input from interested modelers at:**
  - SCAG
  - Metro
  - Caltans
  - Cities
Action Items and Next Meeting Time
Thank You