I-210 Corridor Analysis
Corridor Geometry – Number of Lanes

- I-210: 4 Lanes + 1 HOV
- SR-134 to one interchange east of SR-57

Many arterial have a wide shoulder or curb-size parking → Potential for additional traffic lane.
Jurisdictional Environment

Area 1
Pasadena

Area 2
Arcadia / Monrovia
Duarte

Area 3
Azusa / Glendora / Citrus
Irwindale / San Dimas
Freeway Control – Ramp Metering

- 2001 SWARM Test Area
- 2009/2010 SWARM Test Area

Legend:
- Red: Freeway
- Blue: Arterial
- Orange: Metered Interchange
- Brown: Partially Metered Interchange
- Red: Metering installed / not operational
- Red: Unmetered Interchange

Locations:
- Vernon Ave
- Baseline Ave
- Lake Ave
- SWARM Test Area

Study Areas:
- 2001 SWARM Test Area
- 2009/2010 SWARM Test Area
Parking Occupancy

- **90-99% Occupancy**: P 965
- **80-89% Occupancy**: P 965
- **50-79% Occupancy**: P 965
- **Less than 50% Occupancy**: P 965
- **100% and Above Occupancy**: P 965
- **90-99% Occupancy**: P 965
- **80-89% Occupancy**: P 965
- **50-79% Occupancy**: P 965
- **Less than 50% Occupancy**: P 965
- **Existing facility – No Occupancy Data**: P 965
- **Planned Park-and-ride Lots**: P 965

- **Bus Lines**
- **Metro Silver Line**
- **Metro Gold Line**
- **Metro Gold Line Extension (Phase 2a)**
- **Transit Station**

**Foothill Transit 699 (Express)**
**Foothill Transit 492 (Express)**
**Silver Streak (Bus Rapid)**

**100% and Above Occupancy**

**100%**
**94%**
**92%**

**90-99% Occupancy**

**90%**
**20%**
**46%**
**84%**

**80-89% Occupancy**

**50-79% Occupancy**

**Less than 50% Occupancy**

**Existing facility – No Occupancy Data**

**Planned Park-and-ride Lots**
**Congestion Analysis – Freeway Travel Times**

- **Free-flow**
  - ~20 min

- **EB Congestion**
  - 30-55 min,
  - PM peak
  - Significantly higher peak travel times on Fridays

- **WB Congestion**
  - 25-40 min
  - AM peak
Congestion Analysis – Freeway Congestion

Frequently occurring congestion area based on 2013 PeMS data

- AM Peak
  - Local bottleneck active around 5:30 AM
- PM Peak
  - No congestion found on freeways (210E, 134E, 110N) beyond this point

- Times:
  - 6:00-10:00
  - 6:00-9:00
  - 7:00-9:30
  - 13:00-19:00
  - 15:00-19:00
  - 15:00-17:00
  - 15:00-19:00
  - 16:00-19:00
  - 13:00-14:00
Congestion Analysis – Freeway Congestion

Bottlenecks identified in 2010
CSMP based on 2006-2008 data
Congestion Analysis – Intersection V/C Ratios

**AM Peak**

### 2006
- Huntington Dr: 0.46, 0.49, 0.60
- Las Tunas Dr: 0.85, 0.82
- 2009
- Gladstone St: 0.95, 0.70

### 2009/10
- 210: 0.95, 0.84
- 57: 0.97, 0.82

**Color = LOS**
- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

**V/C**
- 1.04

**2009/10**
- Huntington Dr: 0.62, 0.63
- Las Tunas Dr: 0.52, 0.48

**2009**
- Huntington Dr: 0.94, 0.85
- Las Tunas Dr: 0.65, 0.65

**2006**
- Huntington Dr: 0.72, 0.68
- Las Tunas Dr: 0.63, 0.64

**2009**
- Huntington Dr: 0.91, 0.68
- Las Tunas Dr: 0.68, 0.68

**Legend**
- V/C
- Color = LOS
- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

**2009/10**
- Huntington Dr: 0.97, 0.96
- Las Tunas Dr: 0.82, 0.82

**2009**
- Huntington Dr: 0.91, 0.72
- Las Tunas Dr: 0.72, 0.72
Congestion Analysis – Intersection V/C Ratios

PM Peak

V/C

Color = LOS

LOS A

LOS B

LOS C

LOS D

LOS E

LOS F

2009

2010

2006

2009/10

Gladstone St
Congestion Analysis – Observed Speeds

Google Data
Tuesday, April 16, 2013 – 8:00 AM

Google Data
tuesday, April 16, 2013 – 6:00 PM
Congestion Analysis – Observed Speeds

Google Data
Friday, April 19, 2013 – 3:20 PM

Google Data
Friday, April 19, 2013 – 5:10 PM
Truck Operations

- **Truck volumes**
  - 3-5% of overall traffic along mainline
  - Typically less than 1% on most arterial ramps
  - **Exception:** Irwindale interchange during AM peak and Midday periods

**Irwindale Interchange Truck Volumes – May 2011 (veh/hr)**

- **AM Peak**
  - 159 / 1817 (8.8%)
  - 188 / 1410 (13.3%)

- **Midday**
  - 30 / 511 (5.9%)
  - 34 / 889 (3.8%)
  - 178 / 1160 (15.3%)
  - 237 / 1242 (19.1%)

- **PM Peak**
  - 46 / 669 (6.9%)
  - 52 / 745 (7.0%)
  - 49 / 1900 (2.6%)
  - 24 / 974 (2.5%)
  - 29 / 562 (5.1%)
  - 17 / 1059 (1.6%)
Travel Demand Profile

- **Travel demand analysis (AM Peak)**
  - Based on Caltrans version of SCAG’s 2000 travel demand model
  - Trips with portion of travel within I-210 corridor area

<table>
<thead>
<tr>
<th></th>
<th>I-210</th>
<th>Southern LA</th>
<th>Northern LA</th>
<th>Orange</th>
<th>Riverside</th>
<th>San Bernadino</th>
<th>Ventura</th>
<th>Outside Zone</th>
<th>Total Origin</th>
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<tbody>
<tr>
<td>I-210</td>
<td>83,477</td>
<td>49,842</td>
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<td>3,431</td>
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<td>897</td>
<td>7,780</td>
<td>1,766</td>
<td>76</td>
<td>61</td>
<td>29</td>
<td>95</td>
<td>76</td>
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<tr>
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<td>45</td>
<td>12</td>
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<td>0</td>
<td>0</td>
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<td>286</td>
<td>9</td>
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<td>0</td>
<td>0</td>
<td>23</td>
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<td>San Bernardino</td>
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<td>71</td>
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<td>0</td>
<td>0</td>
<td>105</td>
<td>99</td>
<td>9,862</td>
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<td>Ventura</td>
<td>2,006</td>
<td>103</td>
<td>50</td>
<td>10</td>
<td>45</td>
<td>109</td>
<td>0</td>
<td>33</td>
<td>2,356</td>
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<tr>
<td>Outside Zones</td>
<td>280</td>
<td>180</td>
<td>9</td>
<td>21</td>
<td>85</td>
<td>90</td>
<td>10</td>
<td>336</td>
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<tr>
<td>Total Dest.</td>
<td>106,042</td>
<td>56,577</td>
<td>4,603</td>
<td>3,356</td>
<td>910</td>
<td>4,243</td>
<td>3,267</td>
<td>1,377</td>
<td>180,375</td>
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</tbody>
</table>

*Source: I-210 CSMP Report (2010)*
Travel Demand Profile

- **Travel demand analysis (PM Peak)**
  - Based on Caltrans version of SCAG’s 2000 travel demand model
  - Trips with portion of travel within I-210 corridor area

<table>
<thead>
<tr>
<th></th>
<th>I-210</th>
<th>Southern LA</th>
<th>Northern LA</th>
<th>Orange</th>
<th>Riverside</th>
<th>San Bernadino</th>
<th>Ventura</th>
<th>Outside Zone</th>
<th>Total Origin</th>
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<tbody>
<tr>
<td>I-210</td>
<td>122,552</td>
<td>58,306</td>
<td>10,380</td>
<td>4,747</td>
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<td>409</td>
<td>2,048</td>
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<td>363</td>
<td>82,319</td>
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<td>53</td>
<td>43</td>
<td>155</td>
<td>76</td>
<td>16</td>
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<td>Orange County</td>
<td>5,735</td>
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<td>0</td>
<td>1</td>
<td>13</td>
<td>111</td>
<td>6,011</td>
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<tr>
<td>Riverside</td>
<td>1,306</td>
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<td>0</td>
<td>0</td>
<td>23</td>
<td>135</td>
<td>1,739</td>
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<td>San Bernadino</td>
<td>7,103</td>
<td>1,275</td>
<td>167</td>
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<td>0</td>
<td>0</td>
<td>105</td>
<td>125</td>
<td>8,778</td>
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<tr>
<td>Ventura</td>
<td>2,056</td>
<td>103</td>
<td>55</td>
<td>14</td>
<td>46</td>
<td>134</td>
<td>0</td>
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<tr>
<td>Outside Zones</td>
<td>1,062</td>
<td>546</td>
<td>23</td>
<td>284</td>
<td>341</td>
<td>278</td>
<td>15</td>
<td>1,164</td>
<td>3,713</td>
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<td>Total Dest.</td>
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<td>64,434</td>
<td>12,498</td>
<td>5,223</td>
<td>3,110</td>
<td>13,651</td>
<td>3,272</td>
<td>2,557</td>
<td>326,653</td>
</tr>
</tbody>
</table>

Travel Demand Profile

- Travel demand 52% greater during PM peak
- 85-87% of trip originating or terminating in LA County
  - 38-39% travel within I-210 corridor
  - 41% travel to/from Southern LA County
  - 7% travel to/from other sections of LA County
Travel Demand Profile

- **Freeway interchange truck volumes**

![Freeway interchange truck volumes diagram](image-url)
Trip Generators – Malls, Hospitals, Colleges

- Cal Stateroll: 50,000 employees
- Caltech: 3,000 students, 12,000 employees
- Pasadena City College: 20,000 students, 2,000 employees
- San Diego State University: 30,000 students, 12,000 employees
- Azusa Pacific University: 13,000 students, 10 beds
- Mount San Antonio College: 42,000 students
- Cal Poly Pomona: 25,000 Students
Trip Generators – Schools

Public
- Elementary School
- Middle School
- High School

Private
- K-8
- K-12
- Elementary School
- Middle School
- High School
Trip Generators – Warehouses

Irwindale Interchange
Trip Generators – Major Events

- Tournament of Roses & Rose Parade
- Rose Bowl
- Pasadena Marathon
- Art Night (Pasadena – Spring and Fall)
## Incidents – Frequency and Rates

### All Incident Types, All Days, Jan 2012 – Dec 2012

<table>
<thead>
<tr>
<th>Section</th>
<th>I-210 W</th>
<th></th>
<th></th>
<th>I-210 E</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Incidents</td>
<td>VMT</td>
<td>Incidents/Day</td>
<td>Incidents/million VMT</td>
<td>Number of Incidents</td>
<td>VMT</td>
</tr>
<tr>
<td>SR-134 to Rosemead</td>
<td>871</td>
<td>218,358,820</td>
<td>2.39</td>
<td>3.99</td>
<td>834</td>
<td>232,814,377</td>
</tr>
<tr>
<td>Rosemead to I-605</td>
<td>1,081</td>
<td>315,127,783</td>
<td>2.96</td>
<td>3.43</td>
<td>1,451</td>
<td>290,060,629</td>
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<tr>
<td>I-605 to SR-57</td>
<td>1,479</td>
<td>388,333,834</td>
<td>4.05</td>
<td>3.81</td>
<td>1,457</td>
<td>369,802,092</td>
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<tr>
<td>Total</td>
<td>3,431</td>
<td>921,820,437</td>
<td>9.40</td>
<td>3.72</td>
<td>3,751</td>
<td>892,677,099</td>
</tr>
</tbody>
</table>
Incidents – Causes

Database: Traffic Accident Surveillance and Analysis System (TASAS)
Study Period: 2000-2009
Incidents – Frequency by Location and Time

- Incidents primarily occurring near freeway interchanges and in peak travel period (AM Peak → WB / PM Peak → EB)
Incidences – Duration

Jan-Dec 2012, All Incident Types

I-210 E: 22.9 min
I-210 W: 23.1 min

Jan-Dec 2012
Accidents & Breakdown Only

I-210 E: 26.9 min
I-210 W: 27.8 min
Incidents – Spatial Distribution

TIMS Data
Jan-Dec 2011
Freeway Sensors – % Working

- Percentage of detectors working, Jan-Mar 2013

Mainline

Ramps

HOV

Other

Legend:

- 100% % Detectors Working
- 50-99 % Detectors Working
- 0-49 % Detectors Working
- 0 % Detectors Working
Freeway Sensors – % Observed Data

- Percentage of observed 5-minute data, Jan-Mar 2013

- Drop due to communication line down between SR-134 and I-605
Freeway Sensors – % Working

- **Mainline (Jan-Mar 2013)**

  - I-210 E
  - I-210 W
HOV lanes (Jan-Mar 2013)
Freeway Sensors – % Working

- On-ramps and off-ramps (Jan-Mar 2013)
## Freeway Sensors – Operational Status

### Mainline sensors (03/29/2013)

<table>
<thead>
<tr>
<th>Fwy.Dir</th>
<th>VDS/CA PM</th>
<th>Abs PMMS ID</th>
<th>Name</th>
<th>Type</th>
<th>Lane 1</th>
<th>Lane 2</th>
<th>Lane 3</th>
<th>Lane 4</th>
<th>Lane 5</th>
<th>Lane 6</th>
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</thead>
<tbody>
<tr>
<td>E</td>
<td>2210</td>
<td>1234</td>
<td>5678</td>
<td>Mainline</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>W</td>
<td>2210</td>
<td>9876</td>
<td>4321</td>
<td>Mainline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Good**
- **Line Down**
- **Ctrl Down**
- **No Data**
- **Insufficient Data**
- **Card Off**
- **High Val**
- **Intermittent**
- **Constanl**
- **Feed Unstable**

[Caltrans and PATH logos]
Freeway Sensors – Operational Status

- **HOV sensors (03/29/2013)**

<table>
<thead>
<tr>
<th>Fwy Dir</th>
<th>VDS/SCA PR</th>
<th>Abs PM</th>
<th>ID Name</th>
<th>Lane Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>221-E</td>
<td>76169</td>
<td>221-E</td>
<td>FAIR OAKS 1</td>
<td>HOV</td>
</tr>
<tr>
<td>221-E</td>
<td>76180</td>
<td>221-E</td>
<td>MARINER 2</td>
<td>HOV</td>
</tr>
<tr>
<td>221-E</td>
<td>76199</td>
<td>221-E</td>
<td>LAKE 2</td>
<td>HOV</td>
</tr>
<tr>
<td>221-E</td>
<td>76115</td>
<td>221-E</td>
<td>MILL 1</td>
<td>HOV</td>
</tr>
<tr>
<td>221-E</td>
<td>76110</td>
<td>221-E</td>
<td>ALLEN 2</td>
<td>HOV</td>
</tr>
<tr>
<td>221-E</td>
<td>76111</td>
<td>221-E</td>
<td>GABRIEL 2</td>
<td>HOV</td>
</tr>
<tr>
<td>221-E</td>
<td>76110</td>
<td>221-E</td>
<td>ROSEMEAD 1</td>
<td>HOV</td>
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<td>221-E</td>
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<td>ROSEMEAD 2</td>
<td>HOV</td>
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<td>221-E</td>
<td>76120</td>
<td>221-E</td>
<td>ROSEMEAD 8</td>
<td>HOV</td>
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</tbody>
</table>

- **Fwy Dir | VDS/SCA PR | Abs PM | ID Name | Lane Type |
| 221-E   | 76169      | 221-E  | FAIR OAKS 1 | HOV       |
| 221-E   | 76180      | 221-E  | MARINER 2 | HOV       |
| 221-E   | 76199      | 221-E  | LAKE 2    | HOV       |
| 221-E   | 76115      | 221-E  | MILL 1    | HOV       |
| 221-E   | 76110      | 221-E  | ALLEN 2   | HOV       |
| 221-E   | 76111      | 221-E  | GABRIEL 2 | HOV       |
| 221-E   | 76110      | 221-E  | ROSEMEAD 1 | HOV       |
| 221-E   | 76176      | 221-E  | ROSEMEAD 2 | HOV       |
| 221-E   | 76159      | 221-E  | ROSEMEAD 3 | HOV       |
| 221-E   | 76152      | 221-E  | ROSEMEAD 4 | HOV       |
| 221-E   | 76117      | 221-E  | ROSEMEAD 5 | HOV       |
| 221-E   | 76118      | 221-E  | ROSEMEAD 6 | HOV       |
| 221-E   | 76119      | 221-E  | ROSEMEAD 7 | HOV       |
| 221-E   | 76120      | 221-E  | ROSEMEAD 8 | HOV       |
Freeway Sensors – Operational Status

**On-ramps (03/29/2013)**

<table>
<thead>
<tr>
<th>Fwy-Dir</th>
<th>VDS</th>
<th>CA PM</th>
<th>Abs PM</th>
<th>MS ID</th>
<th>Name</th>
<th>Type</th>
<th>Lane 1</th>
<th>Lane 2</th>
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<tr>
<td>1210-E</td>
<td>716589</td>
<td>R25.74</td>
<td>25.72</td>
<td>4222</td>
<td>MARENGO</td>
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<td>1210-E</td>
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<td>R26.49</td>
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<td>1210-E</td>
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<td>1210-E</td>
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<td>R29.46</td>
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<td>SIERRA MADRE V2</td>
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<td>1210-E</td>
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<td>R29.74</td>
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**Legend:**
- **Good**
- **Line Down**
- **Ctrl Down**
- **No Data**
- **Insufficient Data**
- **Card Off**
- **High Val**
- **Intermittent**
- **Constani**
- **Feed Unstable**
### Freeway Sensors – Operational Status

#### Off-ramp & freeway connectors (03/29/2013)

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Arterial Sensors

- **Pasadena**
  - Video detection systems at 58 intersections (Iteris and Econolite)
  - Traffic detectors at 80 intersections
    - Capability to measure mid-link volumes and speeds
    - Provide necessary data to allow traffic responsive signal operation
  - Approximately 2/3 of the intersections currently have some type of vehicle detection and actuation system
Traffic Signal Controllers

- **Pasadena**
  - 239 intersections with 170 controllers/BiTran 233 firmware
  - Remaining 92 intersections have been upgraded to operate with 2070 controllers/BiTran 2033 software.

- **Arcadia**
  - Majority of controllers equipped with LACO-4E firmware
  - Upgrade to LACO-4E in progress along Duarte, Colorado, Foothill
  - 2070 controller with D4 firmware to be installed at Huntington & Holly (entrance to race tracks) due to complexity of intersection

- **LA County**
  - 170E or 170ATC controllers with HC-11/QUAD UART processors
  - LACO-4 firmware deployed using AB3418E protocol
## Traffic Management Systems

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<td>• San Gabriel</td>
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<td></td>
<td>• West Covina</td>
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<td>Based on 2004 data</td>
</tr>
</tbody>
</table>

- Do not operate their own traffic signals
- Passively manage traffic signals
- Actively manage traffic signals during peak and exception periods + Some ITS devices
- Actively manage traffic signals during day + Large scale ITS deployments

**Signals** operated by another agency

**Signals may be operated by another agency**

**Agencies with own ATMS system**
Traffic Management Systems

- **City of Pasadena**
  - Siemens i2tms (Majority of intersections)
  - McCain QuicNet Pro (60 intersections)
  - TransCore Series 2000 (40 shared State/County intersections)

- **TransCore TransSuite**
  - Arcadia
  - Irwindale (19 intersections) – *Installing as of 2012/03*
  - Alhambra (71 intersections)
  - West Covina (61 intersections) – *Installing as of 2012/03*
Traffic Management Systems

- **Kimley-Horn KITS**
  - San Dimas - *Planned*
  - LA County Unincorporated Areas
  - Cities electing to have LA County operating their signals
    - El Monte
    - San Gabriel
    - Temple City
    - Baldwin Park

- **Econolite Centracs**
  - Glendora (31 intersections) – *Installing as of 2012/03*
Information Exchange Network (IEN)

- Coordinated communication network enabling participant to share traffic signal information and control
- Designed to collect second-by-second data
- Operational since 2002
Information Exchange Network (IEN)

- Interfaces with traffic signal control software:
  - LADOT traffic signal control system
  - TransCore Series 2000
  - TransCore TransSuite TCS
  - Siemens i2TMS
  - McCain QuicNet
  - Kimley Horn KITS
  - Econolite Centracs

- Freeway Data Interface (completed Sept. 2010)
  - Pulls data from RIITS and PeMS into the IEN.
  - Allows the IEN to report freeway congestion status, incidents, and lane closures to IEN users
Information Exchange Network (IEN)

- IEN Web Server
  - XML-based web service to provide summary intersection and arterial detector data to authorized external systems.
  - Not currently accessible from the Internet
Information Exchange Network (IEN)

- Cities/agencies connected to IEN

[Map showing connections of cities and agencies to the Information Exchange Network (IEN)].
Connections to Regional TMCs

- **Pasadena**
  - Many intersections connected to County TMC via the IEN
  - Because the IEN connection has not been consistent, the city is entertaining installing a direct fiber connection

- **Arcadia**
  - Intersections with LACO-4E controllers typically connected to County TMC via IEN

- **Duarte**
  - 5 intersections to be upgraded with LACO-4E and connected to County TMC
    - All city-controlled intersections along Huntington Dr. (5 intersections)

- **Monrovia**
  - 10 intersections to be upgraded with LACO-4E and connected to County TMC
    - All city-controlled intersections along Huntington Dr (9 intersections)
    - Duarte & Myrtle
Positive Aspects

- **Corridor geometry**
  - Linear corridor (east-west alignment).
  - Several parallel arterials in close proximity of I-210.
  - I-10 running parallel to I-210, 4 to 5 miles to the south.
  - Several possibilities for crossover between I-210 and I-10
    - I-605 and SR-57 freeways
    - SR-19 (Rosemead) and SR-19 (Azusa) arterials
  - One-way frontage streets on each side of I-210 within Pasadena
Positive Aspects

- Highly directional traffic control needs
  - AM peak → Westbound
  - PM peak → Eastbound

- Need to manage time-specific/event traffic patterns
  - Higher congestion levels on Friday afternoon due to weekend traffic
  - Traffic associated with events at the Rose Bowl stadium & Santa Anita racetrack
  - Events associated with Caltech, Cal Poly Pomona and other colleges

- Average truck traffic disruptions
  - Trucks only represent 3-5% of traffic → Typical of many urban freeways.
  - Only one interchange has a high proportion (15-20%) of trucks → Allow exploring solutions to improve truck operations around freeway merges.
Positive Aspects

- **Traffic sensing infrastructure**
  - Very good PeMS coverage of freeway mainline, HOV lanes, and ramps
  - Many intersections within Pasadena already equipped with traffic sensors
  - SMART test deployment site along Orange Grove Blvd in Pasadena
    - System collecting event-based high resolution traffic data from multiple intersections and generating real time arterial performance measures, such as intersection queue length and arterial travel time
Positive Aspects

- **Freeway traffic control**
  - All I-210 ramps metered, including interchanges with I-605 and SR-57
  - SWARM test corridor ➔ Very likely that a good ramp metering communication infrastructure is already in place.
  - HOV lane along entire length of I-210 in both directions.

- **Arterial traffic control**
  - Traffic-responsive system may exist along arterials of interest in Pasadena and Arcadia
  - Local TMC in Pasadena
Positive Aspects

- **Transit coverage**
  - **Metro Gold Line along I-210**
    - Direct connection with downtown Los Angeles
    - Current terminus at the Pasadena/Arcadia boundary, but to be extended to Glendora by 2015 and further west subsequently
    - Stations typically within ½ mile of the freeway
  - **Metro Silver line along I-10**
    - Terminus in El Monte, just west of I-605
    - Direct connection with downtown Los Angeles
  - Several express buses running along I-10 and I-210
    - Additional transit connections with downtown Los Angeles
  - Several park-and-ride facilities within the corridor
Positive Aspects

- Potential for implementing a Phase 1 system entirely within the city of Passadena
  - System covering I-210, local frontage roads, and possibly one or more additional parallel arterials.
  - Potential for system extension through Arcadia

- Possibility to divide the corridor into distinct control areas:
  - Pasadena: High signal density/dense street network
  - Arcadia/Duarte/Monrovia: Medium signal density
  - East of I-605: Low-Medium signal density
Areas of Concern

- **Freeway and arterial congestion levels**
  - High level of congestion along I-210 may limit ICM benefits during peak hour (same problem with I-710)
  - Some intersections along local street networks already operating near capacity, constraining potential traffic management solutions during peak hour

- **Parking availability**
  - High occupancy (> 80%) at many park-and-ride facilities
Other Notable Elements

- **Potential for dual I-10/I-210 control:**
  - Traffic conditions along I-10 will likely need to be considered when developing strategies for I-210

- **Frequency of accidents**
  - Same daily frequency of accidents as I-710 (10 per day along corridor)
  - \( \frac{1}{2} \) the accident rate, as I-210 has about twice the VMT as I-710
## Summary

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Geometry</td>
<td>Excellent</td>
<td>Several Parallel arterials in close proximity to I-210; freeway frontage streets in Pasadena</td>
</tr>
<tr>
<td>Freeway Traffic Detection</td>
<td>Very Good</td>
<td>Sensors on mainline and most ramps</td>
</tr>
<tr>
<td>Arterial Traffic Detection</td>
<td>Promising</td>
<td>Many intersections already equipped with traffic sensors</td>
</tr>
<tr>
<td>Traffic Demand Patterns</td>
<td>Very Good</td>
<td>Westbound traffic during AM peak; eastbound traffic during PM peak, average % of trucks</td>
</tr>
<tr>
<td>Existing Freeway Control</td>
<td>Excellent</td>
<td>Existing HOV lanes; ramps and freeway interchanges metered</td>
</tr>
<tr>
<td>Existing Arterial Control</td>
<td>Good</td>
<td>Traffic responsive system already in place on some arterials, participation of key cities in IEN</td>
</tr>
<tr>
<td>Existing Transit Services</td>
<td>Very Good</td>
<td>Metro Gold Line running parallel to I-210, in close proximity</td>
</tr>
<tr>
<td>Park-and-ride capabilities</td>
<td>Uncertain</td>
<td>Many facilities exhibit high occupancy rates</td>
</tr>
<tr>
<td>ICM Opportunities – Peak Hour</td>
<td>Challenging</td>
<td>High congestion level on freeway; some arterials with limited extra capacities at some intersections; incident response needs; different traffic pattern on Fridays</td>
</tr>
<tr>
<td>ICM Opportunities – Off Peak</td>
<td>Excellent</td>
<td>Many large scale events; incident response needs</td>
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