South Bay Corridor Study and Evaluation for Dynamic Corridor Congestion Management (DCCM)

Metro Streets and Freeways Subcommittee Meeting

October 17, 2013
1. DCCM Background
2. Project Overview and Schedule
3. Corridor Study Overview and Results
4. ConOps and Need for Stakeholder Engagement
5. Next Steps
Problem Statement

Transit

Freeway

Arterials

Managed Lanes/Tolls

Emergency Responders

Systems managed independently, little to no coordination
The Integrated Corridor Management (ICM) Approach to Congestion Reduction

**Problem:** Surface transportation congestion

**Traditional approach:** Optimization of individual networks (freeway, arterials, transit, etc. each considered separately)

**ICM approach:** Integrated corridor-wide operations to optimize entire system (not just individual networks)

ICM Manages:
- **Total Corridor Capacity**
- **All modes and routes together**
- **Corridor as a single system**
DCCM Benefits and Opportunities

1. Improved corridor throughput
2. Reduced impact of incidents on freeways and arterials
3. Enhanced performance measurement capability
4. Improved information sharing
5. Opportunity for regional stakeholders to participate in developing a model for automated operations
6. Better informed travelers

<table>
<thead>
<tr>
<th>PERFORMANCE MEASURE AREAS</th>
<th>San Diego</th>
<th>Dallas</th>
<th>Minneapolis</th>
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</thead>
<tbody>
<tr>
<td>Annual Travel Time Savings (Person-Hours)</td>
<td>246,000</td>
<td>740,000</td>
<td>132,000</td>
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<tr>
<td>Improvement in Travel-Time Reliability (Reduction in Travel-Time Variance)</td>
<td>10.6%</td>
<td>3%</td>
<td>4.4%</td>
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<tr>
<td>Fuel Saved Annually (in Gallons)</td>
<td>323,000</td>
<td>981,000</td>
<td>17,600</td>
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<tr>
<td>Tons of Mobile Emissions Saved Annually (in Tons)</td>
<td>3,100</td>
<td>9,400</td>
<td>175</td>
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DCCM Freeway/Arterial Coordination Example

Scenario
- Accident blocks several lanes on NB I-110 during morning rush hour
- Drivers exit to Figueroa and Vermont to detour around the incident

Current response
1. Arterial signal system unaware of increased arterial demand
2. Fixed/time-of-day signal timings not set up to accommodate new demand
3. Traffic backs up on arterials, turn pockets, and freeway off-ramps

DCCM-enabled response
1. Freeway management system alerts arterial system to increased demand
2. Signal system automatically implements agreed-upon signal timing plan designed for the scenario
3. Traffic flows efficiently along parallel arterials around the incident with minimized impact to the arterial network
Who Else is Implementing DCCM Solutions?

Integrated corridor management systems are rapidly being implemented on major corridors across the country:

- Seattle (I-5)
- San Diego (I-15)
- Oakland (I-80) (I-880)
- Portland (I-216)
- Minneapolis (I-395)
- Milwaukee-Chicago
- Detroit (I-75)
- Southwest Penn.
- Montgomery County (I-270)
- San Mateo (US-101)
- Los Angeles (I-210)
- Denver (I-75)
- Dallas (US-75)
- Miami-Dade (I-95)
- San Antonio (I-10)
- Houston (I-10)
- San Mateo (US-101)
- Los Angeles (I-210)
- San Diego (I-15)
South Bay DCCM Project Scope and Schedule

1. Identify a **pilot corridor** on which to deploy a DCCM freeway-arterial coordination system (Aug 2013)

2. Develop a **concept of operations** to guide implementation (Sep-Dec 2013)

3. Develop Memorandums of Understanding (**MOUs**) among all involved stakeholders (Jan-Jun 2014)

4. Conduct a before/after **system evaluation** for the initial pilot project (2014-2015)
Task 1: Corridor Study

Six South Bay corridors evaluated
Task 1: Corridor Study – Evaluation Criteria

Five categories of evaluation criteria:
1. System demand
2. Physical infrastructure
3. ITS infrastructure
4. Institutional coordination challenges
5. ICM readiness
I-110 has emerged as the top rated candidate corridor for DCCM pilot; to be a test case and a model for implementation on the other corridors.

- Improve Ramp/Signal Operations
- Improve Ramp and Signal Communications
- Fill in Detection Gaps
Investigate the most effect, pro-active and vibrant methods for DCCM:
• Freeway Ramp Meter/Arterial Signal Coordination Concepts
• Develop DCCM coordination with Arterial Traffic Signal System
• Queue End Warning (QEW)
• Traffic Signal Control, including adaptive
• Junction Control
• Traffic Demand Management
• Other Active Traffic Management Strategies
• Multimodal Decision Support Systems (DSS)
• Predictive travel time calculations
• Accident response strategy assessments
• Urban and interurban congestion management
Next Steps

1. Stakeholder outreach to develop ConOps
   – Workshops at SCCCOG offices or Caltrans
   – Face-to-Face meetings
   – Webinars
   – Phone Interviews

2. Develop Concept of Operations Document
   – *Becomes blueprint for future similar projects in South Bay Region*
Concepts to be addressed

• Primary – Ramp Meter/Traffic Signal Coordination

• Reduce impacts of freeways on arterials
• Improve ramp metering to avoid queue backup
• Alleviate safety issues
Queue End Warning

Typical queuing conditions:
• Exit ramp spillback
• Construction zone queues
• Fog (visibility)
• Traffic Incidents
Junction Control

- Caltrans Dynamic Lane Management System (DLMS)
I-80 ICM (California)
I-80 ICM (California)
Example MTD measures include:
• Ridesharing
• Pedestrian-oriented Design elements
• Parking Management
• Improving public transportation infrastructure.
• Subsidizing transit costs
• Bicycle-friendly facilities
• Providing active transportation (AT) facilities including bike lanes and multi-use trails.
• Flex-time work schedules
• Congestion pricing tolls during peak hours.
• Road space rationing by restricting travel based on license plate number, at certain times and places.
• Workplace travel plans
• Road space reallocation,
• Time, Distance and Place (TDP) Road Pricing, where road users are charged based on when, where and how much commuters drive.
Questions