Integrated Corridor Management–US 75
US 75 Dallas, Texas

Koorosh Olyai, P.E.
Assistant Vice President
Dallas Area Rapid Transit

2010 ITS Texas Annual Meeting
FT. Worth, Texas
November 11, 2010
What is ICM?

- The integrated management of freeway, arterial, transit, and parking systems within a corridor

- Management of the corridor as a system, rather than the more traditional approach of managing individual assets
Supporting ITS Technologies

- HOT lanes / congestion pricing
- Transit Signal Priority
- Multimodal traveler information / Actionable traveler information
- Real-time traffic signal coordination, timing and control
- Adaptive ramp metering
- Integrated electronic payment
Eight USDOT ICM Pioneer Sites

3 Stages for the Pioneer Sites:
• Stage 1 – Concept of Operations, Sample Data, and Requirements
• Stage 2 – Analysis, Modeling, and Simulation
• Stage 3 – Demonstration and Evaluation

Seattle

Minneapolis

Oakland
San Diego

Montgomery County

Dallas
San Antonio
Houston
## Summary of AMS Site Models

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Minneapolis</th>
<th>Dallas</th>
<th>San Diego</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Travel Demand Model</td>
<td>Metro model in TP+</td>
<td>NTCOG model, TransCAD</td>
<td>TransCAD</td>
</tr>
<tr>
<td>Mesoscopic Simulation Model</td>
<td>DynusT – supported by U of Arizona</td>
<td>DIRECT – supported by SMU</td>
<td>TransModeler Meso</td>
</tr>
<tr>
<td>Microscopic Simulation Model</td>
<td>CORSIM models are available, AIMSUN 5.0 (through parallel effort by UMN)</td>
<td>VISSIM – two networks: a) downtown (200 signals), b) near LBJ interchange</td>
<td>TransModeler Micro</td>
</tr>
</tbody>
</table>
Demonstration Pioneer Sites

Dallas (US-75)

Proposed Strategies
– Decision support system
– Actionable traveler information
  • IVR (e.g., 511)
  • Website
  • E-mail alerts
  • Comparable travel times
– Rerouting of traffic
  • Coordinated timing and adaptive signal control
– Mode shift
  • Parking management
  • Real-time service adjustments

San Diego (I-15)

Proposed Strategies
– Decision support system
– Actionable traveler Information
  • 511 (phone and website)
  • Comparable travel times
– Managed lanes
– Rerouting of traffic
  • Coordinated timing and responsive signal operations
  • Coordinated ramp metering and traffic signals
– Mode Shift
  • Bus Rapid Transit
  • Transit signal priority
  • Real-time transit info
US 75 ICM Vision

Operate the US 75 Corridor in a true multimodal, integrated, efficient, and safe fashion where the focus is on the transportation customer.
Why ICM is needed in US 75 Corridor

• DFW is the 5th most congested region in US
• #1 worst region for growth in congestion
• DFW population is 6 million and adding 1 million every 8 years
• US 75 is a critical, regional corridor
• Travel demand and congestion continues to grow
• No ability to expand freeway, arterials, or alternate routes
• Other freeways are scheduled for construction
• Significant employers in corridor
• Numerous special events throughout year
• Showcase for ITS integration in the region
US 75 Corridor Networks

- US 75 Freeway with Continuous Frontage Roads
- HOV lanes on US 75 and I-635
- Dallas North Tollway
- 167 Miles of Arterials
- DART Bus Network Including Express Service
- DART Light Rail
  - Red and Blue Lines
Dallas ICM Team

- **Agency Partners:**
  - Dallas Area Rapid Transit (Lead)
  - Cities of Dallas, Highland Park, Richardson, Plano, and University Park
  - North Central Texas Council of Governments
  - North Texas Tollway Authority
  - TxDOT Dallas District

- **Technical Support Team:**
  - Telvent Farradyne (Lead)
  - Texas Transportation Institute
  - Southern Methodist University
  - University of Texas at Arlington
Physical Architecture
ICM Strategies

- HOV/HOT lane strategy
- Route Diversion Strategy (minor incident)
  - Diverts traffic to parallel frontage roads
- Route Diversion Strategy (major incident)
  - Diverts traffic to frontage road and strategic arterials
- Mode Diversion Strategy (major incident)
  - Diverts travelers to Red Line LRT
- Combined Route and Mode Diversion Strategy
  - Diverts travelers to frontage roads, strategic arterials, and Red Line LRT
Decision Support Tool
Lessons Learned - Operational

- Only “extra” capacity in US 75 corridor is on rail transit
- Individual agencies operating their systems very well
- Operational opportunities exist with collaborative operation
  - May require penalizing one user group to benefit overall corridor
  - Example – Freeway incident
    - May require decreasing cross street arterial green time in favor of more arterial green time parallel to freeway for diverted trips
- Need for decision support tool to assess those operational trade-offs
- Need for better real-time arterial data
Lessons Learned - Institutional

- Good partnerships already in place
- Operational trust already exists from traffic management team, incident management cooperation, and HOV lane operation
- Build on existing agreements / MOUs
- Build on existing oversight
  - ICM reports to existing Regional ITS Committee
Lessons Learned - Technical

• Need for enhancing regional data sharing
  – Must accelerate existing data sharing projects already scheduled for region
• Need to determine methods for comparing and measuring multi-modal information
• Need additional detection for better real-time arterial data
  – Travel times from toll tags may be most cost effective
• Need for detailed system engineering knowledge
  – Developing Concept of Operations and System Requirements was system engineering intensive
  – Use of consultants with experience was beneficial
Conclusions

• Individual agencies are operating their systems well
• Opportunities for advancement are in coordinated management
• Need alternatives for travelers, especially transit
• Need common, reliable data platforms for decision making
• Building on existing institutional arrangements was a key to building consensus
• Need to build trust with the public on accuracy and reliability of information
ICM System and Subsystems
ICMS - SmartNET / SmartFusion

- Information Exchange Tool & Backbone of ICM Network
  - Web Based Interface to ICM System
  - Data Fusion Engine
  - Allows entry and management of Incidents, Planned Events
  - Receives and Publishes data to the Regional Center to Center System & Other External Systems
  - Feeds Data to the 511 Systems, and Decision Support System
ICMS – Decision Support System

- Will assist operating ICM agencies with responding to incidents in a coordinated manner
- Multiple stage implementation
  - Manual Interaction – use developed response plans
  - Information Integration –
  - Real-time Data Integration –
  - Predictive Model Integration – Utilize Model to Predict 30 minutes into future
ICM – Supporting Systems (Info Sources)

- Utilizing the existing Regional C2C system implemented by TxDOT
- Adding Parking Management, Weather Information, and Arterial Travel Time System
- Integrating DART AVL
ICM–Supporting Systems (Info Provider)

• Deploying Texas’ first 511 System including:
  – Interactive Voice Response System
  – 511 Public Web
  – ALERT System
  – Providing RSS feed to Media
ICM Strategies

• Advanced Traveler Information (all scenarios)
  – Better pre-trip, en-route, and multi-modal information
• Route Diversion Strategy (minor incident)
  – Diverts traffic to parallel frontage roads
• Route Diversion Strategy (major incident)
  – Diverts traffic to frontage road and strategic arterials
• Mode Diversion Strategy (major incident)
  – Diverts travelers to DART Red Line LRT
• Combined Route and Mode Diversion Strategy
  – Diverts travelers to frontage roads, strategic arterials, and DART Red Line LRT
Benefit-Cost

• Produces $16.5M in user benefits per year.
• 10-year life-cycle yields total benefits of $278.8M.
• Cost to deploy is $1.62M per year.
• 10-year life-cycle cost is $13.6M.
• Estimated B/C over the 10-year life-cycle of the project is 20.4 : 1
For Additional Information:

Koorosh Olyai, P.E.
Assistant Vice President
Dallas Area Rapid Transit
olyai@dart.org