Integrated Corridor Management
--An Overview --

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KBPS video
**Integrated** . . combining or coordinating separate agencies so as to provide a harmonious, interrelated “whole” . . .

**Corridor** . . a travel shed of trips anchored by one or more highway, arterial, or rail line

**Management** . . the coordination of jointly managing all the travel therein in order to achieve defined objectives
Performance-Driven, Outcome-Based Approach

• MPOs with State and public transportation operators develop long-range transportation plans (MTP) and transportation improvement programs (TIP) through performance-driven, outcome-based approaches.

• Each MPO shall establish performance targets for tracking progress towards attainment of critical outcomes for the region.
ICM Vision

• ICM program preceded MAP21 by several years

• An opportunity exists to realize significant improvements in the efficient movement of people and goods through aggressive and proactive management of major multimodal transportation corridors
ICM Corridors

- Wedge- or longitudinal-shaped corridors
- Trips therein are “anchored” by major highway and transit arteries
- Real-time traveler information offers relief, capacity, alternatives
- Agencies enable route-shifts & mode-shifts “behind the scene”
- All trips are viewed as “belonging” to all agencies
Examples of ICM Strategies

- Active Traffic Management
- Managed lanes
- Traveler information
- Incident response policies
- Transit supply increase
- Transit only lanes
- Transit signal priority
- Congestion pricing
- Real-time traffic signal control/timing/coordination
- Integrated electronic payment
- Adaptive ramp metering
- Inter-agency information sharing

Any / all are capable of responding to overburden or stress of any others
Surface Transportation Challenges

- Independent operations
- Reactive approach
- Lack of modal and facility integration
- Lack of stakeholder or customer integration
- Limited actionable information
- Limited ability to monitor and manage
- Benefits of changes are difficult to measure
- Limited resources
- Travel reliability not a core objective
The Reality: Operations Today

- Surface transportation systems are made up of several independent networks
  - Freeways, bus/rail transit, arterials, etc.
- Most efforts to reduce congestion have focused on optimization of individual networks
  - Agency/facility/mode – specific ITS systems & strategies
- Minimal cross-network management in response to increased demand / reduction in demand
### Traditional Agency “Stovepipe” Responsibilities

<table>
<thead>
<tr>
<th>Mode</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto</td>
<td>Autonomous response to incidents on ‘their’ facilities . . Traveler information is limited to their own agency’s facility . .</td>
</tr>
<tr>
<td>Rail</td>
<td>. . There is “facility” response, but not necessarily “corridor” response” . .</td>
</tr>
<tr>
<td>Bus</td>
<td>. . They are slowly reactive to intervene in others’ incidents</td>
</tr>
<tr>
<td>Parking</td>
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- **Roads**: Responsible for travel and facilities
- **Ridership**: Responsible for commuter satisfaction
- **Commute routes**: Responsible for overall travel routes
- **Supply**: Responsible for travel resources
Integrated Management

Resource – shared management of travel shed

Mode choice.
Mode shift.
Proactivity.
Communication.
Pre-determined interventions.

Travel efficiency
Traveler information
511 Apps
Ability to make trip choices among entire corridor
KPBS-TV
What’s The 511? New San Diego Traffic App Unveiled By SANDAG

USDOT’s ICM Program

- Started in 2005/2006
- Part of ITS-JPO congestion initiative
- Builds on ATMS efforts
- Has a core transit element
- Fundamentals of ICM approach embedded in current Office of Operations “story”
- “Integrated” management of facilities
Blazing Trails in Congestion Management

ICM will help manage congestion by:

• **Optimizing** existing transportation infrastructure along a corridor.
• **Enabling** travelers to make informed travel decisions and dynamically shift mode.
• **Reducing** travel times, delays, fuel consumption.
• **Increasing** travel time reliability and predictability.
ICM Program Objectives

1. **Demonstrate success:** evaluate pro-active integrated approaches, strategies, and technologies for efficient, productive, and reliable operations.

2. **Provide guidance:** re: the institutional & operational capabilities, and ITS technical methods needed for effective Integrated Corridor Management.

   - Phase 1 – Foundational Research
   - Phase 2 – Corridor tools, strategies and integration
   - Phase 3 – Corridor site development, analysis and demonstration
   - Phase 4 – Outreach via knowledge tech’ transfer (KTT)
Corridor

- Linear geographic band
- Movement of people, goods, and services
- Similar transportation needs and mobility issues
- Various networks that provide similar or complementary transportation functions
- Cross-network connections
A “CMM” is the standard for assessing the institutional and technical maturity of software developers and system integrators.
The ACTIVE and INTEGRATED Continuum

- Active, But Not Integrated
- Early in Active and/or Integrated Operations
- Integrated, But Not Active
- DESIRED END STATE: Active and Integrated
Explore the ICM Concept

Establish an ICM Concept Exploration Working Group to:

1. Select and define a candidate corridor for ICM
2. Identify transportation problems/issues
3. Determine data needed to assess the potential impact (see ICM AMS Guide)
4. Review the Regional ITS Architecture
Why is Dallas candidate for ICM?

• Dallas-Forth Worth is the 5th most congested region in U.S.
• #1 worst region for growth in congestion
• 6 million population (adding 1 million every 8 years)
• US 75 is critical regional corridor
• Travel demand continues to grow
• No ability to expand freeway or arterials
• Significant employers in corridor (e.g., TI, Nokia)
• Numerous special events throughout the year
• Showcase for ITS integration in the region
Dallas US-75 Corridor

- Freeway with continuous frontage roads
- Managed HOV lanes
- Dallas North Tollway
- 167 miles of arterials
- DART bus network
- DART light rail
- Approx. 900 signals
- Multiple TMCs
- Regional ATIS
Decision Support Systems

• Assist managers in the process of collaboratively managing a multimodal transportation network
• Objective driven
• Information systems
• Support multimodal, transportation operational decision-making in real time.
• Interactive, software-intensive system
• Multiple real-time data sources and knowledge-bases.
• Models, processes or analyses to implement context-specific actions and recommendations
Defined Subsystem Action Plans

**Traveler Information**
- No change
- Notify operators of event
- Notify public of event on freeway
- Notify public of event on arterial
- Direct traffic to use alternative routes
- Direct traffic to specific routes or transit usage

**Traffic Signal Timing**
- No action
- Inbound Shoulder
- Inbound Peak
- Inbound Step Up
- Inbound Flush
- Outbound Shoulder
- Outbound Peak
- Outbound Step Up
- Outbound Flush

**Ramp Metering**
- No action
- Meter Off
- Meter Rate 1
- Meter Rate 2
- Meter Rate 3
- Meter Rate 4
- Meter Rate 5
- Meter Rate 6
- Meter Rate 7
- Meter Rate 8
- Meter Rate 9
- Meter Rate 10
- Meter Rate 11
- Meter Rate 12
- Meter Rate 13
- Meter Rate 14
- Meter Rate 15

**Transit**
- No change
- Notify transit dispatcher of event
- Provide transit dispatcher w/ recommended transit user message
- Provide dead-head re-routing recommendation
- Provide in-service re-routing recommendation
- Recommend deployment of stand-by transit vehicles

**Express Lanes**
- No change
- Open to all Vehicles
- Northbound 3 Southbound 1
- Southbound 3 Northbound 1
- Closed to vehicles (segment)

Source: SANDAG
Multi-Modal Response Plans

A combination of Action Plans defines an individual Response Plan based on agreed upon response posture responsiveness

Source: SANDAG
Dallas vs. San Diego DSS

• Different role of “expert rules”
  - **Dallas**: Filtering approach to select from pre-determined response plans
  - **San Diego**: Determine the scale, availability, and aggressiveness of response, but no pre-determined plans

• Presence of “ICM Coordinator” in Dallas
Next Steps?

- US DOT to award next round of grants
- US DOT to learn best practices
- Follow-thru to disseminate best practices
- Bring more corridors online with ICM capability
End

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