

Regional Integration (RI) and Integrated Corridor Management (ICM)

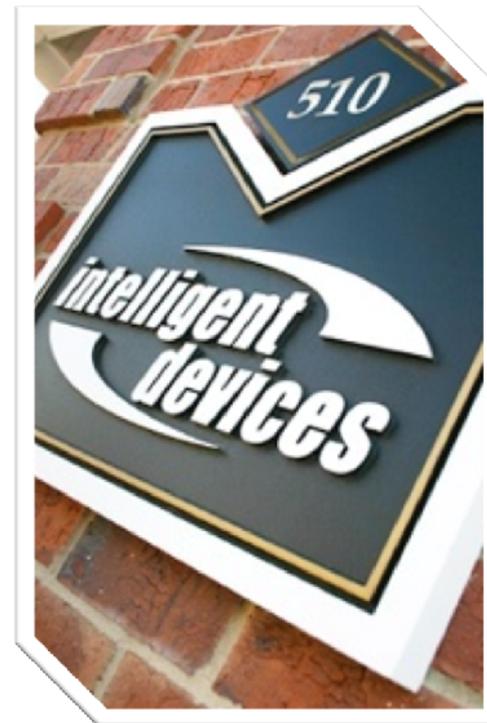
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Praque, Czech Republic



Agenda

- Purpose of Regional Integration and Integrated Corridor Management
- Regional Integration - Overview
- Communications Sharing - Challenges / Solutions
- Benefits of Regional Integration
- Incident Management in Regional Efforts
- ICM

Purpose of RI and ICM

- Motorists are not aware of departmental boundaries (nor should they be)
- Provision of intermodal capabilities and coordination of travel choice modes
- Provision of maximum possible information to travelers to make most efficient mode choices

Regional Integration

- Many regional integration efforts in US and world
 - Joint Transportation Operations Center, NYC, NY
 - San Francisco, CA
- Most involving Departments of Transportations and Police Departments,
 - Few integrating Transit, Parking or Emergency Mgmt Systems
 - None known with rail integration
- Some inter-regional integration projects such as I-95 Corridor Coalition; focused on incident data exchange.

Communications Sharing

- **Main Technical Issues:**
 - Agency-specific infrastructure; not open
 - Incompatible infrastructures (physical and protocols)
 - Bandwidth limitations
- **Main Institutional Issues:**
 - “Islands of Power”
 - Lack of Agency Champions
- **Solutions:**
 - IP-based communications
 - Bandwidth throttling, media converters
 - Memo of Understanding among agencies

Effects of Regional Integration

- **Challenges**
 - Proprietary interfaces of central systems
 - Central systems without interface capabilities
- **Solutions**
 - Migration Plan development
 - Standards-based converters to enable data exchange
 - Standards-based interface development for all new systems

Incident Management

- Determination of User Needs and Functional Requirements for interagency data exchange and incident response - consider future participants (particularly other modes)
- Development of Standard Operating Procedures harmonized among agencies
- Development of Coordinated Interagency Incident Response Plans
 - Precursors (interagency memos of understanding, agency champions, funding)

Incident Management

- Interagency coordination of incident responses
 - Standard Operating Procedures automated in software
 - Multi-modal, comparative travel times
 - Detours / alternative routes
 - Traffic signal timing plan modifications
 - Dissemination via VMS, HAR, webpages, smartphones

Incident Management

- Interfaces with external, non-transportation agencies (Police, EMS, Fire)
 - Issues to be addressed = common tracking of incidents, management of updates
- Interfaces with other transportation modes agencies
 - Transit
 - Rail
 - Emergency Management
 - Tow Trucks

Integrated Corridor Management (ICM)

- US DOT (FHWA, FTA, and others) determined:
 - Regional integration efforts are not coordinated
 - Regional integration efforts are unique and singular efforts
- Federal program to address common approach that is transferable
 - Channel and focus development of ITS Standards
- This program is Integrated Corridor Management (ICM)

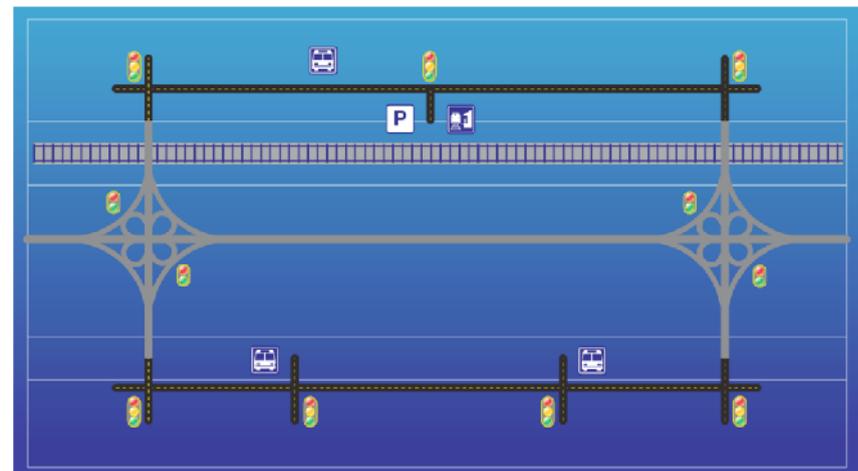
What is ICM?

- 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



Broad ICM Strategies

- Increase multi-agency collaboration and coordination for overall corridor management
 - Coordinate incident management
 - Coordinate operations for planned and special events
 - Optimize corridor mobility by promoting shifts in departure time, mode, and routes
 - Manage demand



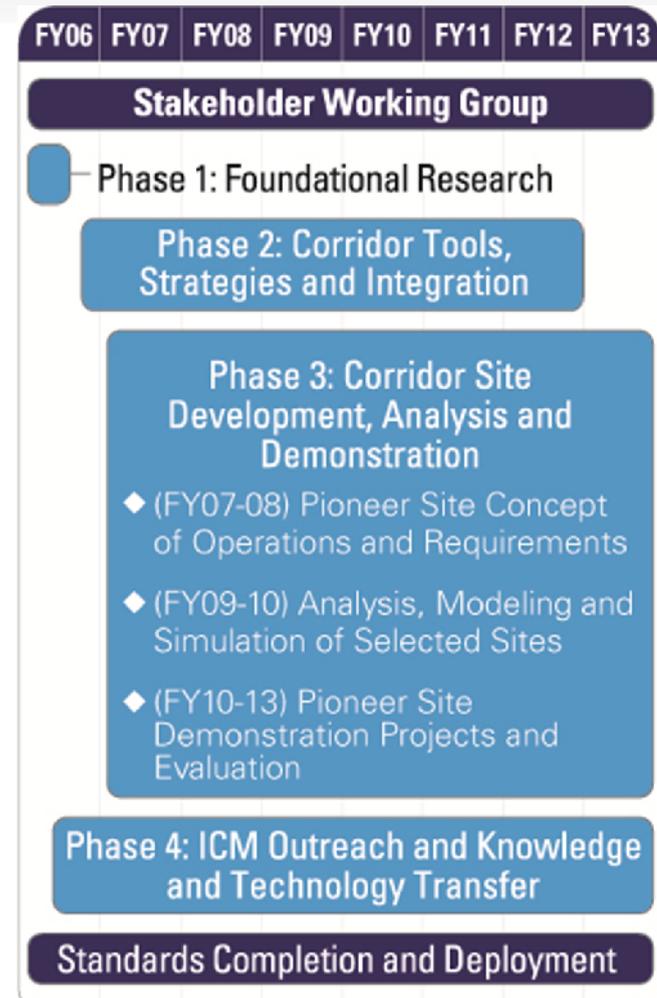
Supporting ITS Technologies

- 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



ICM Initiative

- Goals
 - Demonstrate and evaluate strategies and ITS technologies that help transportation operators efficiently and proactively manage corridors
 - Provide the necessary tools, knowledge, and guidance, for ICM



ICM and ITS Standards

- Demonstrate the ability of ITS standards to facilitate integration of ICM technologies and systems
- Provide standards of value to facilities, centers, and operators within a corridor for supporting corridor management strategies, creating interoperability of systems, control and sharing of technologies and data, and interchangeability of technologies
- Several specific standards are being considered as a part of ICM strategies

ICM and ITS Standards

For traffic signal control, the standards under consideration:

- Actuated Traffic Signal Controller Units (ASC) – NTCIP 1202
- NTCIP Signal Systems Masters – NTCIP 1210
- NTCIP Signal Control and Prioritization (SCP) – NTCIP 1211
- Advanced Transportation Controller (ATC)
- ATC Cabinet
- ATC Application Programming Interface (API)

Device standards providing control and real time mgmt:

- NTCIP Dynamic Message Signs (DMS)
- NTCIP Ramp Metering
- NTCIP Transportation Sensor System (TSS)

Transit Communications Interface Profiles (TCIP) standards provide control and real time management of transit.

ICM and ITS Standards

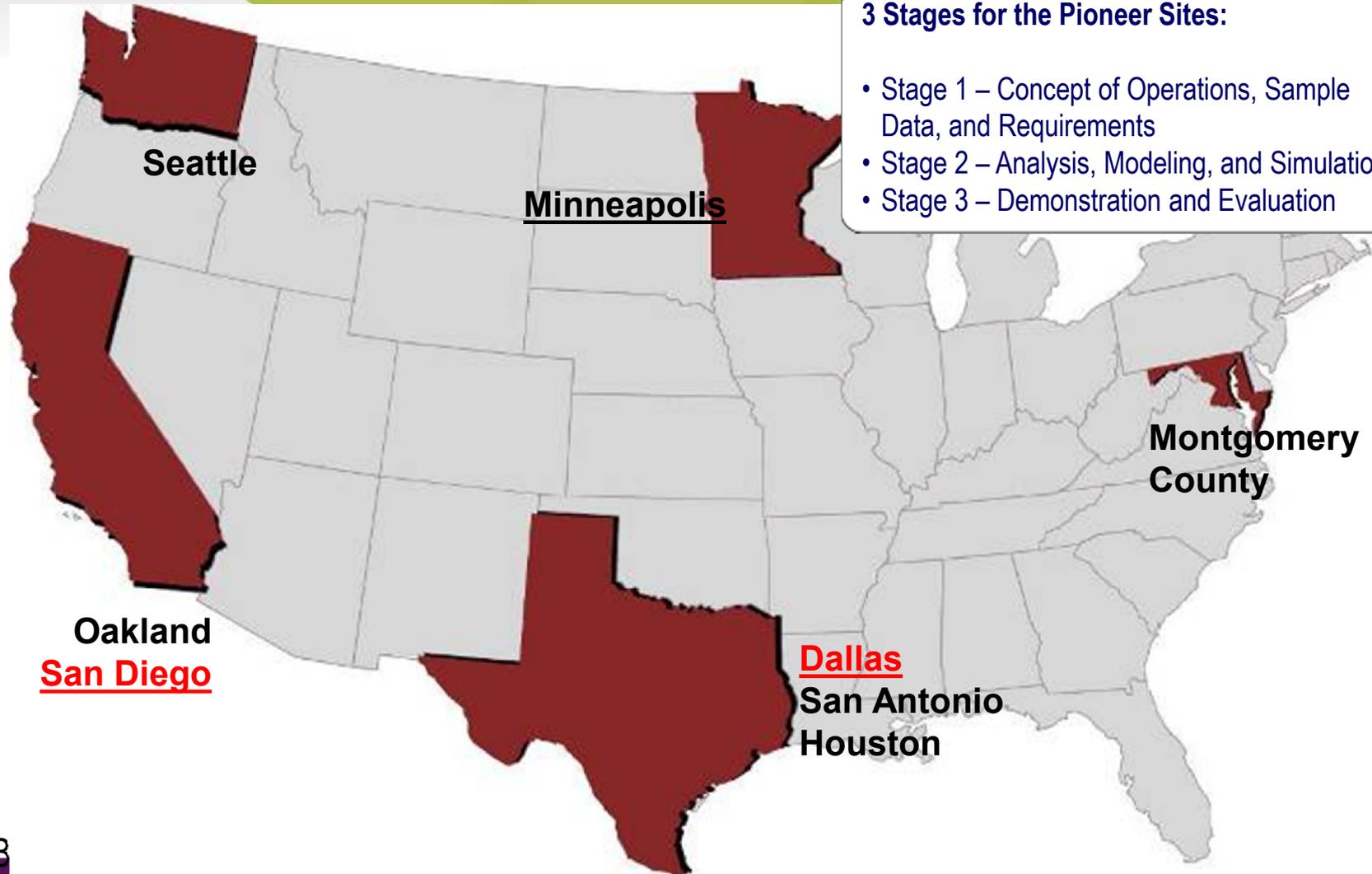
ITS Standards for Data Sharing under consideration:

- NTCIP Center-to-Center (C2C)
- Society of Automotive Engineers (SAE) Advanced Traveler Information System (ATIS) message sets
- SAE Location Referencing Message Sets (LRMS)
- NTCIP TSS
- NTCIP CCTV Camera Control

For monitoring along a corridor the NTCIP TSS, ASC, and CCTV standards will be considered as well as the Transit TCIP standards.

A combination of the aforementioned standards will be used when providing alternative choices of mode or routes to travelers.

Eight USDOT ICM Pioneer Sites

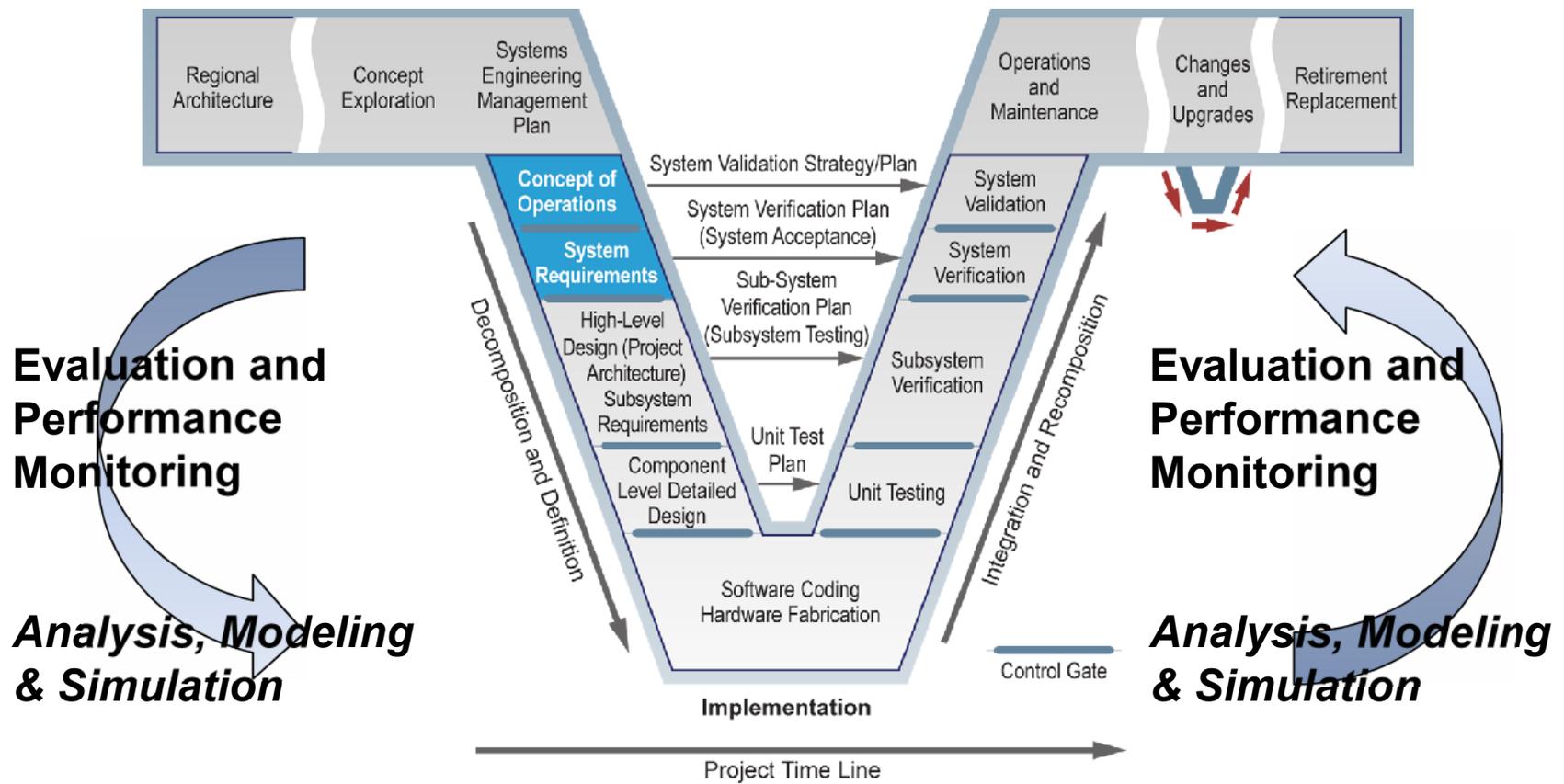


- 3 Stages for the Pioneer Sites:**
- Stage 1 – Concept of Operations, Sample Data, and Requirements
 - Stage 2 – Analysis, Modeling, and Simulation
 - Stage 3 – Demonstration and Evaluation

ICM Pioneer Sites

Pioneer Site Location	Corridor Assets to Be Integrated with ICM									
	Freeway		Arterial		Bus			Rail		
	HOV	Tolling	Value Pricing	Real-Time Control	Fixed Route	Express Buses	Bus Rapid Transit	Commuter Rail	Light Rail	Subway/Heavy Rail
Dallas, Texas	◆	◆		◆	◆	◆			◆	
Houston, Texas	◆	◆	◆	◆	◆	◆	◆			
Minneapolis, Minnesota	◆	◆	◆	◆	◆	◆	◆			
Montgomery County, Maryland	◆			◆	◆	◆		◆		◆
Oakland, California	◆	◆		◆	◆	◆	◆	◆		◆
San Antonio, Texas				◆	◆	◆				
San Diego, California	◆	◆	◆	◆	◆	◆	◆			
Seattle, Washington	◆			◆	◆	◆		◆	◆	

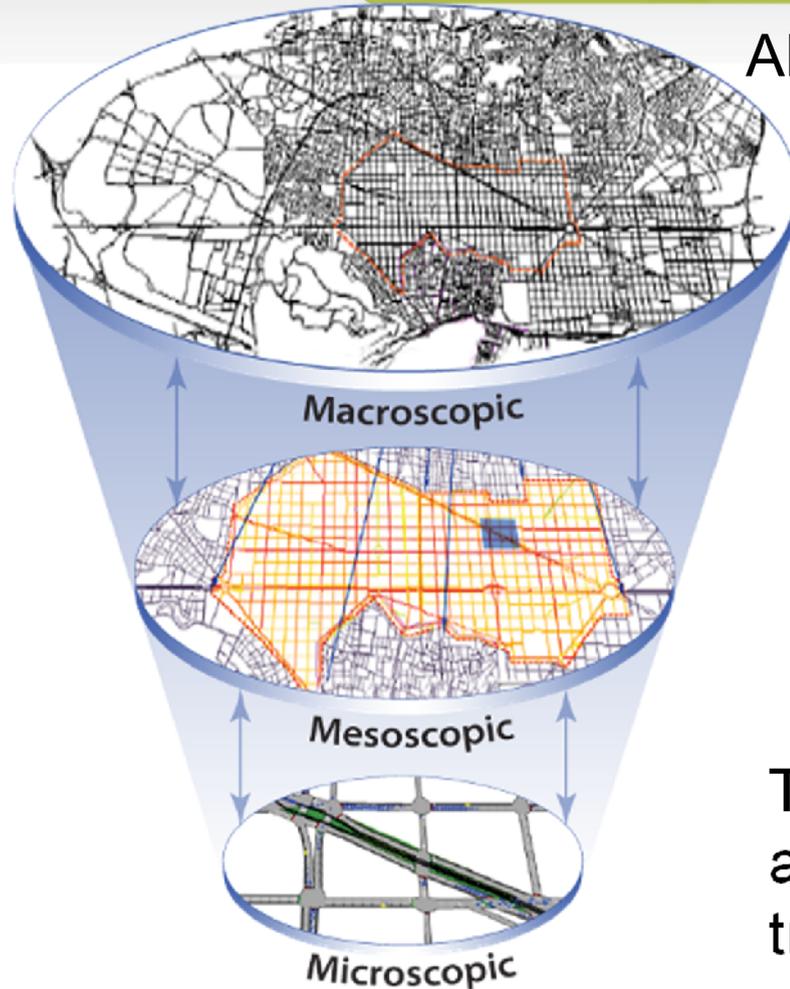
ICM Lifecycle Process



Lessions Learned -ConOps/Requirements Development

1. Involve the right people from the start
2. Develop a clear concept
3. Go slow and deliberate
4. The need for Needs
5. A Picture = A Thousand Words
6. Technical gaps will exist
7. Word Choices are important
8. Build the right thing and build it right

ICM AMS Method: Multi-level Analysis



AMS = Analysis, Modeling & Simulation

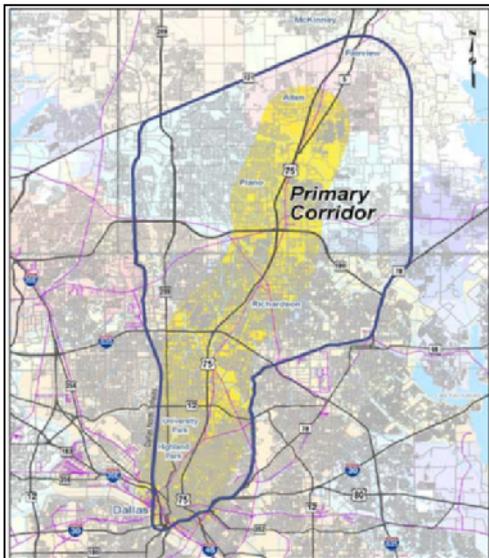
Regional patterns and mode shift; Transit analysis capability

Traveler information, HOT lanes, congestion pricing and regional diversion patterns

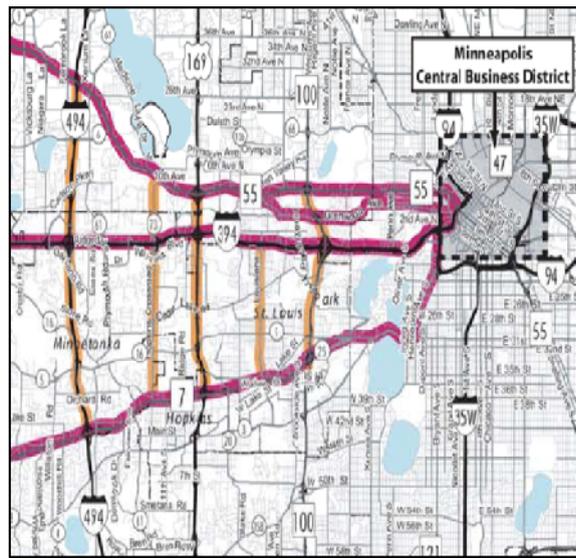
Traffic control strategies such as ramp metering and arterial traffic signal control

AMS Pioneer Sites

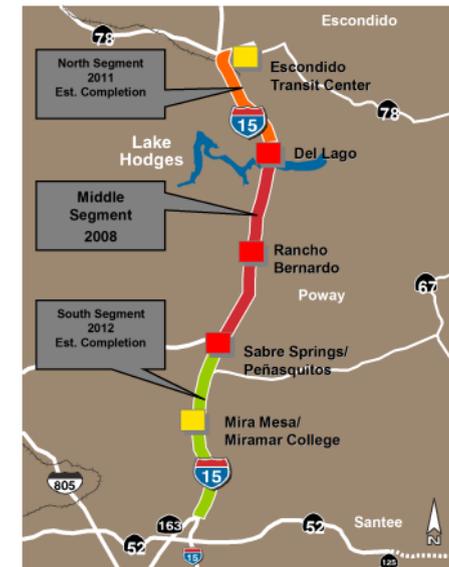
Dallas (US-75)



Minneapolis (I-394)



San Diego (I-15)



Summary of AMS Site Models

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

AMS Pioneer Sites - Strategies

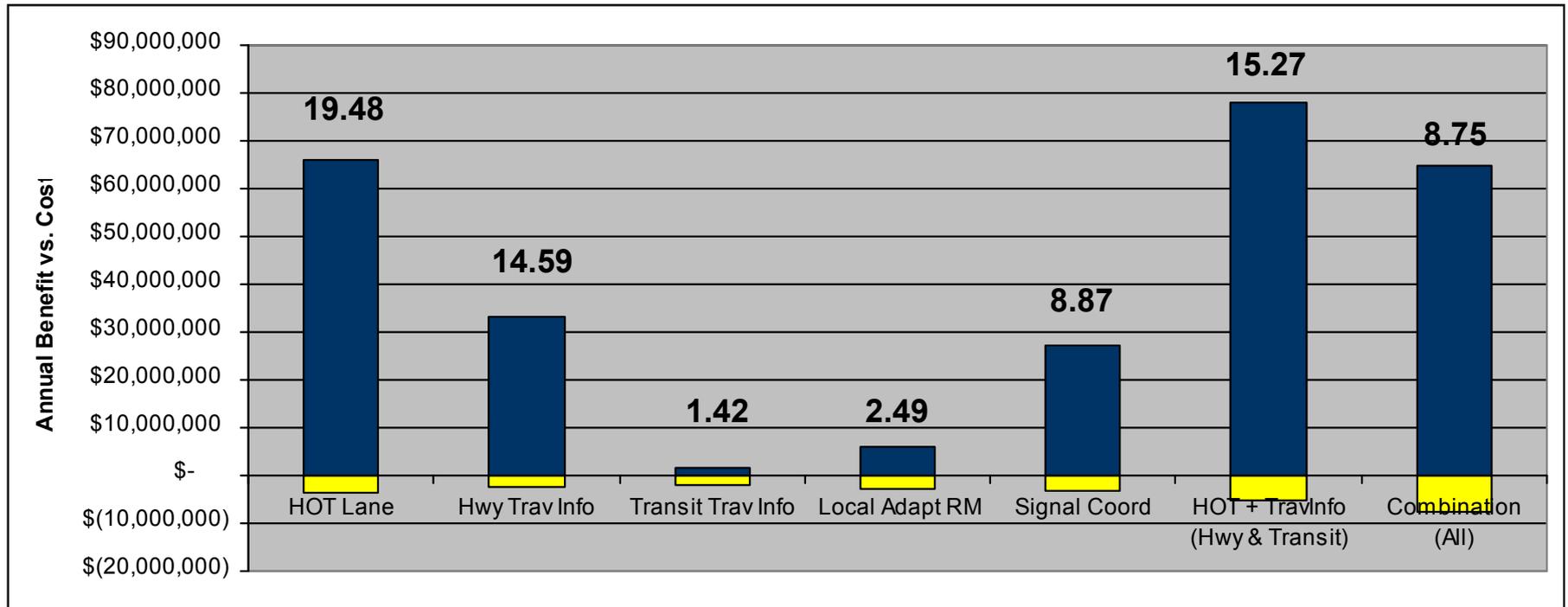
ICM Strategy	Minn.	Dallas	SD
Traveler Information			
• Earlier dissemination and information sharing between agencies	●	●	
• Comparative travel times (mode and route)	●		
• Parking availability at park and ride lots	●	●	
• ABC garage display			
• Freeway traveler information (pre-trip and en-route)	●	●	●
• Arterial traveler information (pre-trip and en-route)	●	●	●
• Transit traveler information (pre-trip and en-route)	●	●	●
Traffic Management			
• Reduced incident times	●		
• Incident signal retiming plans for arterials or frontage roads	●	●	
• Retime ramp meters for incidents or congestion			
• Coordinated signal and ramp meter operation			●
• Systemwide coordinated ramp metering			

AMS Pioneer Sites – Strategies (cont.)

ICM Strategy	Minn.	Dallas	SD
HOT/HOV Lanes			
• HOT lane (congestion pricing)	●	●	●
• HOV lane (change minimum number of occupants)	●	●	●
• Open to SOV during incidents		●	
Transit Management			
• Dynamic rerouting	●		
• Special events capacity expansion	●	●	
• Arterial signal priority	●		● (plus ramps)
• LRT smart parking system		●	
• Add parking and valet		●	
• Physical priority to buses on arterials			●

Summary of Benefits vs. Costs

High Demand with Major Incident



AMS for Stage 2 Sites – Progress Update

- **Tasks Complete**
 - Analysis Plans
 - Data Collection Plans
 - Data Collection
 - Build AMS tools
 - Calibrate/validate the Baseline Models
- **Tasks In Progress**
 - Analyze alternatives
 - Produce performance measures
- **Next Tasks**
 - Draft and final report, AMS workshop

Demonstration Pioneer Sites



Dallas (US-75)



San Diego (I-15)

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

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

ICM Demonstration Schedule

Dallas

- | | |
|------------------------------|---------------------|
| 1. Project Kick-off | Jan 2010 |
| – Draft PMP & SEMP | Mar 2010 |
| 2. Refinement of SyRS | Jan 2010 – Apr 2010 |
| – On-site Walk-through | 5-9 Apr 2010 |
| 3. System Design | Apr 2010 – Dec 2010 |
| 4. System Build | Dec 2010 – Oct 2011 |
| 5. System Testing | Dec 2010 – Dec 2011 |
| 6. Training | Dec 2010 – Oct 2011 |
| 7. System O&M | Jan 2012 – Jul 2013 |
| – Operations Go Live | Jan 2012 |
| 8. AMS | Jun 2010 – Oct 2013 |
| 9. Evaluation | Jun 2010 – Sep 2013 |
| 10. Outreach | Dec 2010 – Apr 2013 |

San Diego

- | | |
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ICM Knowledge and Technology Transfer

Equip corridor managers and operators across the country to implement and use ICM –

Transferability!

Questions and Answers

Questions?

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