Advancing Planning for Operations

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What Is Planning for Operations?

• Enhance and strengthen both planning & operations functions to support regional operations in the 21st Century.

• Enhance regional decision-making process so that operations investments are on par with investments in construction & system preservation.
Planning for Operations: Program Goal

• Improve performance of regional transportation systems through
  – An objectives-driven, performance-based approach
  – Enhanced collaboration & coordination between planners and operators
  – Effective integration of Congestion Management Process (CMP) and Management & Operation (M&O) strategies in Metropolitan Transportation Plan

*The Result:*

**Increased Performance of Our Existing Transportation System**
Responding to a Changing World with a New Approach
A Changing World

- Travelers expect more choices & better information
- Increasing requirement to get most out of existing resources
- Expanding opportunities through technology
- Increasing pressure to address climate change
- Efficient evacuations
- Need to share data & information
- Global economy that demands effective multi-modal solutions

*Requires a shift towards performance based solutions & away from project-focused responses*
Sources of Congestion: National Summary

Traditional transportation planning (demand modeling) only takes this part into account.
Since 1980, vehicle travel up 102%
Road lane miles up 5%
Need to Think Beyond Traditional Capacity Projects

- Limited funding for large-scale capacity projects
- Long-time to plan, assess, and build new infrastructure
- Potential adverse impacts on communities, land use, air quality, etc.

*There exists the need to address traveler concerns through better Management & Operations*
What Do Our Customers Want?

- Safe, seamless, and reliable travel across modes & jurisdictions
- Information about current travel conditions
- Timely information to make mode & route choices
- Efficient & reliable goods movement
- Safe & quick incident clearance
- Efficient evacuations
- Work zone coordination

Consistency across modes & jurisdictional boundaries
What is Congestion Management Process (CMP)?

- Systematic Approach applied in metropolitan region to identify congestion & its causes, propose mitigation strategies, and evaluate effectiveness of implemented strategies.

- An Integral Part of Planning Process that influences decision making. The CMP feeds projects & strategies directly into Plan, TIP, and STIP.
What are Essential Elements of a CMP?

- Monitoring & evaluating transportation system performance
- Identifying causes of congestion
- Identifying & evaluating alternative strategies
- Evaluating effectiveness of implemented strategies
What is Management & Operations?

M&O is: “A regionally integrated program to optimize the performance of existing infrastructure

• Through multimodal and intermodal, cross-jurisdictional systems, services, and projects …

• Includes regional operations collaboration and coordination activities between transportation and public safety agencies.”

SAFETEA-LU Technical Corrections Act of 2008
1. **Planning factor**: Promote efficient system management and operations (Section 6001(h))

2. **Requirement to Include M&O Strategies**
   - MTP shall include “operational and management strategies to improve the performance of existing facilities to relieve vehicular congestion and maximize the safety and mobility of people and goods” (Section 6001(i))
   - Long Range Statewide Transportation Plan (LRSTP) should include: “operations and management strategies to ensure the preservation and most efficient use of the existing transportation system”

3. Additionally, for TMAs, a **Congestion Management Process (CMP)** is required
   - the transportation planning process under this section shall address congestion management through a process that provides for effective management and operation, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under this chapter and title 23 through the use of travel demand reduction and operational management strategies (Section 5303(k))
How does M&O and CMP connect?

Regional operations objectives in the MTP

The CMP actualizes the operations objectives through a systematic approach for:
- Developing performance measures
- Identifying and analyzing problems
- Collecting data
- Developing strategies
- Monitoring performance

Congestion mitigation strategies including M&O strategies
M&O and CMP in Context of Metropolitan Transportation Planning Requirements

Metropolitan Transportation Plan

- Safety
- Economic Vitality
- System Preservation
- Multimodal Connectivity
- Efficient System Management and Operation
- Accessibility & Mobility
- Environment, Energy, and Quality of Life
- Security

Participation Plan

- Coordination with local elected officials
- Coordination with State and local transportation agencies
- Consistency with ITS architecture
- Air Quality Conformity
- Fiscal Constraint

- Consultation with Federal, State & Tribal agencies
- ADA, Title VI, Environmental Justice
- Nonattainment and maintenance areas

* Required for TMAs
+ Required for nonattainment and maintenance areas
How do we effectively integrate the CMP and M&O into our planning process?

- A viable approach
- Measurable objectives
- A systematic process that includes performance measures for developing and selecting M&O strategies
- Collaboration to create more effective management & operations
New Thinking

Advancing an Objectives Driven Performance-Based Approach in Planning for Operations
Objectives-Driven Performance-Based Approach

Transportation Plan includes:

- Goals and measurable objectives that advance operational performance outcomes of the transportation system
- Performance measures used to track progress toward objectives
- M&O strategies to meet the measurable objectives

M&O strategies are programmed & implemented in collaboration with local agencies
Benefits of Collaboration between Planners & Operators

- Planners better understand operations and how operational strategies can meet regional transportation goals
- Planners utilize the best data available to forecast future conditions

- Operators better understand the planning process, opportunities, and expectations
- Operations projects and programs receive increased resources and credibility

Transportation investment decisions reflect the best allocation of resources
The Approach

1. Regional goals and motivation
2. Operations objectives
   - Systematic process to develop and select M&O strategies to meet objectives — Process encompassed by CMP
   - M&O Strategies
3. Metropolitan transportation plan
4. Transportation improvement program and other funding programs
5. Implementation

Monitoring and evaluation
Operations Goals in the MTP

• Goals describe desired end state

• Examples of operations goals:
  – “Maximize Transportation System Management and Operations” Baltimore Regional Transportation Board (BRTB) – 2035 Regional Transportation Plan
  – “Improve transportation system performance” Chicago Metropolitan Agency for Planning (CMAP) – 2030 Regional Transportation Plan
  – “A reliable commute” - Metropolitan Transportation Commission - 2030 Plan

• Other goals include safety, economy, land use, etc.
Operations Objectives

Operations objectives to be included in the plan are developed through collaboration with a broad range of regional participants and reflect regional values.

Specific. Sufficient to guide approaches

Measurable. Quantitative measurement

Agreed. Consensus among partners

Realistic. Can be accomplished

Time-bound. Identified time-frame for accomplishment
# Operations Objectives in the Planning Process

<table>
<thead>
<tr>
<th>Stage of Planning Process</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td>Operations Goal(s)</td>
<td>Improve transportation system reliability / reduce unexpected traveler delay</td>
</tr>
<tr>
<td>Operations Objectives</td>
<td>Reduce incident-based delay so that by 2010, travelers experience…</td>
</tr>
</tbody>
</table>
| Performance Measures      | • Average incident duration (mean minutes per incident)  
|                          | • Vehicle hours of non-recurring delay due to incidents | • Percentage of buses more than 5 minutes off schedule  
|                          | • Vehicle hours of non-recurring delay due to incidents | • Number of bus breakdowns/ major delays |
| Strategies                | • Traffic cameras and detection systems to identify incidents more quickly  
|                          | • Roving incident response teams | • GPS systems to track transit buses  
|                          | | • Improved traveler information on transit services |
| Projects/Implementation   | • Install traffic cameras on Route X (2009)  
|                          | • Install variable message signs on Route X (2010)  
|                          | • Implement Incident Clearance Teams on Route X (2010) | • Install GPS locator system for bus system (2010)  
|                          | | • Install “Next Bus” electronic signs along major commuter corridors (2011) |
The Key Role of Performance Measures

- Within the CMP, used to identify specific deficiencies within the system and monitor congestion
- Focus attention on operational issues (e.g., congestion, incident clearance time, etc.)
- Prioritization of investments
- Track progress toward measurable objectives
- Report progress to the public and decisionmakers
- Demonstrate value of operational projects/programs
- Provide real-time guidance for system management
Defining Performance Measures

• Wide range of potential performance measures
  – Outcome measures: e.g., hours of delay
  – Activity measures: e.g., incident clearance time, percentage of roadways with automated signal coordination

• Coordination and collaboration among range of agencies
  – MPO
  – Transit Agencies
  – State DOT
  – Local DOT, Departments of Public Works

• Can draw on existing agency performance measures
## Sample Transportation System Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
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<tbody>
<tr>
<td>Travel time</td>
<td>Average travel times; Average travel speeds</td>
</tr>
<tr>
<td>Congestion extent</td>
<td>Lane miles of congested conditions; Average hours of congestion per day</td>
</tr>
<tr>
<td>Delay</td>
<td>Vehicle-hours of recurring delay; Non-recurring delay</td>
</tr>
<tr>
<td>Incident occurrence/delay</td>
<td>Median minutes from time of incident to clearance</td>
</tr>
<tr>
<td>Travel time reliability</td>
<td>Buffer time; Buffer time index</td>
</tr>
<tr>
<td>Transit performance</td>
<td>On-time performance; Transit travel times in comparison to personal vehicle travel times</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>Percent reporting being satisfied</td>
</tr>
<tr>
<td>Person throughput</td>
<td>Peak hour persons moved per lane</td>
</tr>
</tbody>
</table>
Determining Operations Needs

• One of first steps in reaching objectives – determining what changes are needed from multi-agency, regional perspective

• Several ways to do this depending on focus of operations objective:
  – Collecting data on current & planned transportation system. Determine where congestion occurs & its causes as part of Congestion Management Process
  – Convening operators in region & examining where activities can be coordinated & improved
  – Revisiting needs brought out during Regional ITS architecture development
Systematic Process: Identify M&O Strategies

- Regional goals and motivation
- Operations objectives
- Systematic process to develop and select M&O strategies to meet objectives—Process encompassed by CMP
- M&O Strategies
  - Define performance measures
  - Determine operations needs
  - Identify M&O strategies
  - Evaluate M&O strategies
  - Select M&O strategies for the plan
- Metropolitan transportation plan
- Transportation improvement program and other funding programs
- Implementation
Identifying M&O strategies to address operations needs

• M&O strategies best established through collaboration between operators in the region and planners

• Strategies may include:
  – Expansion of current operations capabilities/services
  – Adoption of best practices from another region
  – Institutional arrangements enabling mutual support & cooperation between operators
  – Implementation of new systems
Examples of Management & Operations Strategies

Applied individually or in combination

- Traffic incident management
- Traveler information services
- Road weather management
- Freeway management
- Traffic signal coordination
- Work zone management
- Electronic payment/toll collection

- Transit signal priority
- Emergency response and homeland security
- Freight management
- Travel demand management
- Transit fleet management and dispatching

Regional ITS Architecture provides a blueprint for how ITS (used for many M&O strategies) can be coordinated on a regional level.
A Powerful Tool to Use: 
Integrated Corridor Management

- Coordinated, multimodal cross-network operations within a corridor
- Efficient use of existing network assets
- Better information & more choices for travelers
Why Integrated Corridor Management (ICM)?

- Integrates strategies & technology to more efficiently move people & goods
- Is Toolbox of policies, strategies, requirements & methodologies to advance Operations
- Demonstrates how proven & emerging technologies can strongly link separate transportation networks
### Example ICM Strategies

<table>
<thead>
<tr>
<th>Agency data sharing</th>
<th>Ramp meter retiming during incidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>(earlier, better, more)</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Comparative travel times (mode and route)</th>
<th>Active traffic management strategies</th>
</tr>
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<tbody>
<tr>
<td>Parking availability</td>
<td>HOT lane (congestion pricing)</td>
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<tr>
<th>Multi mode Traveler information</th>
<th>Dynamic transit re-routing</th>
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<tbody>
<tr>
<td>Coordinated incident management</td>
<td>Advanced Transit signal priority</td>
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</table>

| Ramp meter coordination | Emergency preemption integration |

**Strategies are small part of ICM. Integration is the Key…**
Summary of Approach

Regional goals and motivation

Operations objectives

Systematic process to develop and select M&O strategies to meet objectives — Process encompassed by CMP

M&O Strategies

Define performance measures
Determine operations needs
Identify M&O strategies
Evaluate M&O strategies
Select M&O strategies for the plan

Metropolitan transportation plan

Transportation improvement program and other funding programs

Implementation
How Do We Collaborate?
A Key Way to Engage Operators: MPO Operations Committees

• Many MPOs convene committees of operators in their regions to coordinate ITS/operations activities and recommend M&O strategies for consideration in the Plan and TIP

• Examples:
  – **Capital District Transportation Committee** (Albany, NY) hosts Regional Operations Committee to assist in proposing M&O strategies/initiatives in TIP
  – **Hampton Roads** Intelligent Transportation System (ITS) and Operations Planning Committee reviews ITS applications for CMAQ funding and provides recommendations to MPO
Benefits of Collaboration
Pima Association of Governments
Signal Timing Program

• Convened regional operators to develop RCTO and developed operations objectives & performance measures

• Identified tremendous needs for signal retiming assistance across region

• Developed signal timing program to give assistance to overextended engineers in region through central on-call consultant
Denver Traffic Signal System Improvement Program

• Assists signal operators to regularly time their signals & improve system infrastructure with funding & technical assistance

• Works towards regional goals of improving mobility & reducing air pollution

• From 2003 to 2006, TSSIP:
  – Reduced delays by nearly 36,000 vehicle hours/day
  – Reduced fuel consumption by 15,000 gallons/day
  – Reduced air pollution emissions by more than 45,000 lbs/day
For More Information:

• Visit Our Website on Planning for Operations at:
  http://www.plan4operations.dot.gov

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ICM - For More Information:

• Visit Integrated Corridor Management website:
  http://www.its.dot.gov/icms/index.htm

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Questions & Discussion