Regional Operations in the 21st Century
A Vital Role for MPOs
Purpose of this Meeting:
Share Thoughts & Discuss

• Challenges brought about by the changing transportation environment and MAP 21
• How “operations” and supporting technologies can help address these challenges
• The importance of “mainstreaming” operations into the regional planning and programming processes
  o “Planning for Operations” – an objectives-driven, performance-based approach
What is Operations?

Transportation Systems Management and Operations (TSMO, TSM&O)

• “Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects” (MAP 21)

• Regional integration an important consideration
  - Many strategies are multi-modal
  - All require inter-agency collaboration, including coordinating with enforcement and incident responders
Example Operations
Strategies and Solutions

- Work Zone Management
- Traffic Incident Management
- Special Event Management
- Road Weather Management
- Transit Management
- Freight Management
- Traffic Signal Coordination
- Traveler Information
- Ramp Management
- Managed Lanes
- Active Traffic Management
- Integrated Corridor Management

Implemented and operated by transportation agencies (State DOT, transit agency, local DOT) on a day-to-day basis.
The Transportation Environment is Changing

- Increased reliance on information and technology
- Increasing customer needs and expectations
- Growing emphasis on outcomes and performance measurement
- MAP 21 requirements
- Reduced financial resources
- Technology also offers opportunities – enhanced operations and regional multi-modal integration
Technology Is Transforming Our World

• **Increased availability of information**
  - Internet connectivity, wireless communications, cloud computing
  - Information is available 24/7 on mobile devices

• **Shifting customer expectations:** technology leads to improved efficiencies and service

• **The future** – even more innovative technologies and a shorter shelf life
  - New data services
  - Connected / autonomous vehicles

(Source: Portland TriMet)
Customer Expectations and Needs are Changing

- Public’s expectations of government
  - Increased productivity and efficiency
  - Greater demand for accountability – value expected from the use of tax dollars and transit fares
  - Transportation network viewed as a “whole”; not concerned with which agency owns the facility

- Improved performance and services for commuter, freight, recreational, and other trips
  - Mobility including reduced delays and congestion
  - Safety
  - Accurate, timely, and accessible information
  - Reliability (a focus of SHRP 2 program)
Performance Measures

Element of increased accountability

“The game gets serious when you start to keep score!”

Increasing focus on outcomes – improvements in safety, mobility, reliability, on-time performance, emissions, etc.

Emphasized in MAP 21

Goals and associated measures being established for:

- Safety
- Infrastructure Condition
- Congestion Reduction
- System Reliability
- Freight Movement and Economic Vitality
- Environmental Sustainability
- Reduced Project Delivery Delays
• MPOs and State DOTs must consider projects and strategies as part of their planning process that promote efficient operations.

• Metropolitan planning processes will use a performance-based approach to transportation decision making.
  
  o Plan will include performance measures, targets, and system performance report.
  
  o TIP will link investment priorities to performance targets in Plan to extent possible.
Increasing Financial Constraints

Decreasing fuel tax revenues going into Trust Fund

- No change in the federal gas tax since 1993
  - Predictions that fund will become insolvent soon

- Increased fuel efficiency
  - New CAFE standards
  - Emerging fleet of electric vehicles and plug-in hybrids pay no fuel tax

MUST DO MORE WITH LESS
Operations Can Help Address These Challenges

Leverage Technology

- Preserve and maximize existing capacity
- Enhance safety
- Promote mobility and customer outreach
- Improve reliability for commuters and freight
- Enhance sustainability and livability
- Monitor performance
- Implement quickly at relatively low cost
- Help achieve regional goals
# Benefits From Operations

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<td>Operations Strategy</td>
<td>Example Benefits</td>
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<td>Dynamic Speed Limits</td>
<td>• Crashes reduced 10% - 30% &lt;br&gt;• Secondary crashes reduced 50% &lt;br&gt;• Improved reliability</td>
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<td>Dynamic Shoulder Running</td>
<td>• Travel times reduced up to 25% &lt;br&gt;• No impact on safety</td>
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<td>Ramp Metering</td>
<td>• Crashes reduced 15% - 40% &lt;br&gt;• Travel times increased 10% +</td>
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<td>Transit Signal Priority</td>
<td>• Bus times improved 2% - 15% &lt;br&gt;• Minimal impact to side streets</td>
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<td>Adaptive Signal Control</td>
<td>• Delay reduced 4% - 40%</td>
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<td>Integrated Corridor</td>
<td>• Estimated B/C of 5-10 : 1</td>
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Operations in Support of Sustainability

Promotes the entire “triple bottom line”

• Economic
  o Improved mobility and reliability

• Social
  o Enhanced safety

• Environmental
  o Reduced emissions and GHG

Examples of Environmental Benefits

• Traffic signal control: Emissions reduced 3% - 22%

• Congestion mitigation strategies (e.g., incident management): CO2 reduced 7% -12%

• Variable speed displays: CO2 reduced 10% - 20%

• Operations and ITS support “eco-driving” measures
Operations in Support of Livability

- Addresses safety
- Helps provide range of transportation choices
  - Multi-modal traveler information
  - Connecting the modal pieces (ICM)
- Supports fast, frequent, and dependable public transportation
- Enhances the environment
  - Reduced emissions including GHG
- Supports travel demand management (TDM) approaches
  - Traveler information, managed lanes, and pricing
## Operations in Support of Climate Adaptation

### Extreme Weather

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<th>Extreme Weather</th>
<th>Supporting Operations / ITS</th>
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<tr>
<td>Hot Days (buckling pavements, cars overheating, wildfires)</td>
<td>- ATM (variable speed limits)</td>
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<td>- Incident management</td>
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<td>- Work zone management</td>
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<td>Rising Sea Levels / Storm Surge</td>
<td>- Traveler information</td>
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<td>- Roadway / transit diversions</td>
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<td>Increased number / intensity of precipitation events</td>
<td>- ATM (variable speed limits)</td>
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<td>- Incident management</td>
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<td>Increased Hurricane and Super Storm Frequency</td>
<td>- Contra-flow operations</td>
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<td>- Ramp management / closures</td>
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<td>- Integrated Corridor Management along evacuation routes</td>
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### Resiliency Operations Critical Before and After Weather Event
Traditional Approach to Managing Transportation

• Predict future (long-range) traffic volumes
• Fund major capital projects to provide additional capacity

This only addresses 40% of the congestion problem.

• Also becoming more and more difficult to provide new capacity

Causes of Congestion (Source: FHWA, 2005)
Providing Effective, Safe and Reliable Transportation

- Building the necessary infrastructure
- Keeping in a state of good repair (maintenance and reconstruction)
- Operating and managing the infrastructure on a day-to-day basis

Core attributes of planning process for decades (LRTP, TIP)

Operations should be integrated into the traditional planning and programming processes

“Mainstreaming”

New construction will continue to be important. But we can’t build our way out of congestion!
Mainstreaming Operations

“Planning for Operations” – a joint effort between planners and operators to merge operations into traditional planning and programming

• Develop and program operations strategies based on regional goals, objectives and performance measures.

• Enhance the process so that operations investments are on par with construction and preservation funding.

• Help meet requirements of MAP 21 (e.g., “promote efficient operations”).
Key Attributes of Planning for Operations

“Objectives – Driven Performance-Based Approach”

• Multi-modal collaboration between agencies and jurisdictions, and between planners and operators

• Focus on regional goals, objectives and specific outcomes
  o Not just implement a project or solve a location-specific problem.

• Prioritize investments to achieve operations objectives and improve transportation system performance

• Include operations strategies and supporting technologies in Transportation Plans and TIP

• Demonstrate accountability through performance measures
Objectives – Driven, Performance-Based Approach

1. Regional Goals
2. Operations Objectives
3. Operations Strategies
4. Metropolitan Transportation Plan
5. TIP and other funding programs
6. Implementation

- Define performance measures
- Determine operations needs
- Identify operations strategies
- Evaluate operations strategies
- Select operations strategies
SMART Operations Objectives

Operations objectives are developed through collaboration with a broad range of regional participants and reflect regional values.

**Specific.** Sufficient to guide approaches.

**Measurable.** Quantitative/qualitative measurement.

**Agreed.** Consensus among partners.

**Realistic.** Can be accomplished with available resources.

**Time-Bound.** Identified time-frame for accomplishment.

Associated performance measures are outcome-based.
Summary

• Operations is a critical component for managing the transportation network on a daily basis.
  o Enhances mobility, reliability, safety, and environment;
  o Provides a sustainable transportation network;
  o Supports a performance-based approach, focusing on outcomes; and,
  o Achieves quick and cost-effective implementation.

• To be successful, operations needs to be “mainstreamed” into the regional planning and programming processes and documentation.

You have an important role to play.
Help Mainstream Operations into the Planning Process

Traditional Focus

- Long term
- Capital investment
- Project orientation
- Capacity deficiencies
- Link improvements
- Environmental impacts
- Recurring congestion (from forecasts)

Needed (In Addition)

- Significant collaboration
- Consideration on non-recurring congestion and operations
- An objectives-driven approach
- Performance-based focus on outcomes
- Network and region-wide applications
- On-going funding for operations and maintenance
National Operations Center of Excellence

- Partnership of AASHTO, ITE, and ITS America with support from the FHWA
- Offers a document library, peer exchanges, webinars, on-call assistance, assessments, and other TSM&O support via the Operations Technical Services Program.
  - A place to share information as well as receive it
- [www.transportationops.org](http://www.transportationops.org)
Next Steps

• Demonstrate commitment and involvement – today’s issues require regional approaches

• Support the mainstreaming of operations
  o Develop a Regional Operations Plan and objectives
  o Integrate operations into the CMP and TIP

• Empower the people in your respective agencies who can make it happen and give them the resources they need.

If you need assistance – Contact:

• FHWA: Steve Clinger (Stephen.Clinger@dot.gov)
• AASHTO: Gummada Murthy (gmurthy@aashto.org)
Questions
ADDITIONAL SLIDES AS APPROPRIATE
**What is “Reliability”?**

- **Consistency** or **dependability** in travel times.
  - As measured from day to day, or across different times of day.
- Less tolerance for unexpected delays.
- Planning for travel variability has costs for users, including individuals, transit operators, freight and their end users.
Transit Management

Example Benefits
- AVL / CAD improved schedule adherence by 9% – 23%
- TSP improved bus travel times by 2% – 15% (minimal impact on side street traffic)

- Automated Vehicle Location (AVL)
- Computer Aided Dispatch (CAD)
- Automatic Passenger Counting (APC)
- Bus Rapid Transit (BRT)
- Transit Signal Priority (TSP)
- Transfer Connection Protection
- Automated Fare Media