



# **Regional Operations in the 21st Century**

**A Vital Role for MPOs (L31)**

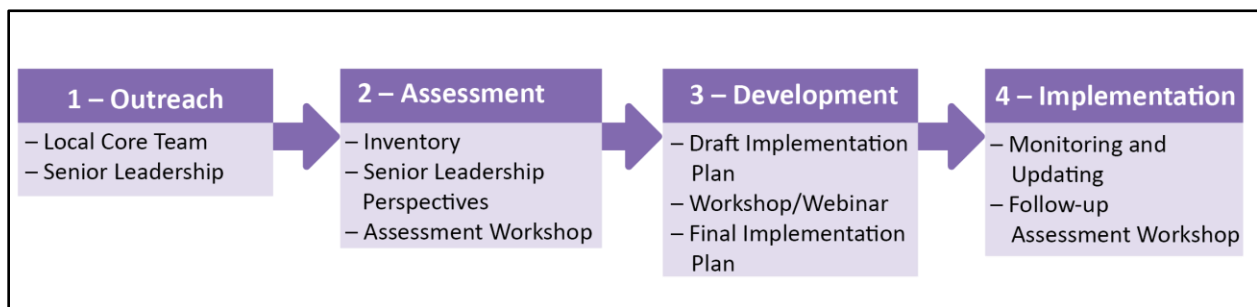
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May 2014

## INTRODUCTION

This document is the presentation guide in support of the accompanying PowerPoint presentation entitled “Regional Operations in the 21<sup>st</sup> Century – A Vital Role for MPOs.” This is an update to the presentation developed under SHRP 2 Project L31, Reliability Workshops for State and Public Sector Managers. That presentation focused on DOTs and their senior management. During the update process, it was determined that a parallel presentation was also required for MPOs and the importance of mainstreaming operations into the regional transportation planning process. Additional updates were required to reflect the requirements contained in MAP-21, recent enhancements to the FHWA “planning for operations” initiative (e.g., the objectives-driven, performance based approach to planning) and the needs of the joint FHWA / AASHTO deployment of SHRP2 Organizing for Reliability, including “lessons learned” from the pilot Capability Maturity Model (CMM) activities.

With respect to the latter, an Implementation Assistance Program (IAP) is underway to help transportation agencies in deploying new products developed under the second Strategic Highway Research Program (SHRP2). Twenty seven “lead adopters”—several of which included MPOs and regional entities – were selected for the first round of assistance opportunities for the SHRP2 Organizing for Reliability. The process and activities associated with this 2-3 year implementation assistance is shown in Figure 1.



**Figure 1 – Overview of Activities: CMM Assistance for Lead Adopters**

These presentation materials are intended to help support these CMM activities in all four phases, starting with the initial engagement and subsequent meetings with a MPO’s senior leadership and their Board (and other regional committees and groups) during the Outreach and Assessment phases. The presentation materials may also be used as one of the activities and supporting “tools” during the implementation phase to help mainstream operations into the regional transportation planning process. The presentation materials, along with a companion presentation geared more towards State DOTs, are included in the Tool Kit developed for this CMM-related effort.

The material is geared towards for presentation to the chief executive officers (CEOs) and senior managers of MPOs and to the MPO’s board members (who are typically senior officials of transportation agencies and local governments within the region) about the value of mainstreaming operations as a core component and investment priority in the regional transportation planning process. Not only can this senior leadership provide valuable input to the process; but they are also the ones that must ultimately approve and subsequently

promote any changes to the institutional framework and processes in support of enhanced operations. Additionally, the presentation materials may also be used as a tool to discuss the importance of operations to middle management and other MPO staff, as well as various “technical” committees supported by the MPO. It is also envisioned that the presentation materials will prove useful in other efforts to advance operations (e.g., for communicating with the public and other stakeholders).

## **GOAL**

The overall goal of these presentation materials is two-fold. The first is to promote an understanding and appreciation for what Transportation Systems Management and Operations (TSMO – simply referred to as “operations” in the presentation) can do to help a transportation agencies within a region meet today’s many challenges and improve the transportation network. The executive audience needs to understand policy-related issues and basic concepts in order to become advocates for operations.

The second hoped-for result is that the executive(s) will then task their senior staff to formalize operations as an integral part of the transportation planning process (using an objectives-driven performance based approach) and an on-going focus within the various transportation agencies and local governments within the region. In this context, the executive should:

- Establish someone to be responsible for identifying needed changes to the regional transportation planning process.
- Indicate support for reasonable resource allocation based on the business case.
- Identify what measure of success would be.
- Set a time line for achievement and reporting back

## **PRESENTATION APPROACH**

This presentation has been created to address transportation operations at a high level that is relevant to most, if not all, MPOs and other regional entities. The presentation slides are sequentially ordered in this document and include the following information for each<sup>1</sup>:

- *Description of the slide*—a brief narrative setting up the key points to be made during the presentation of the slide. This may be an introduction to the slide subject putting the key points in context, a definition, or some combination.
- *Key points*—a bulleted list of key points to be articulated while the slide is displayed;
- *Other* – Additional information and guidance for the presenter to consider, such as identifying and including examples specific to the DOT / audience. (An “Other” note is not provided for all slides).

The presenter should use and convey the information included in the “Description” and “Key Points” as appropriate to the audience. Local examples and updates as a result of on-going activities should also be considered as identified in “Other”.

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<sup>1</sup> This same information is also provided on the notes page of each slide within the presentation

The executive sessions should be planned for opportunities that relate to elected/appointed officials natural “turf” and appropriate time – for example, MPO senior staff and directors’ meetings, MPO Board and other committee meetings, state legislature transportation committee meetings, or conference venues (AASHTO, NCSL, NACO, APWA, etc.).

The presenter(s) should have credibility with the target audience. This suggests some sort of peer relationship (e.g., the presenter was once a MPO executive or member of a MPO Board) or acknowledged leader in the field of operations. The presenter should also interject personal anecdotes and local examples as appropriate (e.g., “You are already using these operations objectives / performance measures in the planning process.”) As such, it is important in preparation for the session that the presenter(s) familiarize themselves with a general understanding of the region of interest (target), as well as offering real-life examples from other regions.

**PRESENTATION ORGANIZATION**

The presentation slides are organized as follows:

Topic	Slide Numbers
Introduction and Purpose of Session / Definition of “Operations”	1 - 4
The Changing Transportation Environment and Associated Challenges to MPOs and their Member Agencies, and How Operations Can Help	5 - 11
How Operations Can Support Regional Goals Such as Mobility, Safety, Reliability, Sustainability, and Livability	12 - 16
Importance of “Mainstreaming” Operations Into the Regional Transportation Planning Process, Including an Overview of “Planning for Operations” and the “Objectives-Driven Performance Based Approach”	17 – 22
Summary and Next Steps for Executives, Including Contacts Within FHWA and AASHTO	23-25
“Questions” – To stimulate a dialogue and interactive discussion	26
“Parking Lot” of slides that the presenter may include depending on the specific interests and needs of the audience. As noted in the Notes, slides on individual operations strategies are also available from the companion DOT presentation and may be incorporated into the MPO presentation as appropriate.	27-29

**MODIFYING THE PRESENTATION**

The presentation, as described herein, will likely take 30 minutes followed by questions and discussions; and it may be expanded to an hour if slides on individual operations strategies (from the “Parking Lot” and / or from the companion DOT presentation) are included.

Experience has shown that MPO executives are often very busy with many other issues and priorities demanding their attention; or there may be limited time on the MPO Board agenda. As such, there may be only 10 to 15 minutes available for the presentation and subsequent discussion. Accordingly, this presentation should be viewed as a “menu” of slides that can be modified, edited, rearranged, and otherwise tailored such that it is relevant to the audience, the MPO’s operations and planning process, the presentation environment, and the allotted timeframe.

One potential example of a shorter presentation is provided below, showing the most essential slides and other potential slides, some of which may be added depending on the specific operations programs within the agency and the interest of the target audience. This is only an example, and the presenter should tailor the presentation to the specific needs and interest areas of the MPO and the allotted time.

Topic	Essential Slides	Other Potential Slides
Introduction and Purpose of Session / Definition of “Operations”	1 – 4	
The Changing Transportation Environment and Associated Challenges to MPOs and their Member Agencies, and How Operations Can Help	5, 11	A few from 6 - 10
Examples of Operations Strategies and Benefits	12	A few from 13 - 16
Importance of “Mainstreaming” Operations Into the Regional Transportation Planning Process, Including an Overview of “Planning for Operations” and the “Objectives-Driven Performance Based Approach”	18, 19, 21	
Summary and Next Steps for Executives, Including Contacts Within FHWA and AASHTO	24-25	

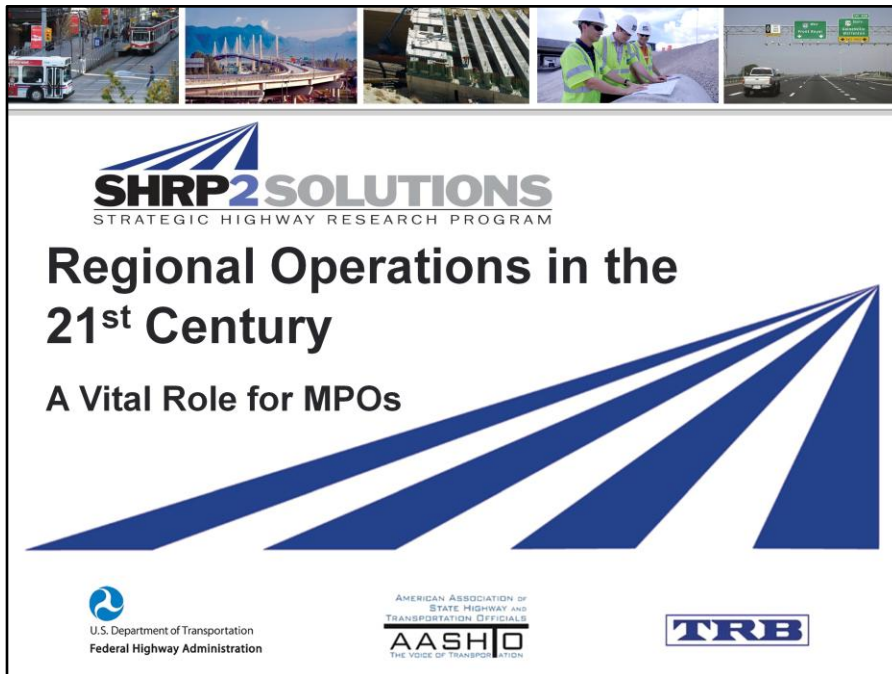
Given that transportation systems management and operations and the planning for operations concept are constantly evolving, this presentation is intended to be a “living document”, with updates provided as may be required to reflect the state-of-the-practice (e.g., changes in Federal legislation and policy, findings and lessons learned from the on-going CMM activities, evaluations of operations strategies). Moreover, should any presenter identify materials and information that should be included in the presentation materials, or develop a modified order of the slides that has proven beneficial, please contact Steve Clinger of FHWA at [Stephen.Clinger@dot.gov](mailto:Stephen.Clinger@dot.gov). These additional tools will also be included in subsequent updates as appropriate.

A history of the presentation versions and the major changes made for each version update is provided below.

**MPO CEO Presentation Version Control**

<b>Version</b>	<b>Date</b>	<b>Changes and Updates</b>
1.0	April 2014	Initial version of MPO CEO Presentation

# SLIDE 1: Regional Operations in the 21<sup>st</sup> Century



## Description of the Slide

Cover: This presentation is geared towards MPO executives and board members regarding the increasingly important role of transportation systems management and operations (TSMO) – hereinafter simply referred to “operations” – in the effective management and delivery of transportation services within a region. In other words – how operations can help MPOs and their member agencies to achieve regional goals and meet customer needs and expectations in a rapidly changing environment.

## Key Points

- Hello and thank you for taking time from your busy schedule(s) to discuss transportation system management and operations, what operations can do to help the MPO and its member agencies achieve regional goals and improve customer service, and some actions you can take to improve operations from a regional perspective.
- Introductions

**Other** - Depending on the audience and time, consideration should be given to prompting the audience to ask questions at any time during the presentation.

## SLIDE 2: Purpose of This Meeting

### 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
  - “Planning for Operations” – an objectives-driven, performance-based approach

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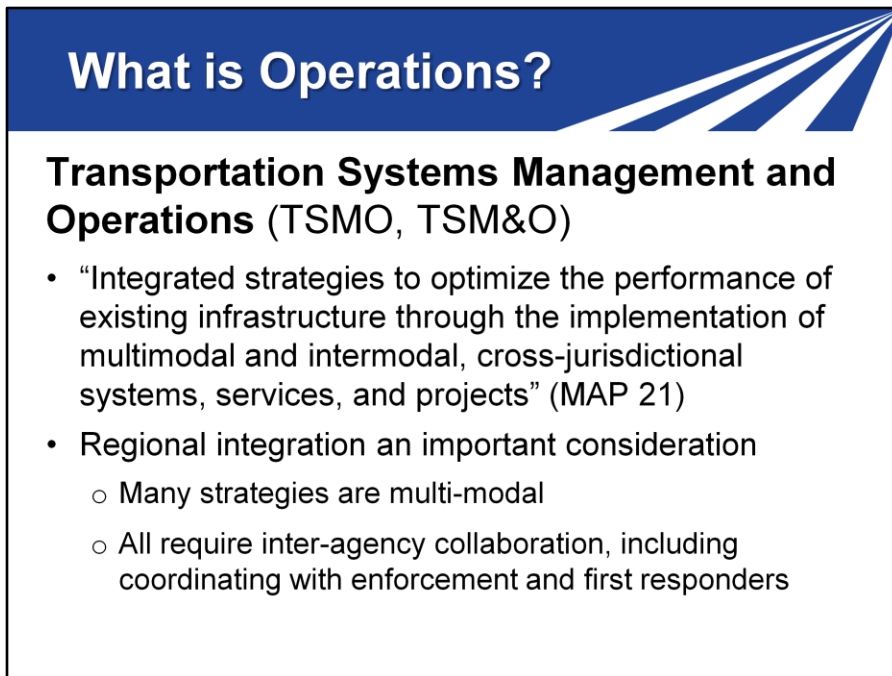
#### Description of the Slide

Our presentation and discussions today will focus on three key areas as shown here.

#### Key Points

- The roles and responsibilities of MPOs have evolved and grown over the past few decades since the Federal Aid Highway Act of 1962, which mandated the creation of MPOs and the regional transportation planning process. In general, the planning process initially centered around building and preserving the transportation infrastructure. The responsibilities of an MPO and its member transportation agencies have expanded to also include actively managing and operating the multi-modal transportation network as effectively as possible so as to meet the regional goals (and customers’ demands) for safety, mobility, reliability, and improved environment; and to do so in the most cost-effective manner.
- Operations and the supporting technologies are valuable tools for meeting these challenges and achieving the regional transportation goals.
- Moreover, the current federal transportation authorization (MAP 21) requires MPOs and State DOTs to consider projects and strategies as part of the planning process that promote efficient operations.
- Operations cannot succeed in a vacuum – it must be understood and become a core function of all transportation agencies, and be mainstreamed into the regional transportation planning and programming processes.
- As will be discussed later, an objectives-driven and performance based approach can help make this happen.





**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 first responders

**Description of the Slide**

Before getting into any more discussions, it is perhaps worthwhile to define just what is meant by “operations”.

**Key Points**

- The current federal transportation reauthorization – Moving Ahead for Progress in the 21st Century Act, or MAP 21 – defines “Transportation Systems Management and Operations”
- A key phrase in this definition is the notion of “integrated strategies.” The goal of integration is to bring the management and operation of the surface transportation network into a unified whole, thereby making the various transportation modes and facilities perform better and work together.
- There are many aspects of integration from a regional perspective – for example:
  - Technical integration in terms standards and system architectures that support information sharing between ITS-based systems across all modes; and also
  - Institutional integration such as coordination and collaboration between various agencies and jurisdictions in the region to achieve seamless interoperability

**Other** - MAP-21 expires in September, 2014. The presenter should check the subsequent re-authorization for any change in the definition of TSMO or emphasis.

## SLIDE 4: Example Operations Strategies and Solutions

### 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.

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### Description of the Slide

This slide lists several of the operations strategies that's have been applied by transportation agencies across the country; and in doing so, they have made substantial positive impact on the safety, mobility, and reliability of the surface transportation network.

### Key Points

- Operations consists of a wide array of possible strategies and opportunities, from every-day activities to cutting edge solutions and technologies.
- Many of these strategies can be applied to both urban and rural environments.
- These are implemented and operated by the member agencies, with support from the MPO

**Other** - If possible, perhaps highlight a few of these strategies in terms of what the specific region has done / is doing. In some cases, the MPO may be actively involved in some of these strategies (e.g., incident management teams), and that should also be mentioned.

## SLIDE 5: The Transportation Environment is Changing

### 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



### Description of the Slide

It should come as no surprise to you that the transportation environment in which your member transportation agencies conduct their business is rapidly changing.

### Key Points

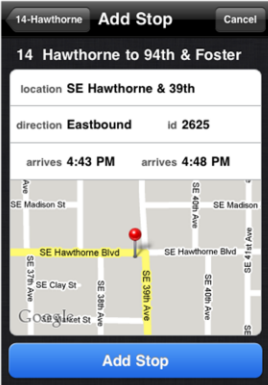
- We are living in an information revolution, brought about and supported by new and emerging technologies. In today's connected world, customers are regularly introduced to new ways of using real-time information to save time and money; and transportation agencies are expected to take advantage and use these technologies.
- The traveling public expect that the products they use and the technologies they encounter will be "smart" and that the information received will be accurate and reliable—regardless of who "owns" the road or the information.
- There is also an increased emphasis on accountability and transparency on how transportation agencies conduct their business; and this requires that the performance of the transportation network be regularly measured and compared to established metrics.
- MAP 21 has several requirements that impact the transportation planning process
- Moreover, the increased expectations and accountability are coming at a time when government agencies are expected to do more, but with fewer financial resources.
- Technologies can also help transportation agencies meet these increased expectations through the execution of operations strategies. These strategies can also help promote regional integration and boundary-free operations.

**Other** - The key points listed above are for a shorter version. If a longer version is being presented (including the next 5 slides), then the key points can be skipped, and lead into the next slide with "there are several reasons behind this changing environment"

## SLIDE 6: Technology is Transforming Our World

### Technology Is Transforming Our World

- Increased availability of information
  - Internet connectivity, wireless communications, cloud computing
  - Information is available 24/7 on mobile devices
- Customers' perception: technology can improve efficiency and service
- The future – even more innovative technologies and a shorter shelf life
  - New data services
  - Connected / autonomous vehicles



(Source: Portland TriMet)

### Description of the Slide

We are living in an information revolution. The internet and wireless communications, coupled wide-spread use of mobile devices and related technologies, have transformed the way business is done and how value is delivered.

### Key Points

- In today's connected and information-rich world, customers are regularly introduced to new ways of using real-time information to save time and money; and transportation agencies are expected to take advantage of and use technology to improve efficiency and service.
- The agencies' customers – that is, the traveling public within the region – expect that the products they use and the technologies they encounter will be “smart” and will ultimately improve their travel experience. They also expect that the information received will be accurate and reliable—regardless of who “owns” the road or the information.
- Moreover, technology will likely have an even greater impact on the transportation network in the future. We are watching a new era of transportation emerge through the Connected Vehicle program that allows cars and infrastructure to communicate with one another. And a week doesn't pass without some news article on the future of autonomous vehicles. How these future technologies may impact how we manage and operate the transportation network is mind-boggling.

## SLIDE 7: Customer Expectations and Needs are Changing

### 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 service 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)

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### Description of the Slide

As already noted, advances in technology and the availability of real-time information have increased DOT's customers' expectations.

### Key Points

- Technology has been harnessed by the private sector to improve productivity; and the same is expected (and is well underway) for government entities.
- Past part of these increased expectations is a greater demand for accountability – that customers are receiving value for their tax dollars and transit fares. Moreover, transportation users view the transportation network as a regional whole; and are not that concerned with which agency owns or is responsible for a particular facility
- Additionally, transportation customers are expecting improvements in mobility, safety, information, and reliability.
- With respect to the last point; congestion is an accepted and even predictable reality in major urban areas. So the real source of frustration for users and lost productivity for businesses comes from unexpected delays that are encountered because of crashes, special events, unanticipated work zones, extreme weather, and the like. The reliability of the transportation system has come to be at least as important as travel time itself.

**Other** - There is a “reliability” slide in the “parking lot” at the end of the presentation, and can be used next if the audience may not be aware of what the term “reliability” actually means.

### 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

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### Description of the Slide

The increased emphasis on government accountability and transparency has focused more attention on measuring performance. MAP-21 and FHWA emphasize the use of measurable objectives and associated performance metrics.

### Key Points

- Performance measurement for transportation has been gaining traction the past several years. In essence
  - If you don't measure results, can't tell success from failure.
  - If you can't see success, can't reward it.
  - If you can't see failure, can't correct it.
  - In other words, you can't manage it unless you measure it!
- Under the requirements of MAP 21, we are beginning the process of “keeping score”. Goals and associated performance measures are being developed for several transportation categories.
- There is also an increasing emphasis on the outcomes from transportation improvements. It is no longer enough to say that X lane-miles were added or that Y DMS were installed; the key question is how did these changes improve the transportation network and contribute to regional transportation goals.

### Other

- Prior to the presentation, the presenters should check on the current status of the effort to develop and publish (e.g., in the Federal Register for comment) the performance measures being developed by FHWA under the MAP 21 requirement.

## MAP 21 and Performance Based Planning

- 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
  - Plan will include performance measures, targets, and system performance report
  - TIP will link investment priorities to performance targets in Plan to extent possible

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### Description of the Slide

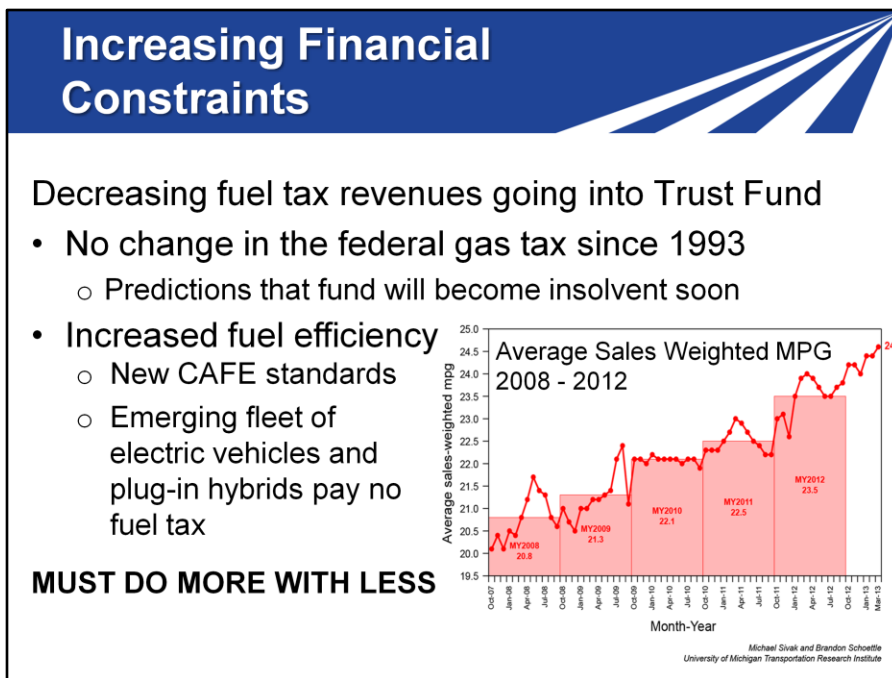
In addition to its emphasis on performance measures, MAP 21 also requires the transportation planning process to address operations.

### Key Points

- One of the requirements is that MPOs and State DOTs must consider projects and strategies as part of their planning process that promote efficient operations
- Another requirement is that metropolitan planning processes will use a performance-based approach to transportation decision making. We'll discuss this a bit more later on.

**Other** - Perhaps note how the MPO has incorporated operations into its current planning process.

## SLIDE 10: increasing Financial Constraints



### Description of the Slide

The need to meet growing customer expectations for mobility and safety, increased accountability, and the associated performance management requirements is occurring at a time of reduced financial resources for most transportation agencies

### Key Points

- The Highway Trust Fund, which was so instrumental in the construction of the Interstate Highway System and other transportation improvements, is running out of money, with current predictions that the transportation fund will become insolvent next year, if not sooner.
- There are several reasons for this
  - The last increase in the federal gas tax was over 20 years ago, and inflation has significantly reduced its purchasing power.
  - Cars have become more fuel efficient, and will continue to do so in accordance with current Corporate Average Fuel Economy (CAFE) standards (average 35.5 mpg in 2016; average 54.4 mpg in 2025). This means less tax paid per miles driven, with electric vehicles paying no gas tax at all.
  - Technology allows many of us to be virtual commuters. The recent recession and high gas prices also reduce the amount of driving, further reducing the amount of gas tax taken in.
- Several initiatives are underway to find a long-term solution to the declining gas tax revenues; but for the foreseeable future, many agencies will likely need to do more and satisfy rising customer expectations with less.

**Other** - It would be worthwhile to determine the state gas tax(es) where the MPO is located, the history of increases, and any initiatives underway to provide a more sustainable funding mechanism.



## SLIDE 11: Operations Can Help Address These Challenges

### 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



The slide features two images. The top image shows a multi-lane highway with several overhead speed limit signs. The signs display 'SPEED 60', 'SPEED 45', 'SPEED 45', 'SPEED 45', and 'SPEED 45'. A red sign on the right side of the highway reads 'REDUCE SPEED'. The bottom image is a 3D architectural rendering of a city street. It shows a red-paved bus lane with the text 'ONLY BUSES' on it. There are also green-paved bike lanes on either side of the bus lane. Pedestrians are shown walking on the sidewalks, and various vehicles like cars and a bus are on the road.

### Description of the Slide

Given the many challenges facing transportation agencies – increased customer expectations and accountability, financial constraints, and the limitations on the provision of significant new capacity – it is increasingly important to leverage technology and operate the existing network to its fullest service potential. A robust transportation systems management and operations program can help transportation agencies within the region to address all of these challenges.

### Key Points

- A major selling point for an increased emphasis on operations is that these strategies and supporting ITS technologies go to the heart of what transportation agencies want and need to deliver today. Operations investments lead to:
  - More efficient and effective use of the existing capacity
  - A safer system for travelers and responders to traffic incidents,
  - Enhanced customer mobility and outreach via state-of-the-art technologies
  - More-reliable service for commuters and shippers, thereby enhancing economic competitiveness
  - A significant contribution to a more sustainable transportation network as well as increased livability within the region
- The same data collected to support operations can also be used as part of a performance management program
- The benefits from operations can happen more quickly than the process to build new lanes, at a relatively low cost, and with great benefit–cost ratios. Moreover, in many instances operations can provide the opportunity to alleviate bottlenecks without new construction (e.g., ramp metering, hard shoulder running)
- All of these can significantly contribute to achieving the regional transportation goals.

## SLIDE 12: Benefits From Operations

Benefits From Operations							
Regional Goals	Incident Management	Transit Management	Traffic Signal Coord.	Traveler Information	ATM – Variable Speeds	Managed Lanes	Integrated Corridor
Mobility	●	●	●	●	○	●	●
Reliability	●	●	●	●	●	●	●
Safety	●	○	●	○	●	●	○
Environment	●	●	●	●	●	●	●

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### Description of the Slide

Many regional transportation goals include statements addressing mobility, reliability, safety, and the environment.

### Key Points

- The various operations strategies can significantly contribute to the achievement of all of these and other related transportation goals and objectives.
- A filled circle indicates that the specific operations strategy fully contributes to the associated goal, and an open circle indicates a partial (and still positive) contribution.

**Other** - Perhaps check the regional transportation plan of the MPO where this slide is being presented, and use the exact language vis-à-vis these goals.

## SLIDE 13: Operations in Support of Mobility and Safety

<b>Operations in Support of Mobility and Safety</b>	
<b>Operations Strategy</b>	<b>Example Benefits</b>
Variable Speed Limits	<ul style="list-style-type: none"><li>• Crashes reduced 10-30%</li><li>• Secondary crashes reduced 50%</li><li>• Improved reliability</li></ul>
Hard Shoulder Running	<ul style="list-style-type: none"><li>• Travel times reduced up to 25%</li><li>• No impact on safety</li></ul>
Ramp Metering	<ul style="list-style-type: none"><li>• Crashes reduced 15-40%</li><li>• Travel times increased 10% +</li></ul>
Transit Signal Priority	<ul style="list-style-type: none"><li>• Bus times improved 2 - 15%</li><li>• Minimal impact to side streets</li></ul>
Adaptive Signal Control	<ul style="list-style-type: none"><li>• Delay reduced 4-40%</li></ul>
Integrated Corridor	<ul style="list-style-type: none"><li>• Estimated B/C of 5-10 : 1</li></ul>

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### **Description of the Slide**

Examples of benefits resulting from various operations strategies as they relate to regional mobility and safety goals.

### **Key Points**

- This is just a sample of operations strategies and the associated improvements in mobility (such as reduced delays and improved travel times) and safety. Various operations strategies can significantly contribute to the achievement of all of these and other related transportation goals and objectives.

### **Other**

The companion slide presentation for DOTs includes several slides (#14 - #24) that provide more detailed information and example benefits for specific operational strategies, including work zone management, traffic incident management and service patrols, planned special event management, road weather management, emergency management, traffic signal synchronization, traveler information, ramp management, active transportation and demand management, and connected vehicle. The "parking lot for the DOT presentation also has strategy / benefit slides for managed lanes, active traffic management, and integrated corridor management. A slide on transit management is also included in this MPO presentation parking lot. Depending on the available time and the interest of the audience, the presenter may consider choosing a subset of these strategies to include in the presentation.

### Operations in Support of Sustainability

<p><b>Promotes the entire “triple bottom line”</b></p> <ul style="list-style-type: none"><li>• <b>Economic</b><ul style="list-style-type: none"><li>○ Improved mobility and reliability</li></ul></li><li>• <b>Social</b><ul style="list-style-type: none"><li>○ Enhanced safety</li></ul></li><li>• <b>Environmental</b><ul style="list-style-type: none"><li>○ Reduced emissions and GHG</li></ul></li></ul>	<p><b>Examples of Environmental Benefits</b></p> <ul style="list-style-type: none"><li>• Traffic signal control: Emissions reduced 3-22%</li><li>• Congestion mitigation strategies (e.g., incident management): CO2 reduced 7-12%</li><li>• Variable speed displays: CO2 reduced 10-20%</li><li>• Operations and ITS support “eco driving” measures</li></ul>
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### Description of the Slide

The most widely quoted definition of “sustainability” is based on the concept of sustainable development as defined by the Brundtland Commission of the United Nations – “Meeting the needs of the of the present without compromising the ability of future generations to meet their own needs.” Or perhaps in sound bite form “treating the world as if we intended to stay.”

### Key Points

- The core of mainstream sustainability thinking has become the idea of three dimensions – environmental, social, and economic sustainability. These three dimensions – which match regional transportation goals – are often referred to as the “triple bottom line.” These are sometime referred to as the of three Ps: profit, people and planet.
- The previous slide showed operations benefits as they relate to economic and social sustainability in terms of improved mobility and enhanced safety. Operations strategies can also support environmental sustainability by reducing emissions.
- Several eco-driving measures rely on operations and the supporting ITS technologies, such as “maintain optimum highway speed” (variable speed limits), “ride the green wave” (traffic signal synchronization), and “navigate to reduce carbon dioxide” (enhanced via real-time traveler information)

### 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

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### Description of the Slide

Livability is related to sustainability, and may be defined as using the quality, location, and type of transportation facilities and available services to help achieve broader community goals, such as increasing travel choices, improving economic competitiveness, and enhancing unique community characteristics.

### Key Points

- Operations supports many aspects of livability, including:
  - A safer and more secure transportation network
  - Promoting a multi-modal view and providing integrated information on all the possible choices
  - A cleaner environment
  - Supporting various transportation demand management strategies

## SLIDE 16: Operations in Support of Climate Adaptation

<b>Operations in Support of Climate Adaptation</b>	
<b>Extreme Weather</b>	<b>Supporting Operations / ITS</b>
Hot Days (buckling pavements, cars overheating, wildfires)	<ul style="list-style-type: none"><li>▪ ATM (variable speed limits)</li><li>▪ Incident management</li><li>▪ Work zone management</li></ul>
Rising Sea Levels / Storm Surge	<ul style="list-style-type: none"><li>▪ Traveler information</li><li>▪ Roadway / transit diversions</li></ul>
Increased number / intensity of precipitation events	<ul style="list-style-type: none"><li>▪ ATM (variable speed limits)</li><li>▪ Incident management</li></ul>
Increased Hurricane and Super Storm Frequency	<ul style="list-style-type: none"><li>▪ Contra-flow operations</li><li>▪ Ramp management / closures</li><li>▪ Integrated Corridor Management along evacuation routes</li></ul>

**Resiliency Operations Critical Before and After Weather Event**

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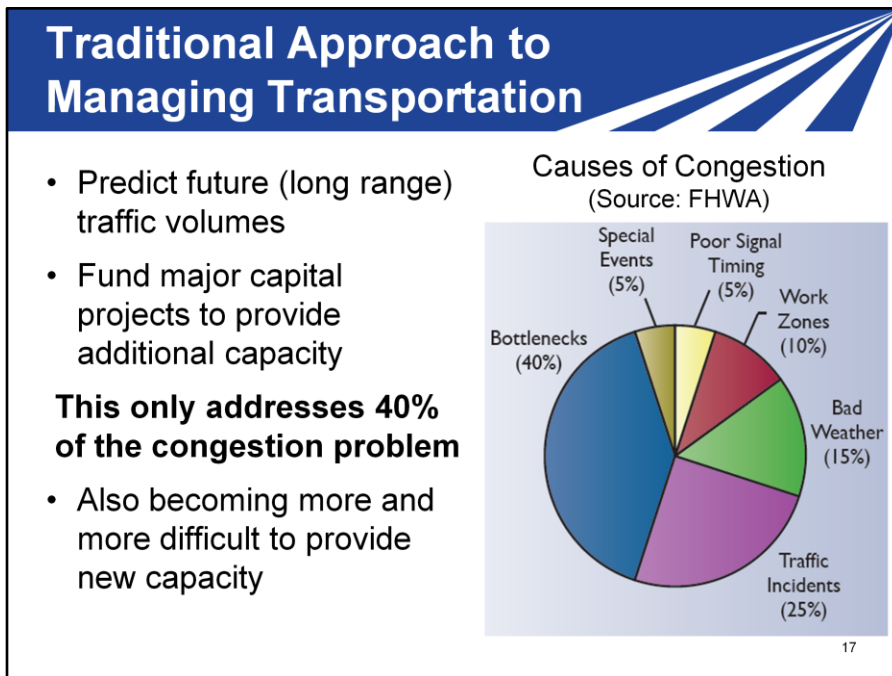
### Description of the Slide

A related consideration to environmental sustainability is that of adaptation. There is no need to get into a debate regarding climate change, or its potential causes; but there can be no doubt that severe weather events seem to be becoming more frequent, and they can have a significant regional impact.

### Key Points

- Operations and the supporting ITS technologies can help the transportation network adapt to the impacts of severe weather events and enhance its resiliency.
- This is a list of potential extreme weather events, and the role operations can play, such as traveler information, incident management activities, reduced speed limits, and contra-flow operations.
- Moreover, not only do these operations strategies play an important role prior to a severe weather event (e.g., accommodating evacuations and planned closures); but also after the event when parts of the transportation network still may be closed and when travelers want to get back to their normal routine (e.g., return home, go to work) as soon as possible.

**Other** - Perhaps check recent extreme weather in the specific region where the presentation is being made, and focus on those location-specific events.



### Description of the Slide

Historically, the transportation planning process has focused on relieving the causes of recurring congestion, such as bottlenecks and other capacity constraints. However, in large metropolitan areas over half of the total delay, and most of system unreliability, results from disruptions and incidents— what is referred to as non-recurring congestion – which is not substantially dealt with by adding new capacity

### Key Points

- The relationships among types and causes of congestion and mobility may not be widely appreciated.
- The traditional approach of adding capacity to meet current and future demands only addresses part of today’s mobility, reliability and safety issues.
- Most congestion and delays are the result of “non-recurrent” causes as shown, such as crashes, weather, and construction activities – events that additional capacity does not directly address.
- Additionally, it is becoming more difficult to provide new capacity given current financial constraints and environmental concerns.
- It is therefore important to change the way we plan for, fund, and manage the surface transportation network.

## SLIDE 18: Providing Effective, Safe and Reliable Transportation

### Providing Effective, Safe and Reliable Transportation

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

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

Operations should be integrated into the traditional planning & programming processes

**“Mainstreaming”**

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

### Description of the Slide

Providing a safe, and reliable transportation network may be likened to a 3-legged stool, with each leg representing the functions of building the necessary infrastructure, preserving that infrastructure through maintenance and reconstruction, and operating and managing it on a daily basis so the available capacity can be utilized to its fullest extent. The transportation network cannot effectively serve customer needs if any of these three legs is missing or is underemphasized (i.e., too short) relative to the others.

### Key Points

- There is no doubt that adding physical capacity to our transportation infrastructure through basic construction projects, and then keeping this infrastructure in a state of good repair, will remain significant missions for transportation agencies. But we can’t build our way out of congestion. Moreover, the traditional process does not fully address non-recurring congestion and the associated reliability issues.
- Operations strategies and the supporting ITS technologies must therefore become a formal core program with the same emphasis in the planning and programming processes as the other two.
- In other words, operations must be mainstreamed into the regional transportation planning process.

**Other** - It might be worthwhile to mention, if appropriate, that the SHRP2 effort has developed:


- Products to improve the quality of decision making and shorten project delivery time for new construction.
- Technologies and institutional solutions to support systematic rehabilitation of highway infrastructure in a way that is rapid, presents minimal disruption to users, and results in long-lasting facilities.



### Mainstreaming Operations

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

- Develop and program operations strategies based on regional goals, objectives & performance measures
- Enhance the process so that operations investments are on par with construction & preservation funding.
- Help meet requirements of MAP 21 (i.e., “promote efficient operations”)



#### Description of the Slide

FHWA and the SHRP2 research efforts have focused significant attention on how to mainstream operations within an individual agency as well as the regional transportation planning process. One of these efforts, promoted by FHWA, is known as “planning for operations” – a joint effort between planners and operators to support improved regional transportation system management and operations.

Traditionally, transportation planning and transportation system operations have been largely separate, independent activities.

- Planners focused on long-range transportation investments, including development of metropolitan transportation plans and programming of projects.
- Operators concerned with addressing immediate system needs—incident response, traffic control, traveler information, and work zone management.

#### Key Points

- Planning for operations connects these two vital components of transportation, and mainstreams operations considerations into the planning process, including the integration of operations strategies into the metropolitan transportation investment and funding plans.
- It requires coordination and collaboration between a number of regional partners, including planning staff and operations staff, from metropolitan planning organizations (MPOs), State DOTs, transit agencies, and local governments.
- It involves developing and programming operations strategies based on regional goals, objectives & performance measures.
- Such an approach also helps meet the requirements of MAP 21

**Other** – Perhaps address how the MPO is already mainstreaming operations into their specific planning process.

### 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
  - 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

### Description of the Slide

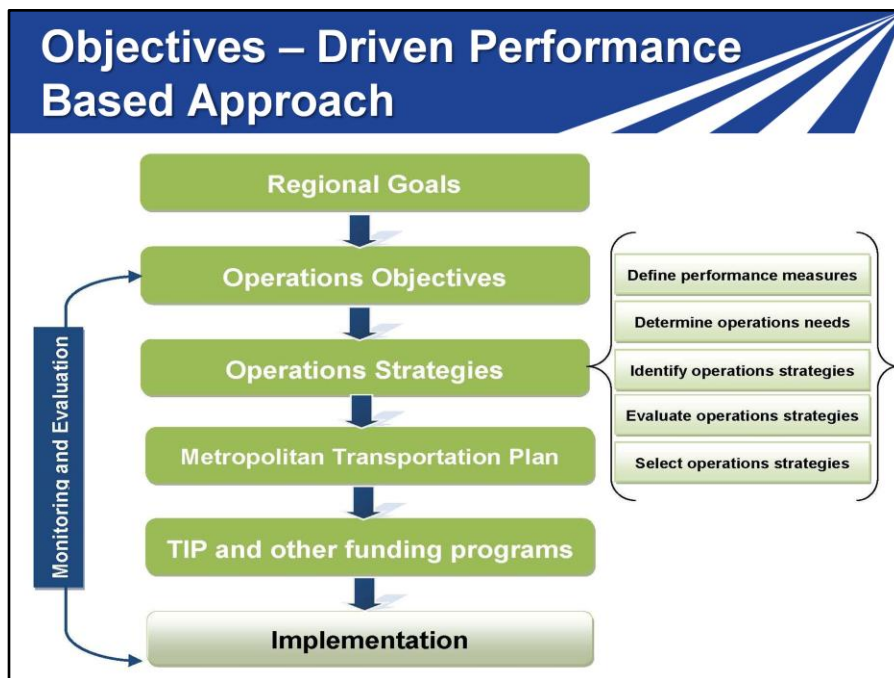
The approach to planning for operations is objectives-driven and performance-based, rather than an individual project focus.

### Key Points

Key attributes of such an objectives-drive performance based approach include:

- Operators and planners from all transportation agencies working together to develop and address short-term and long-term system operations and reliability objectives
- Focusing on operational objectives that are tied to the regional goals, and then using outcome-based performance measures and targets as a basis for identifying solutions and prioritizing investment strategies to achieve the operational objectives.
- Integrating these operations-based solutions and investments into the congestion management plan, the TIP and other planning documents
- Demonstrating accomplishments and accountability based on performance measures and metrics. This corresponds to the maxim that “what gets measured gets managed.”
- The process recognizes that performance measurement can focus the attention of decision makers, practitioners, and the public on important characteristics of the transportation system.

## SLIDE 21: Objectives – Driven Performance Based Approach



### Description of the Slide

This shows the process for an objectives-driven performance based approach.

### Key Points

- Regional goals form the basis for developing operational objectives
- A systematic process is used for developing and selecting operations strategies based on needs (as can be identified from the Congestion Management Plan), performance measures, and an evaluation of the candidate strategies
- The selected operations strategies are included in the Metropolitan Transportation Plans and TIP
- This leads to the implementation of the operations strategies and supporting technologies and staffing. Implementation is a crucial part of achieving the objectives.

**Other** – If the previous slide (# 20) is not used in a shortened presentation, some of the Key Points from slide # 20 should be addressed with this slide

## 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

### Description of the Slide

By definition, regional goals are broad statements. For this process to work, the associated objectives need to be specific statements. Such objectives can be thought of as "SMART"

### Key Points

- The term "SMART" is an easy way to reference the characteristics of operations objectives.
- They should be specific, measurable, agreed upon, realistic, and time-bound.
- Being measurable, SMART objectives lend themselves to the development of outcome-based performance measures

**Other** – Perhaps include examples SMART objectives as used by the specific MPO, or another near-by MPO as appropriate.

## SLIDE 23: Summary

### Summary

- Operations is a critical component for managing the transportation network on a daily basis.
  - Enhance mobility, reliability, safety, and environment
  - Provide a sustainable transportation network
  - Support a performance-based approach, focusing on outcomes
  - Achieve quick and cost-effective implementation
- To be successful, operations need to be “mainstreamed” into the regional planning and programming processes and documentation

**You have an important role to play in this regard.**

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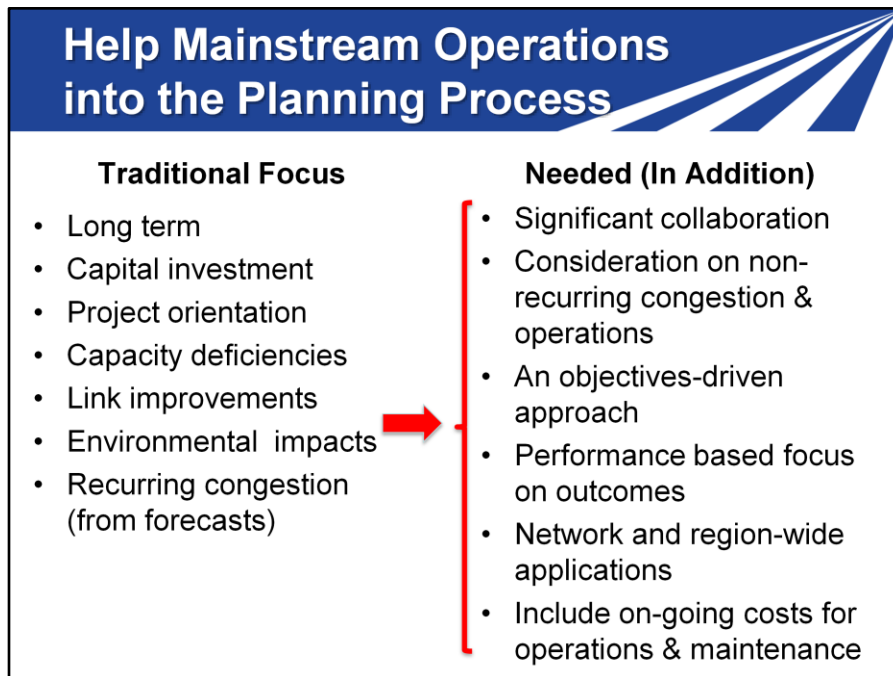
### Description of the Slide

This slide summarizes the key points from the previous slides and discussions.

### Key Points

- Operations is a critical component for actively managing the transportation network on a daily basis, providing several benefits to the region and the member transportation agencies:
  - Enhance mobility, reliability, safety, and the environment
  - Promote a sustainable and livable transportation network
  - Provide customer service via a performance-based approach
  - Achieve quick and cost-effective implementation (with large benefit – cost ratios)
- To be successful, operations needs to be “mainstreamed” into the transportation planning and programming processes at the regional and agency levels.
- Such change and mainstreaming cannot be achieved without your enthusiasm , leadership, and support.

## SLIDE 24: Help Mainstream Operations into the Planning Process



### Description of the Slide

Mainstreaming operations reflects a significant shift from the previous project-focused and capital investment planning process, -- a process that does not account significantly for the role of technology and operations solutions.

### Key Points

The existing process needs to be enhanced to include:

- More collaboration between planners and operators
- Implementing an objectives-driven, performance-based approach
- Using established system performance measures rather than simply focusing on implementation of projects as a measure of success.
- Focusing on both short term and long term system performance, including the on-going costs associated with a robust operations program

**Other** – If previous slide # 23 is not used in a shortened version of this presentation, the following key points should also be emphasized:

- To be successful, operations needs to be “mainstreamed” into the transportation planning and programming processes at the regional and agency levels.
- Such change and mainstreaming cannot be achieved without your enthusiasm , leadership, and support.

## Next Steps

- Demonstrate commitment and involvement – today’s issues require regional approaches
- Support the mainstreaming of operations
  - Develop a Regional Operations Plan and objectives
  - 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@ashto.org)

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**Description of the Slide**

As an executive of an MPO or of a member agency, the ball is in your court

**Key Points**

- Demonstrate your own commitment. Get engaged and develop champions within your respective organizations, and provide them with the necessary resources to help make this happen.
- Support efforts to mainstream operations into the regional transportation planning process, as well as the planning processes of individual agencies
- Empower the people in your respective organizations who you will rely on for results.
- Feel free to contact FHWA or AASHTO at any time if you have any questions or need additional assistance.

**Other** – The specific names and contact information for FHWA may be changed or additional names listed depending on the DOT / agency for whom the presentation is being given.



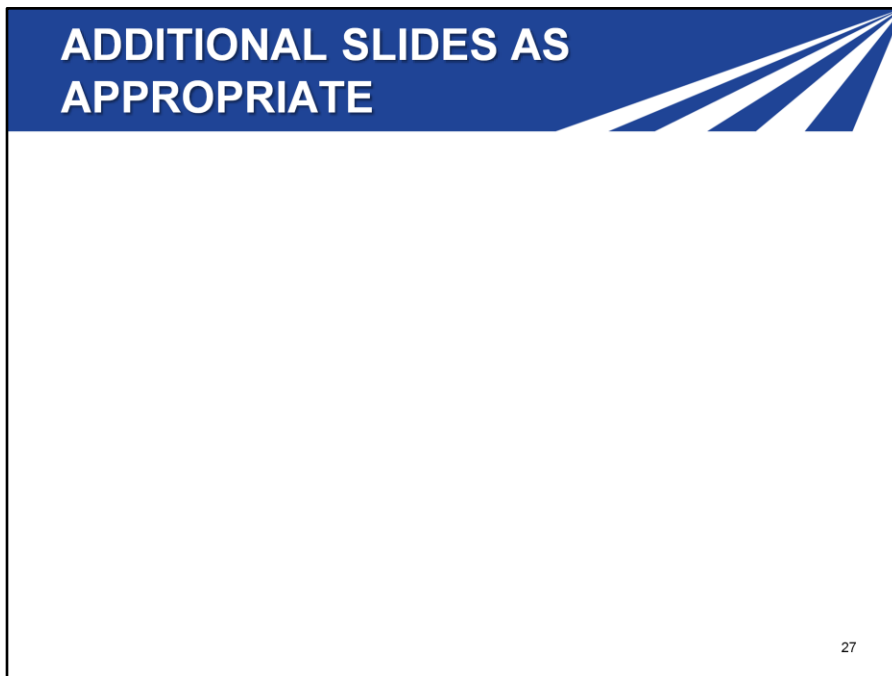
**Description of the Slide**

- Solicit and respond to questions and comments

**Key Points**

- Make sure to follow up to any questions that can't be answered immediately, and to requests for any additional information.





This is a “parking lot” for slides providing additional details on selected areas and operations strategies. These may be included in the presentation as indicated in the “Other” notes for previous slides.

Another source for additional slides is the companion slide presentation for DOTs. It includes several slides (#14 - #24) that provide more detailed information and example benefits for specific operational strategies, including

- Work zone management
- Traffic incident management and service patrols
- Planned special event management
- Road weather management
- Emergency management
- Traffic signal synchronization
- Traveler information
- Ramp management
- Active transportation and demand management
- Connected vehicles

The “parking lot for the DOT presentation also has strategy / benefit slides for managed lanes, active traffic management, and integrated corridor management. A

Depending on the available time and the interest of the audience, the presenter may consider choosing a subset of these strategies to include in the presentation.

## 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

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### Description of the Slide

What we mean by reliability – is the ability for travelers and transporters to depend on getting from point a to b in an expected amount of time. The more reliable a route is the less tolerance is given for unexpected delays. If we can decrease the opportunities for delay we can decrease the need to budget for variable travel delays thereby saving money for travelers, transit operators, freight transporters and their end users.

### Key Points

- Reliability focuses on the consistency of travel times.
- The past focus was on average travel times; reliability is concerned with the variability of individual travel times from day to day.
- Optimal operations fine tunes travel reliability on the system and reduces amounts of unexpected delays.
- Less need to budget in time and money for “inevitable” travel delays saves money for users and end users.


## Transit Management



- 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

**Example Benefits**

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



**Description of the Slide**

Operations strategies and the enabling ITS technologies have provided significant benefits to transit agencies

**Key Points**

- Several strategies and technologies exist for improving transit operations and schedule adherence – a measure of transit reliability.

**Other** - Perhaps provide a local / near-by example of the transit management activities.