Webinar Agenda

- Overview of FHWA Primer on Transportation Systems Management and Operations (TSMO) Program Planning
  - Jim Hunt, Federal Highway Administration (FHWA) Office of Operations
  - Pat Noyes, Pat Noyes & Associates

- State Perspectives
  - Washington State DOT, Monica Harwood
  - Nevada DOT, Rod Schilling
  - Arizona DOT, Susan Anderson

- TSMO Program Plan Development Roundtable Trends
  - Daniel Grate, FHWA Resource Center

- Discussion
FHWA’s Primer on TSMO Program Planning

- The Primer provides the rationale for and the key elements of successful TSMO program planning.
- It is intended to help agencies understand:
  - Why is TSMO program planning important? How can it benefit a transportation agency or region?
  - What are key elements of effective TSMO program planning, and what steps or activities should be taken?
  - What would an effective TSMO Program Plan look like?

Available at: https://ops.fhwa.dot.gov/publications/fhwahop17017/index.htm
Motivation for Primer

- TSMO efforts within a State or region need to move from an ad hoc set of activities or strategies into a cohesive program that is vital to the mission of the agency to be most effective.

- TSMO program planning helps agencies develop and sustain a formal TSMO program.
FHWA’s Commitment to TSMO

- TSMO Program Planning Primer and series of workshops to support TSMO program planning
- Other projects and documents include:
  - Mainstreaming TSMO
  - Integrating Travel Time Reliability in Transportation System Management
  - Capability Maturity Frameworks
  - Integrating Business Processes to Improve Transportation System Performance
  - TSMO in Action
  - Guidance on planning for TSMO within subareas and corridors
Understanding TSMO
What is TSMO?

- TSMO focuses on actively managing the multimodal transportation network to deliver improved safety and mobility outcomes.
- TSMO is an integrated set of strategies to optimize the performance of infrastructure through the implementation of multimodal and multi-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system.

- *Moving Ahead for Progress in the 21st Century (MAP-21)*
TSMO Strategies and Efforts

- Traffic incident management.
- Traffic signal coordination.
- Transit signal priority.
- Freight management.
- Work zone management.
- Special event management.
- Road weather management.
- Congestion pricing.
- Integrated corridor management.
- Managed lanes.
- Ridesharing programs.
- Parking management.
- Electronic toll collection.
- Traveler information.
- Coordination of highway, rail, transit, bicycle, and pedestrian operations.
- Active transportation and demand management.
- Connected/automated vehicles.
Why Do We Need TSMO?

- Greater safety.
  - Variable speed limit systems can reduce crashes.
- More free time.
  - Transit signal priority reduces transit delay.
  - Parking management decrease search time.
- Less wasted fuel.
  - Incident management programs reduced fuel consumption.
- Cleaner air.
  - A signal retiming projects reduce emissions.
- More livable communities.
  - Improved access, more mobility choice, more accurate and timely information.

Source: iStock/Pavlina2510
Shifting Paradigms

Operations and Maintenance

- Operating Completed Projects
- Reactive
- Recurring

TSMO

- Integrated throughout the Project Lifecycle
- Proactive and Reactive
- Recurring and Non-Recurring
Shifting Paradigms

Operations and Maintenance

- Average Travel Time, LOS
- Focus on Highways and Jurisdictions
- Moving Cars and Trucks
- Individual Strategies

TSMO

- Travel Time Reliability
- Entire Transportation System
- Moving People and Cargo
- Integrated Strategies
TSMO Program Planning
Why TSMO Program Planning?

- Moves TSMO from an ad hoc set of activities or strategies into a cohesive *program* that is vital to the mission of the agency.

- Facilitates *integration* and *mainstreaming* of TSMO within a transportation organization to support new and evolving roles and responsibilities of these organizations.
Key Elements of TSMO Program Planning

1. STRATEGIC

2. PROGRAMMATIC

3. TACTICAL
Strategic Elements: Setting Clear Direction and Common Understanding

TSMO program planning starts with defining a high-level strategic business case for TSMO and clearly defining TSMO as a core part of the agency’s mission and vision.
Developing the Business Case

- Internal motivation – Why is TSMO important for the agency?
- The value to customers – Why is TSMO important to the traveling public and communities?
- Issues:
  - Challenges facing the region.
  - Cost-effectiveness and benefits of TSMO strategies.
  - Anticipated future challenges.
  - Emerging opportunities, such as new data and technologies.

Florida DOT’s TSMO Business Case

TSMO Strategic Plan describes:
- Florida’s challenges, including population growth, traffic fatalities, and safety for older drivers in particular.
- Benefit-cost ratios of intelligent transportation system (ITS) technologies.
- Economic benefits associated with ITS investments due to technology sector job creation.

Developing a TSMO Vision and Mission

- Identifying a vision for TSMO.
  - Shared direction focused on high-level outcomes.
- Developing a description of the role of TSMO in supporting the agency’s mission.

Maryland DOT’s TSMO Program Vision and Mission

TSMO Program Vision
Maximize mobility and reliable travel for people and goods within Maryland by efficient use of management and operations of transportation systems.

TSMO Program Mission
To establish and maintain a TSMO program and implement supporting projects within Maryland State Highway Administration (SHA) improving mobility and reliability for all people and goods through operations of transportation facilities.

Source: Maryland DOT – State Highway Administration, Maryland Transportation Systems Management & Operations Strategic Implementation Plan, August 2016.
Developing Strategic Goals and Performance Objectives

- Focusing on outcomes to the customer.
- Common steps:
  1. Build off of agreed-upon planning goals.
  2. Gather data and understand baseline conditions.
  3. Collaborate internally and externally.
  4. Define performance targets.

### Denver Regional Continuity of Government – TSMO Goals, Objectives, and Performance Measures

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Initiatives</th>
<th>Performance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal 1: Provide reliable transportation operations for regional travelers</strong></td>
<td>Daily Operations</td>
<td>Daily Operations</td>
</tr>
<tr>
<td></td>
<td>• Increase trip travel time reliability on freeways and arterials for all modes</td>
<td>• Continue to coordinate signal timing system management across jurisdictional boundaries</td>
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<td></td>
<td>• Reduce traveler stops and delay due to signal operations</td>
<td>• Continue to coordinate freeway management</td>
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<td></td>
<td>• Incident Management</td>
<td>• Expansion management</td>
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<td></td>
<td>• Reduce average incident duration time</td>
<td>• Establish Regional Incident Management Process</td>
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<td>• Reduce the occurrence of secondary incidents</td>
<td>• Work Zones and Special Conditions</td>
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<td>• Improve work zone/special event management</td>
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<td></td>
<td>Cross-Cutting</td>
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<td></td>
<td></td>
<td>• Coordinate/integrate multi-modal traveler information</td>
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<td></td>
<td>• Expand traffic monitoring capabilities and infrastructure</td>
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<tr>
<td></td>
<td></td>
<td>• Establish shared monitoring between jurisdictions</td>
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<td></td>
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<td>• Expand a shared communications network</td>
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<td></td>
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<td>• Establish a shared data warehouse or data management process</td>
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<tr>
<td><strong>Goal 2: Provide safe transportation operations for regional travelers and for public safety and construction/maintenance personnel</strong></td>
<td>Daily Operations</td>
<td>Daily Operations</td>
</tr>
<tr>
<td></td>
<td>• Reduce traffic injury rates</td>
<td>• Traffic fatality rates</td>
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<tr>
<td></td>
<td>• Reduce traffic fatality rates</td>
<td>• Traffic injury rates</td>
</tr>
<tr>
<td></td>
<td>• Establish Regional Incident Management Process</td>
<td>• Number of personnel injuries/fatalities</td>
</tr>
<tr>
<td><strong>Goal 3: Provide transportation operations support for non-auto modes of travel</strong></td>
<td>Daily Operations</td>
<td>Daily Operations</td>
</tr>
<tr>
<td></td>
<td>• Reduce SOV mode share</td>
<td>• Single occupancy vehicles (SOV) mode share</td>
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<td>• Reduce per capita VMT</td>
<td>• Annual per capita VMT</td>
</tr>
<tr>
<td></td>
<td>• Reduce per capita greenhouse gas emissions</td>
<td>• Annual per capita greenhouse gas emissions</td>
</tr>
</tbody>
</table>

Source: DRCOG, Regional Concept of Transportation Operations, Adopted August 15, 2012.
Identifying Strategic Focus Areas

- **Geographic:**
  - Scales such as corridors, urban areas, or rural areas.

- **Functional areas:**
  - TSMO functions, such as traveler information, incident management, and work zone management.

- **Internal capabilities:**
  - Issues such as data management and decision support.
  - Often identified based on an agency self-assessment.

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**Caltrans’ Corridor Focus**

Caltrans has put significant emphasis on the corridor-level through development of Corridor System Management Plans because it recognizes that these plans are unique in their ability to analyze existing corridor conditions, to forecast corridor performance through scenario testing utilizing complex traffic simulation models on a corridor-wide scope, and to recommend consensus-driven long-range implementation strategies.

Programmatic Elements: Organizing, Staffing, and Developing Processes to Advance TSMO

The programmatic elements of TSMO program planning address the institutional and organizational structure needed to deliver the TSMO mission for the agency in coordination with its partners.
Defining an Organizational Structure

- Addressees the roles and responsibilities for the TSMO program.
  - Where is TSMO in the organizational hierarchy?
  - What organizational unit(s) have primary responsibilities for TSMO?

Arkansas DOT TSMO Division

When the Arkansas DOT initially conducted a capability maturity model assessment of TSMO for its organization, it recognized a number of weaknesses in how it was organized to advance TSMO. As a result, the agency developed a new transportation systems management and operations division in 2015 to provide focus within the agency. The agency shifted several core functions into the TSMO Division, including traffic safety and operational programs, such as roadway-safety improvements, traffic signal systems, ITS operations, pavement conditions, traffic operations center, incident management, emergency management, and innovative technologies.

Source: Arkansas DOT, Organization Chart.
Organizational Structure Examples

- **TSMO Division**
  - Arizona DOT
  - Colorado DOT

- **Operations**
  - Tennessee DOT (Traffic Operation Division under Operations Bureau)
  - New Hampshire DOT (TSMO Bureau under Operations Division)

- **Highway Division**
  - Iowa DOT (Systems Operations Bureau)

- **Office of Traffic Engineering & Operations**
  - Florida DOT

- **Executive Committee**
  - Maryland DOT SHA Administrator chairs Committee
Developing TSMO Programmatic Objectives

- Programmatic objectives focus on the effectiveness of delivering the TSMO program and business processes and procedures.

- Typically addresses:
  - Development of plans, programs, or services.
  - Gaining new staffing capabilities.
  - Customer service and responsiveness.
  - Resources.

Maryland TSMO Program Objectives (Portion)

Other programmatic objectives include:
- Implement a comprehensive, system level performance measurement program to monitor mobility and reliability targets by June 2017.
- Coordinate and ensure TSMO is considered in SHA’s asset management program.
- Include reliability in existing traffic analyses and travel forecasting modeling tools.

Source: Maryland SHA, Maryland Transportation Systems Management & Operations Strategic Implementation Plan, August 2016.
Identifying Staffing and Workforce Development Needs

- Identify core TSMO program staff roles, responsibilities, and requirements.
- Identify needed skill sets and career path.
- Identify training needs.
- Consider using contractors or outsourcing.

Iowa DOT TSMO Staffing Needs in TSMO Program Plan

Iowa DOT identified about 40 staffing positions to support the TSMO Program across multiple functions including:

- Management and Support.
- Systems and Technical Services.
- Traffic Incident and Emergency Management.
- Research and Decision Support.
- Traffic Management Center Services.
- Districts.

Source: Iowa DOT TSMO Program Plan
TSMO Program Resource Management

- Financial resource management considerations.
  - TSMO-related assets.
  - Processes and procedures for sustainable funding.
  - Processes and procedures for prioritizing funding.

Iowa DOT uses Interstate Condition Evaluation for Operations (ICE-OPS) as a Tool for Prioritizing Investments

Source: Iowa DOT.
Developing Business Processes and Management Strategies

- Organizational and Administrative Processes.
- Procurement and Contract Management.
- Performance Management, Quality Management, and Continuous Improvement.
- Data Management.
- Decision Support Systems.
- Research and Development.
Integrating TSMO into Agency Planning

TSMO projects, services and activities should be coordinated and integrated with statewide and regional planning.

Source: Iowa DOT.
Promoting and Embedding a TSMO Culture

- Internal Collaboration:
  - Planning.
  - Programming.
  - Project Development and Design.
  - Maintenance and Asset Management.

- Collaboration with External Partners.

- Communication, Marketing, and Outreach with System Users.

Colorado DOT Integration of TSMO Evaluations into Project Development Process

Colorado DOT developed an operations evaluation process as an essential element of the project development process for new infrastructure projects. A TSMO evaluation helps ensure that suggested improvements are included in the project throughout the design process. It consists of:

1. A safety analysis.
2. An operations analysis.
3. An ITS analysis.

Source: Colorado DOT, Lean Case Studies, available on CDOT web site.
Tactical Elements: Identifying Priority Services, Activities, and Projects

TSMO program planning addresses tactical issues that lay the groundwork for TSMO deployment, including the identification of prioritized services, activities, and projects.
Identifying Prioritized Services, Activities, and Projects

- What services, activities and projects provide the greatest return on investment in meeting our TSMO goals and objectives?
- What services and activities are we performing today that can be leveraged or enhanced to support TSMO?
- What gaps do we currently have that need to be addressed?
- What is the structure of the service delivery program?
Defining Implementation Policies and Guidelines to Support Service Functions

- May include:
  - Policies, such as quick clearance for traffic incident management (TIM).
  - Guidance on public/private initiatives in data sharing.
  - Decision-making guidelines for implementation of services, projects, or activities.
## Performance Management and Financial Management Across All Three Elements

<table>
<thead>
<tr>
<th>Element of TSMO Program Planning</th>
<th>Performance Management</th>
<th>Financial Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic</strong></td>
<td>• Strategic goals and performance objectives.</td>
<td>• Considers financial resources in developing the strategic and performance objectives.</td>
</tr>
<tr>
<td></td>
<td>• Uses measures focused on outcomes for system users.</td>
<td></td>
</tr>
<tr>
<td><strong>Programmatic</strong></td>
<td>• Programmatic objectives.</td>
<td>• Identifies staffing and resources needed for the TSMO program.</td>
</tr>
<tr>
<td></td>
<td>• Uses measures focused on internal processes and activities.</td>
<td>• Identifies sustainable funding sources or approaches for the TSMO program.</td>
</tr>
<tr>
<td><strong>Tactical</strong></td>
<td>• On-going program monitoring and evaluation in relation to objectives.</td>
<td>• Develops near-term (e.g., 5-year) investment plan, including specific actions or projects, along with funding sources.</td>
</tr>
<tr>
<td></td>
<td>• Uses data to inform specific actions and deployments.</td>
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Making the Key Elements Work Together: The Resulting TSMO Program Plan

1. **Strategic Foundations** -- See Section 5 on Strategic Elements
   a. Why TSMO Matters
   b. TSMO Plan Purpose
   c. TSMO Vision and Mission
   d. Strategic Goals and Objectives

2. **The TSMO Program** -- See Section 6 on Programmatic Elements
   a. TSMO Program Objectives
   b. Organizational Structure
      i. Program Structure
      ii. Inter and Intra-agency Integration
   c. Business Processes
      i. Budgeting and Accounting
      ii. Procurement and Contract Management
      iii. Administrative Processes
      iv. Quality Management and Continuous Improvement
      v. Systems Engineering
      vi. Performance Management, including data management and decision support
   d. Resources
      i. Staffing and Workforce Development
      ii. Resource Inventories and Asset Management
      iii. Financial
      iv. Research and Development
   e. Communication and Collaboration
      i. Internal Collaboration
      ii. Collaboration with External Partners
      iii. Communications, Marketing and Outreach with Users

3. **Implementation and Deployment** -- See Section 7 on Tactical Elements
   a. TSMO Services, Projects, and Activities
   b. Annualized Actions and Deployment
   c. Implementation Policies and Guidelines
   d. Performance Assessment
Capability Maturity Model

- ADOT Self Assessment March 2014
- Highest scores (2.0 on 1-4 scale)
  - Systems and Technology
  - Culture
  - Collaboration
- Weakest score – Business Processes
### ADOT TSMO Strategic Plan

<table>
<thead>
<tr>
<th>Immediate Recommendations</th>
<th>Near-Term Recommendations</th>
<th>Long-Term Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRAFFIC INCIDENT</strong></td>
<td><strong>Establish a Statewide TIM Coordinator</strong></td>
<td><strong>Develop Regional TIM Coaltions</strong></td>
</tr>
<tr>
<td>Management</td>
<td><strong>Update and automate the Statewide Alternate Routing Plan</strong></td>
<td><strong>Develop a computer-based program to support asset management</strong></td>
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<tr>
<td><strong>FIELD MAINTENANCE</strong></td>
<td><strong>Expand “Move Over”/“Move Minor Crash” signage and education programs</strong></td>
<td><strong>Evaluate and updating training program</strong></td>
</tr>
<tr>
<td><strong>SAFETY</strong></td>
<td><strong>Refine/evaluate TIM asset management process (RIS)</strong></td>
<td><strong>Update SHSP Plan</strong></td>
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<tr>
<td><strong>PROJECT</strong></td>
<td><strong>Develop a formal statewide maintenance training program</strong></td>
<td><strong>Update SHSP Plan</strong></td>
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<td><strong>PROGRAMMING,</strong></td>
<td><strong>Develop a computer-based program to support asset management</strong></td>
<td><strong>Update 5-year TSMO Business Plan</strong></td>
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<td><strong>DEVELOPMENT,</strong></td>
<td><strong>Establish a 5-year TIM business plan for ADOT</strong></td>
<td><strong>Update 3-year Technology Plan</strong></td>
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<tr>
<td><strong>AND IMPLEMENTATION</strong></td>
<td><strong>Develop a Data Management Strategy with ITG</strong></td>
<td><strong>Conduct a 5-year evaluation of TSMO Performance at ADOT</strong></td>
</tr>
<tr>
<td><strong>NEXT GENERATION</strong></td>
<td><strong>Establish a Statewide ITG Policy/Research Coordinator position</strong></td>
<td><strong>“For more partnerships with universities to create projects to support data management and performance measurement”</strong></td>
</tr>
<tr>
<td><strong>TECHNOLOGY</strong></td>
<td><strong>Establish a Statewide ITG Architecture</strong></td>
<td><strong>“For more partnerships with universities to create projects to support data management and performance measurement”</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Forize ITG technical staff roles</strong></td>
<td><strong>“For more partnerships with universities to create projects to support data management and performance measurement”</strong></td>
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<tr>
<td><strong>PERFORMANCE</strong></td>
<td><strong>Distribute a State of the System Report for TSMO</strong></td>
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</tr>
<tr>
<td><strong>MEASURES</strong></td>
<td><strong>Conduct a 5-year evaluation of TSMO Performance at ADOT</strong></td>
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</tr>
<tr>
<td><strong>OUTREACH</strong></td>
<td><strong>Leverage the Policy Coordinator position to support public outreach</strong></td>
<td><strong>“For more partnerships with universities to create projects to support data management and performance measurement”</strong></td>
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<td><strong>PARTNERSHIP WITH</strong></td>
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<td><strong>“For more partnerships with universities to create projects to support data management and performance measurement”</strong></td>
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<tr>
<td><strong>UNIVERSITIES</strong></td>
<td></td>
<td><strong>“For more partnerships with universities to create projects to support data management and performance measurement”</strong></td>
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</table>

**Recommendations that build off one another are part of a larger recommendation.**

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**ADOT TSMO Strategic Plan**

Immediate Recommendations: 2 YEARS

**TRAFFIC INCIDENT MANAGEMENT**
- Develop a provision to require contractors to take TIM training
- Formulate ADOT’s Quick Clearance policy and roles
- Create joint ADOT/TMC TIM policies and reporting
- Develop TIM resources (including website training programs)
- Expand ALERT/TISP to other areas

**FIELD MAINTENANCE**
- Evaluate staff compensation
- Formalize a career path with promotional opportunities
- Create training matrix for cross training
- Develop response-time thresholds for maintenance calls
- Evaluate FY opportunities for TSMO maintenance

**SAFETY**
- Establish a formal Safety Corridor Program
- Re-evaluate HSIP programming
- Finalize Safety Analyst HSM technology
- Implement SHSP
- Refine crash form/electronic form submittal

**PROJECT PROGRAMMING,**
- Identify and evaluate current and future TSMO funding sources
- Develop a 5-year Business Plan to identify TSMO priority projects
- Refine TSMO criteria for ADOT programming process
- Establish regular meetings with MO for project programming and implementation
- Update the PA process to include TSMO
- Establish funding ranges for TSMO improvements

**NEXT GENERATION TECHNOLOGY**
- Develop DVAV strategy
- Develop a 3-year Technology Plan in coordination with ITG
- Expand communications links to field devices

**PERFORMANCE MEASURES**
- Finalize TSMO Performance Measures
- Develop a Reporting Strategy for internal and external annual reporting
- Formalize NAP-21 reporting requirements for safety and mobility
- Align TSMO Performance Measures to ADOT

**OUTREACH**
- Partner with ADOT Communications to support media coverage and public outreach for TSMO
- Establish regular meetings with Regional MPOs
- Develop a TSMO outreach strategy to promote TSMO program internally
- Create a scheduled program to have TSMO leadership meet at each ADOT District twice per year

**PARTNERSHIP WITH UNIVERSITIES**
- Develop an annual TSMO internship program with statewide universities
- Update TSMO Research program through the ADOT Research Center

**ADOT TSMO Strategic Plan**

Near-Term Recommendations: 2-4 YEARS

**TRAFFIC INCIDENT MANAGEMENT**
- Establish a Statewide TIM Coordinator
- Update and automate the Statewide Alternate Routing Plan
- Expand “Move Over”/“Move Minor Crash” signage and education programs

**FIELD MAINTENANCE**
- Refine/evaluate TIM asset management process (RIS)
- Develop a formal statewide maintenance training program

**SAFETY**
- Update SHSP Plan
- Implement enhanced GIS/web-based crash reporting and analysis
- Make safety data available to users
- Analyze routes with high crash rates and identify low-cost countermeasures

**PROJECT PROGRAMMING,**
- Create a process for performance-based prioritization of TSMO projects
- Establish a TSMO Project Development Engineer position

**NEXT GENERATION TECHNOLOGY**
- Develop a Data Management Strategy with ITG
- Establish a TSMO Policy/Research Coordinator position
- Update Technology Plan & Statewide ITG Architecture
- Formize ITG technical staff roles

**PERFORMANCE MEASURES**
- Distribute a State of the System Report for TSMO
- Conclude a 5-year evaluation of TSMO Performance at ADOT

**OUTREACH**
- Leverage the Policy Coordinator position to support public outreach

**PARTNERSHIP WITH UNIVERSITIES**
- Forize partnerships with universities to create projects to support data management and performance measurement

**ADOT TSMO Strategic Plan**

Long-Term Recommendations: 4+ YEARS

**TRAFFIC INCIDENT MANAGEMENT**
- Develop Regional TIM Coaltions

**FIELD MAINTENANCE**
- Develop a computer-based program to support asset management

**SAFETY**
- Update SHSP Plan

**PROJECT PROGRAMMING,**
- Establish a 5-year TIM business plan for ADOT

**NEXT GENERATION TECHNOLOGY**
- Update 3-year Technology Plan

**PERFORMANCE MEASURES**
- Conclude a 5-year evaluation of TSMO Performance at ADOT

**OUTREACH**
- Leverage the Policy Coordinator position to support public outreach

**PARTNERSHIP WITH UNIVERSITIES**
- Forize partnerships with universities to create projects to support data management and performance measurement

**ADOT TSMO Strategic Plan**
Capability Maturity Re-Assessment

- Significant Impacts
  - Creation of TSMO Division
  - Re-organization of ADOT Districts

<table>
<thead>
<tr>
<th>DIMENSION</th>
<th>2014 CMM Score</th>
<th>2016 CMM Score</th>
<th>COMMENTS</th>
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</thead>
<tbody>
<tr>
<td>Business Processes</td>
<td>1</td>
<td>2</td>
<td>New TSMO Division created within Arizona DOT has raised awareness of TSMO and is incorporated into the project planning process.</td>
</tr>
<tr>
<td>Systems and Technologies</td>
<td>2</td>
<td>2</td>
<td>ADOT has developed an ITS Statewide Architecture and has funding in place to update the Architecture document.</td>
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<tr>
<td>Performance Measurement</td>
<td>1+</td>
<td>1+</td>
<td>This area is progressing slower than desired.</td>
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<tr>
<td>Culture</td>
<td>2</td>
<td>2</td>
<td>The TSMO Division has provided training to other divisions to improve understanding of how TSMO integrates with other divisions.</td>
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<tr>
<td>Organization and Staffing</td>
<td>1.5</td>
<td>2</td>
<td>Development of new TSMO Division has resulted in the consolidation of several key ADOT groups into the TSMO Division.</td>
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<tr>
<td>Collaboration</td>
<td>2</td>
<td>2</td>
<td>Although good collaboration between TSMO Division and Infrastructure Delivery and Operations (IDO) Division, limited opportunities to collaborate with rural jurisdictions.</td>
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</tbody>
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TSMO Program Planning

Current State

- Business Processes
  - Planning and programming of projects
  - TSMO comprehensive, long-term planning document
  - Five-year planning cycle is difficult to plan
  - Need to collaborate with other Divisions
TSMO Program Planning

Current State

- Systems and Technology
  - Standardization / innovation
  - Integration on regional basis

- Performance Measurement
  - Depends upon data – current and accurate
  - Use data to identify priority projects
  - Formalizing asset management
TSMO Program Planning

Current State

- **Culture**
  - Still challenged with understanding TSMO

- **Organization and Staffing**
  - Identify opportunities for increased efficiencies

- **Collaboration**
  - Opportunities exist to work across Divisions and with regional agencies
FHWA Program Planning Workshop

- December 2017

- Benefits
  - Brought together stakeholders for TSMO
    - TSMO, IDO, MPD, FMS, P3/Contracts, FHWA-AZ
  - Collaboration and communication
  - Highlight the role and need for TSMO across agency
  - Improved support and interest
  - Better defined actions to move forward
Outcomes

• Focus on TSMO staffing resources
  • Identifying unique, specialized skill sets
  • Updating position descriptions
  • Career paths

• Incorporate TSMO into ADOT processes
  • Project Development/Design
  • Asset Management
  • Planning and Programming
Program Projects with TSMO Features

- Must be included in STIP
- Planning to Programming (P2P) Process
- Requires TSMO to identify projects
  - One comprehensive list
  - Prioritized, ranked and scored
  - Documented, defensible process needed
Planning to Programming (P2P) Overview

Statewide Preservation Projects Prioritized List
Statewide Modernization Projects Prioritized List
Statewide Expansion Projects Prioritized List

Long Range Transportation Plan Investment Category Recommended Investment Choice $$$

Tentative 5 Year Program

Board Approval
TSMO Role in P2P Process

Projects Identified From Studies
- Tribal Program
- Planning Assistance for Rural Areas
- Bike / Pedestrian Program
- Project Scoping / Corridor Planning
- Freight Planning Program
- MPO / COG Coordination Program
- Statewide Planning Program
- Rail Planning Program
- Safety Program

Technical Nominations
- District
- Pavement
- Bridge
- Traffic Safety Section
  - Subprograms:
    - Stormwater
    - Port of Entry
    - Rest Areas
    - Rockfall/Slope Management

Statewide Pool of Projects
Additional Challenges / Next Steps

- Prioritization process for TSMO projects
- Continue seeking alternatives
  - Procurement
  - Funding
- Data management
- Invest in TSMO staff
Thank you!

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TSMO Program Plan Development Roundtable Trends
Capability Maturity Model

Effective TSM&O Strategies

- Business Processes
- Systems and Technology
- Performance Measurement

Collaboration

Organization and Staffing

Culture

Most Agencies Today

Perform Level 1
- Activities & relationships ad hoc
- Limited accountability
- Champion-driven

Managed Level 2
- Processes developing
- Staff training
- Limited accountability

Integrated Level 3
- Process documented
- Performance measured
- Organization/partners aligned
- Program budgeted

Optimized Level 4
- Performance-based improvement
- Formal program
- Formal partnerships

Goal for the Future

Business Processes
Organization and Staffing
Culture

TSM&O Strategies

Effective
DEVELOP OUTREACH/EDUCATION CAMPAIGN
DEVELOP A TSMO PROGRAM PLAN
DEVELOP BUSINESS CASE MATERIALS
DEVELOP AND EXECUTE STAFF TRAINING PLANS TO...
DEVELOP A PERFORMANCE MEASURES...
REVIEW/UPDATE ITS ARCHITECTURE
EXAMINE ORGANIZATIONAL STRUCTURE
REVIEW EXISTING PARTNERSHIP FRAMEWORKS
SYSTEM ENGINEERING REVIEW
PROMOTION/BRANDING FOR TS MO
DEVELOP AN INCIDENT MANAGEMENT PLAN
IMPROVE PROCUREMENT PROCESSES
DEVELOP A TS M&O ASSET MANAGEMENT PLAN
DEVELOP TIM TRAINING AND TASK FORCE
DEVELOP BUSINESS CASE MATERIALS
TSMO Program Plan Development Roundtable Trends

- Four Roundtable with this Theme
  - Winter 2016
    - IA, MD, SD,
  - Spring 2017
    - Birmingham MPO, AzTech, TDOT
  - Winter 2017
    - NCTCOG, WA, DVPRC, NJTPA, ARC
  - Spring 2018
    - PA, OH, MO
Plan Examples

IOWA TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSMO) PLAN

**TSMO STRATEGIC PLAN**
- Components
  - Iowa's Challenge
  - The Case for TSMO
  - Mission and Vision
  - Strategic Goals and Objectives
  - Program Plan Overview

**AUDIENCE**
- All levels of DOT

**TSMO PROGRAM PLAN**
- Components
  - Program Objectives
  - TSMO Integration with other DOT Programs
  - Leadership and Organization
  - Business Processes and Resources
  - Performance Management and Decision Support Assessment
  - 5-Year TSMO Program
    - Interstate Conditions
    - Evaluation-Traffic Operations (ICE-OPS) Analysis
    - Activities to meet Goals and Objectives
    - Budget
    - Service Layers Overview

**AUDIENCE**
- Agency Leadership

**TSMO SERVICE LAYER PLANS**
- Components
  - Opportunities and Challenges
  - Description of Services, Activities, and Projects
  - Existing Conditions
  - Gap Analysis
  - Recommendations
  - 5-Year Service Layer Cost Estimate

**8 SERVICE LAYER PLANS**
- Traffic Management Center
- ITS and Communications
- Traveler Information
- Traffic Incident Management
- Emergency Transp. Operations
- Work Zone Management
- Active Transportation and Demand Management
- Connected and Autonomous Vehicle

**AUDIENCE**
- Staff Involved with TSMO

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**Goal 1 - Develop and implement sustainable TSMO program within SHA to implement TSMO**

**Objective 1.1 - Incorporate TSMO oriented practices in routine planning and programming business processes by 2018**

**Strategy 1.1a - Identify and implement means of incorporating TSMO into relevant agency policies**

**Action Items**
- 1.1a.i. Evaluate the inclusion of reliability in MDOT mission, vision, and strategic plans.
- 1.1a.ii. Develop a policy and procedure for TSMO – Draft policy statement needs to address establishing TSMO structure (office/functional area responsibilities). The procedure will include an institutional framework for TSMO – Including roles for steering and executive committees.
- 1.1a.iii. Incorporate planning for operations in all processes within SHA - Maryland Transportation Plan 2035 and SHA Business Plan.
- 1.1a.iv. Identify methods for evaluating capacity vs. TSMO options considering: service issues, network scale, time to implement, incremental improvement options capital operating and maintenance costs, cost-effectiveness related to relevant performance measures.

**Deliverables**
- 1.a. Policy and Procedure to establish TSMO structure for evaluating the benefits operational projects, side-by-side, with capacity projects.
- 1.b. Inclusion of reliability in appropriate plans.
- 1.c. Incorporation of TSMO in SHA business processes.
- 1.d. Report documenting quantitative improvements in travel times/speeds for Maryland based on identified TSMO improvements. Comparison of existing eligible improvements to assess if mobility needs are met through new TSMO projects.

**Outcome**
- TSMO processes become institutionalized in the State Highway Administration.
Lessons Learned

- TSMO Program Plan Development
  - Cost: $0 – 400k
  - Timeframe: 6-18 months

- Plan Format
  - Statewide Strategic Plan – High-level Document
  - Program Plan – Tactical Document

- Plan Approach
  - “TSMO First” Mantra
  - Regional
  - Corridor
Lessons Learned

- **Performance Measures**
  - Before and After Historical Data Assessments
  - Based on Available Data
  - Performance Measure Matrix Development

- **Communicating TSMO**
  - Leadership Buy-in
  - Making the Business Case for TSMO (*Telling Your Operations Story*)
  - Common Areas of focus: WZ, TIM, Signals
  - Rural Areas: Road Weather Management, EMS, IM, & Freight

- **Funding**
  - Dedicated TSMO/Operations Funding
  - Common Funds Used: CMAQ
  - Major reconstruction Projects
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Closing Discussion