Agenda

Why TSMO?
What is TSMO?
Methodology for Development
▶ State-wide in Texas
▶ Austin District
Implementation
Why TSMO?
Why TSMO?

- Prioritizes funding for mobility strategies
- Innovative strategies that reduce congestion
- Enhances Safety
Why TSMO?

Funding

Annual Needs vs TxDOT Budget

- Congestion: $15,000,000,000
- Bridge: $5,000,000,000
- Pavement: $5,000,000,000

Total Annual Needs: $25,000,000,000

TxDOT Budget: $8 Billion

Source: Texas Transportation Plan 2040
Case study: Integrated Corridor Management, Texas

Optimal Benefit/Cost
Dallas, TX

- Deployed ITS infrastructure
- Combined Traffic Management Center
- Route and mode diversion
- Smart parking systems at transit stations
- Advanced traveler information systems.

Results

- Travel time reliability improved 3 percent
- Approx. 1 million gallons of fuel was saved annually
- Travel time was reduced 740,000 person-hours per year

These results were all achieved with a project benefit-cost ratio of about 20:1.

Source: www.rees.com
Why TSMO?

Congestion

- Bottlenecks: 40%
- Traffic Incidents: 25%
- Bad Weather: 15%
- Work Zones: 10%
- Special Events: 5%
- Signal Timing: 5%
- Special Events: 5%
- Bottlenecks: 40%

Recurring Congestion

Non-recurring Congestion

Source: FHWA
Why TSMO?

Safety

FHWA defines a primary incident as:

“…any non-recurring event that causes a reduction of roadway capacity or an abnormal increase in demand.”

and a secondary incident as: “Occurring as a result of the primary incident.”

The chance of secondary incidents occurring increases 2.8% for each minute the primary incident continues to pose a hazard.

TSMO planning supports implementation of programs such as:

- Traffic Incident Management
- Emergency Response Operators/Teams
- Road Weather Management
- Smart Work Zones
- Special Event Management
What is TSMO?
MAP-21 defines TSMO as “integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system.”
What is TSMO?

- TSMO is a performance-based communications and collaboration approach
- It is an approach to improve mobility for all modes of transportation by integrating planning and design with operations and maintenance to holistically manage the transportation network and optimize existing and future infrastructure
- TSMO involves performance metrics focused planning, consisting of coordinated mobility strategies supported by a program of funding, technical and business processes, institutional arrangements and regional partnerships
Methodology
State-wide Strategic Plan
States with a Traffic Operations Division (54%)

States with a Statewide TSM&O Plan (24%)

States with MPO or COG with TSM&O Plan (18%)

States with a TSM&O Division (6%)
### Capability Maturity Model (CMM)

<table>
<thead>
<tr>
<th>Business Processes</th>
<th>Systems &amp; Technology</th>
<th>Performance Measures</th>
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</thead>
<tbody>
<tr>
<td>Planning, budgeting, procurement, and process development that is required for TSMO programs.</td>
<td>Planning, construction, operations, and maintenance of systems and technology ensures operational needs are met.</td>
<td>Used to evaluate the effectiveness of mobility strategies and whether changes need to be made to achieve mobility goals.</td>
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<tr>
<th>Culture</th>
<th>Organization and Workforce</th>
<th>Collaboration</th>
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<td>Organizational culture in which TSMO messaging is communicated internally and externally.</td>
<td>Qualified staff and organizational structure which unifies TSMO activities in project delivery.</td>
<td>The ability of divisions, districts, partner agencies, and other stakeholders to work together to achieve TSMO activities.</td>
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Capability Maturity Model (CMM)

Goal for the Future

- Performance-based improvement
- Formal program
- Formal partnerships

Integrated
- Processes documented
- Performance measured
- Organization/partners aligned
- Program budgeted

Optimized

Managed
- Processes developing
- Staff training
- Limited accountability

Performing
- Activities and relationships ad hoc
- Champion-driven

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Optimized
TxDOT Structure

- Largely Decentralized

- Statewide Level – Divisions/Central Office provide support to the districts
  - Traffic, Bridge, Information Management, etc…

- District Level – The District Engineer oversees the planning, design, construction, operation & maintenance of the state transportation system.

- Each District is split into “Areas” with Area Engineers
State-wide TSMO Framework

- **Strategic**: Business Case, Vision and Mission, Strategic Goals
- **Programmatic**: Organizational Structure, Workforce needs, Business Processes, Culture, Financial Resource Mgmt
- **Tactical**: Prioritized Services, Activities & Projects, implementation policies, performance assessment

Source: FHWA Primer for Program Planning
Methodology
Austin District Program Plan
State of the Practice
Capability Maturity Model (CMM)

Level 1: Performed
Level 2: Managed
Level 3: Integrated
Level 4: Optimized

- Business Processes
- Culture
- Systems and technology
- Organization and staffing
- Performance measurement
- Collaboration
State of the Practice

**Collaboration**
- Formalize internal collaboration activities and include in the project delivery process to improve successful project handoff between departments.
- Establish a regional TSMO subcommittee to discuss mobility challenges and opportunities for project improvement.

**Organization/Workforce**
- Establish a training plan and provide TSMO training to all departments within the District.
- Review the agencies’ structure and identify opportunities for existing staff to perform TSMO activities.

**Culture**
- Establish a TSMO engagement plan to share information and success stories relating to TSMO with all departments within the district.
- Develop a standard business case to explain the value of TSMO that can be customized for different scenarios.

**Performance Measures**
- Establish mobility-based, target-specific performance measures, definitions, utilization strategies, and a data acquisition plan.
- Complete before and after studies for mobility improvement projects and develop an iterative process to continuously improve based on analysis.
- Integrate performance measures of developing transportation plans into district-wide metrics.

**Systems and Technology**
- Encourage implementation of the Systems Engineering Analysis (SEA) process.
- Develop a process to vet innovative technology.
- Develop procedures to ensure systems and technologies are considered in each new project and align with the Traffic Management System (TMS) initiative.
- Integrate the TSMO evaluation tool into processes.
- Modify existing technical systems to include data collection for all types of incidents.

**Business Processes**
- Incorporate TSMO processes into the project development process.
- Revise project manuals to include the TSMO considerations and before/after studies.
- Provide dedicated funding for TSMO activities and include in the Unified Transportation Plan (UTP).
- Provide a business case for mobility improvements to help engineers advocate for projects.
- Develop a process to prioritize projects based on need and potential benefit.
# Program Plan Development
## Business Processes

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
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<td></td>
<td>Ad-Hoc</td>
<td>Processes Developing, Staff Training, Limited Accountability</td>
<td>Processes Documented, Performance Measured, Partners Aligned, Program Budget</td>
<td>Performance Based Improvement, Formal Program, Formal Partnerships</td>
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### Needs Identification
- *Coordinate with area stakeholders to ensure compatibility with regional transportation plans.*
- Ensure soping language includes the testing of ITS devices immediately after construction. Coordinate with Design, Maintenance, Traffic, and Construction to identify opportunities or issues within the evaluated area.
- *Considering all transportation modes, the need for multimodal alternatives, and the intermodal freight transport.*

### Study Alternatives, Impacts, and Costs
- *Consult regional transportation plans to identify design alternatives.*
- *Obtain traffic data, evaluate existing mobility strategies in place, and determine the need for feasibility (route/corridor) study.*
- Analyze and evaluate mobility strategies against conventional methods using cost-effective tools related to mobility, safety, and economic development. Consult with maintenance to ensure operations are maintenance of ITS devices is practical and feasible.
- Identify successful, performance based mobility strategies from completed projects' performance and compare them against conventional solutions.

Employ region-wide interagency historical traffic data and highlight future corridor improvements based on regional mobility and safety performance goals.
Program Plan Development
Performance Measures

TIMD Project Performance Measures
BEFORE ANALYSIS
This worksheet is designed to initiate the consideration of performance measures after the design stages are completed. The categories of performance measures were based on the Austin District Program Plan. Additional details can be found in Section 8.3.2 in the Austin District Program Plan.

Project:

Safety
Is the project expected to improve safety? [ ]
What crash types do you expect to address? [ ]
What modes: automotive, pedestrian, bicycle, etc... will safety improve? [ ]
How will safety during construction be considered? [ ]

If data is available, the following performance measures should be determined:
- Crash rates: rate of crashes, fatalities, and serious injuries
- Specific crash types: rate of each crash type
- Work zone crashes: number of crashes when work zone is in place
- Incident clearance time: the average amount of time to clear an incident. This definition is being determined by TxDOT
- Secondary incidents: the number of secondary incidents occurring using the FMHA definition of a secondary crash

Reliability
Is the project expected to improve travel time reliability? [ ]
What modes will be affected? [ ]
How is reliability during construction being considered? [ ]

TIMD Project Performance Measures
AFTER ANALYSIS
This worksheet is designed to initiate the consideration of performance measures after the project is constructed. The categories of performance measures were based on the Austin District Program Plan. Additional details can be found in Section 8.3.2 in the Austin District Program Plan.

Project:

Safety
Did the project improve safety? [ ]
What lessons learned in terms of addressing safety on this project? [ ]

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Reliability
Did the project meet its travel time reliability objectives? [ ]
What lessons learned in terms of addressing travel time reliability on this project? [ ]

If data is available, the following performance measures should be determined:
- Travel time reliability: the dependency and consistency of travel time along a section of roadway:
  - Travel time index: ratio of the period travel time to the free flow travel time
  - Planning time index: ratio of 90 percentile travel time to the free flow travel time
Program Plan Development
Organization & Workforce

Internal

- Under the State-wide frame work, a TSMO Coordinator and TSMO Champion were selected for the District.
- We established several TSMO Liaisons to ensure TSMO activities are being performed.

External

We established a regional TSMO committee
Program Plan Development
Stakeholder Collaboration

- Identify Opportunities to continually improve TMS
- Develop joint regional mobility strategy plans
- Develop additional funding mechanisms for TMS Projects
- Promote TMS throughout the region
- Gather input during Project Planning
- Set Regional Mobility Performance Targets
- Develop Formal Transportation Research Goals
- Formalize Data Sharing Agreements

- TxDOT Regional TSMO Committee
- City Transportation Agencies
- Tolling Entities
- County Transportation Agencies
- Transportation Research Institutions
- CAMPO
- Police, Emergency Services Towing
- Public Transit Agencies
Implementation
Develop TSMO policy. → Send TSMO policy to districts.

Develop statewide data management and analysis platform. → Implement data management platform statewide.

Verify and consolidate District’s performance measure strategy into statewide platform dashboard. → Share consolidated district performance strategies with all districts.

Develop engagement plan for advocating for TSMO. → Implement engagement plan statewide.

Provide TSMO training opportunities to districts. → Provide training biannually.

Initiate a Statewide TSMO Meeting. → Hold regular Statewide TSMO Meetings.
State-wide – District Responsibilities

- Revise project delivery process to include TSMO activities & TSMO tool. Include project delivery process in TSMO Program Plan.
- Develop and/or update regional architecture. Send regional architecture to TRF for TSMO tracking purposes.
- Customize TSMO business case to meet individual district needs. Include business case in TSMO Program Plan.
- Develop TSMO training plan. Include training plan in TSMO Program Plan.
- Establish Regional TSMO committee. Attend Regional TSMO subcommittee meetings.
Quick Reference to the Austin District TSMO Program Plan

Includes brief discussion on Why TSMO? & What is TSMO?

Includes Implementation Plan to assist readers in finding applicable action items
Austin District – Implementation Plan

FY 2019 Q3 (March—May)

_____ Implement project-based performance measurement for before-and-after analysis. Use qualitative information unless consistent and high-quality data is available.

Task Lead: Project Manager
Oversight: TSMO Planning Liaison
Evaluation Metric: Provide update in annual TSMO Report
This is a continuous task

FY 2021 Q1 (September—November)

_____ Complete TMS Status report with updated data.

Task Lead: TSMO Coordinator
Oversight: TSMO Champion
Evaluation Metric: Send TMS Status Report to TRF
Frequency: Bi-annually

Reference: AUS Program Plan 8.3.3
Reference: AUS Program Plan 8.2.4
The Traffic Operations Division oversees the design and placement of signs, signals, pavement markings, lighting and intelligent transportation systems. It also develops traffic safety initiatives aimed at reducing fatalities and serious injuries from motor vehicle crashes.

In addition, the division is responsible for the collection and analysis of crash data used to plan highway safety and educational programs to promote safe driving practices, and manages rail safety programs, including railroad-highway crossings and railroad inspections.

Traffic Operations also oversees driver safety programs and campaigns geared toward teen drivers, child safety, sober driving, hurricane evacuation and many other issues.

Michael A. Chacon, P.E., serves as director. Contact us with questions or comments.

Safety Information
- Driver Resources
- Non-Radioactive Hazardous Materials Routes
- Highway Safety Engineering
- Solutions for Saving Lives on Texas Roads (Texas Traffic Safety Task Force)

Grants
- Traffic Safety eGrants

Traffic Information
- Road Construction/Closures
- Speed Limits
- Traffic Cameras
- Traffic Signals

Traffic Management
- Texas Connected Freight Corridors
- Transportation Systems Management & Operations (TSMO)

Crash Data and Records
- Purchase a Crash Report
Thank you!

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