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Successfully Implementing Transportation Systems Management and Operations (TSMO)

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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

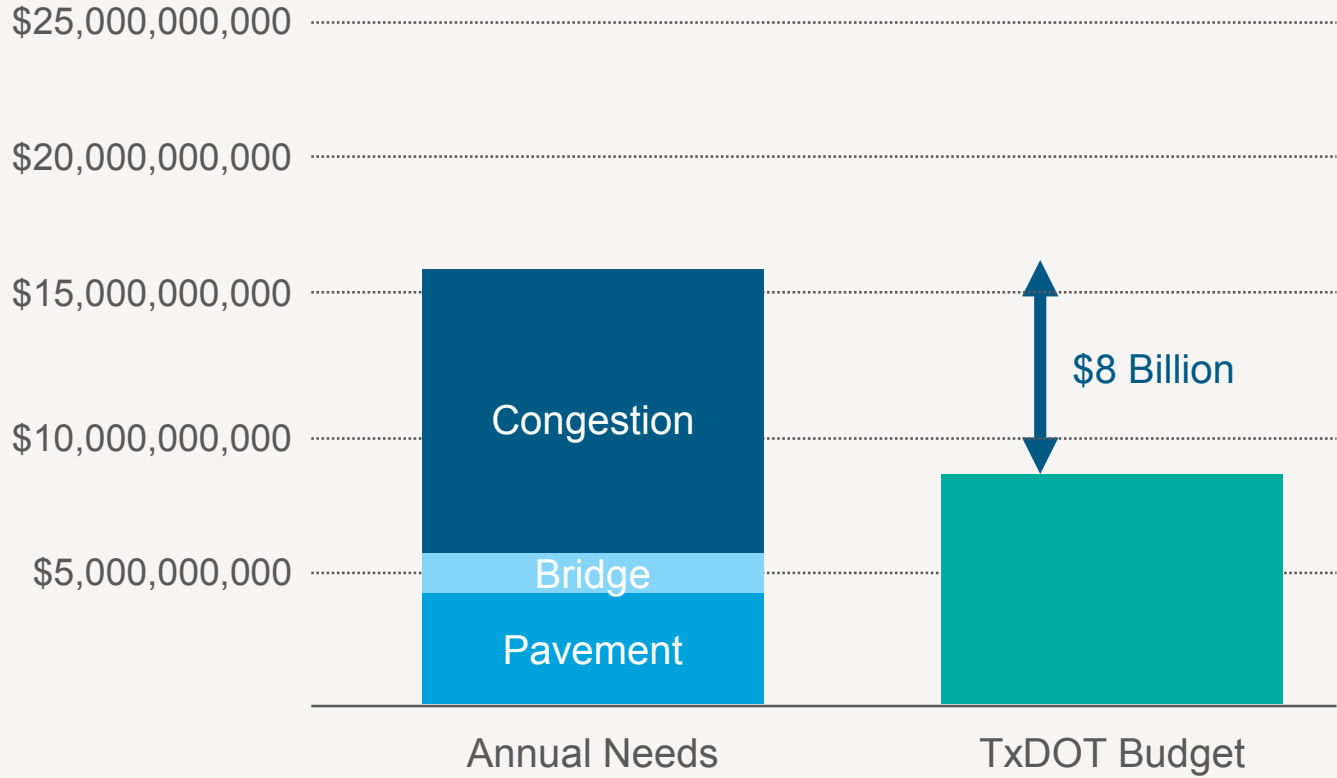


Enhances Safety



Why TSMO?

Funding



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.

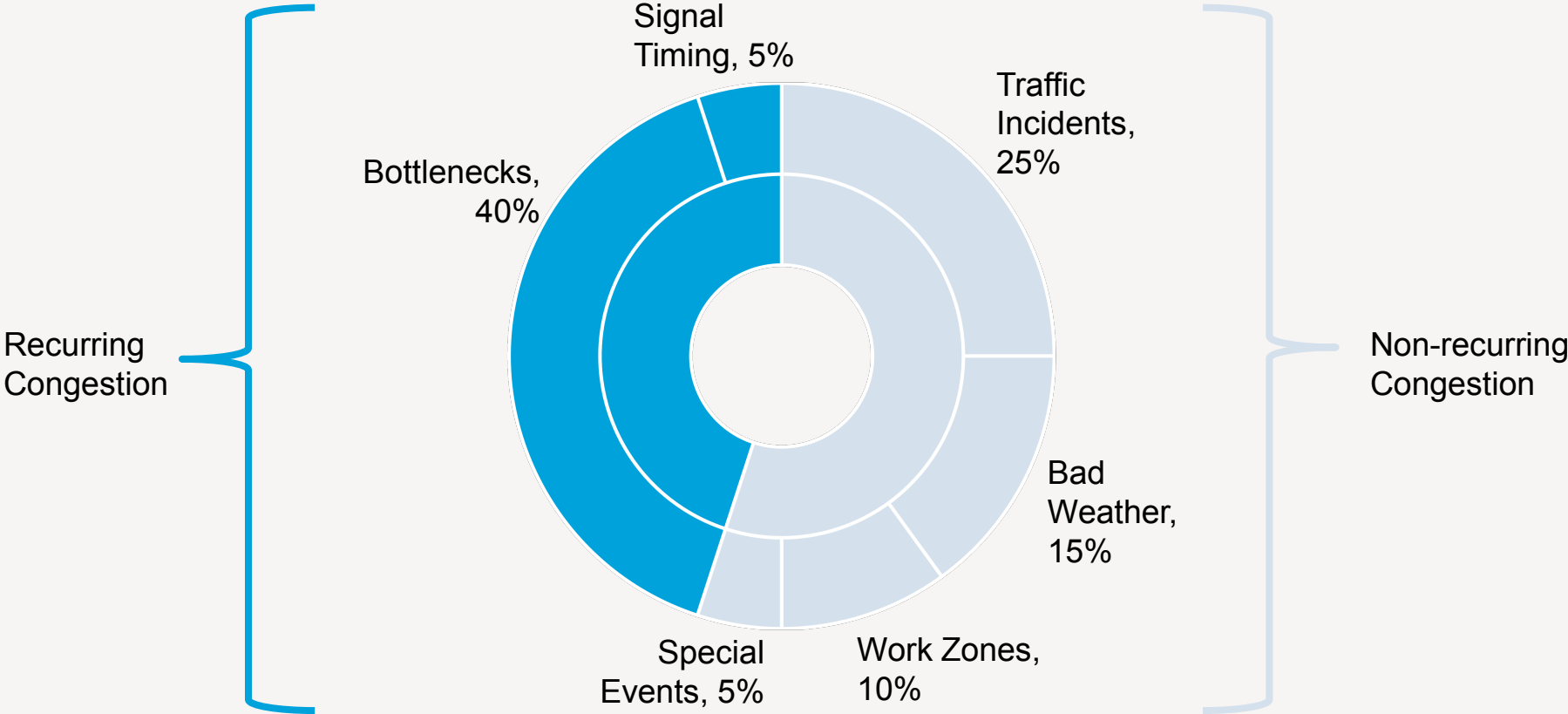


Source: www.rees.com

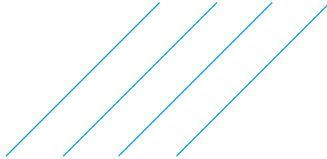


Why TSMO?

Congestion



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



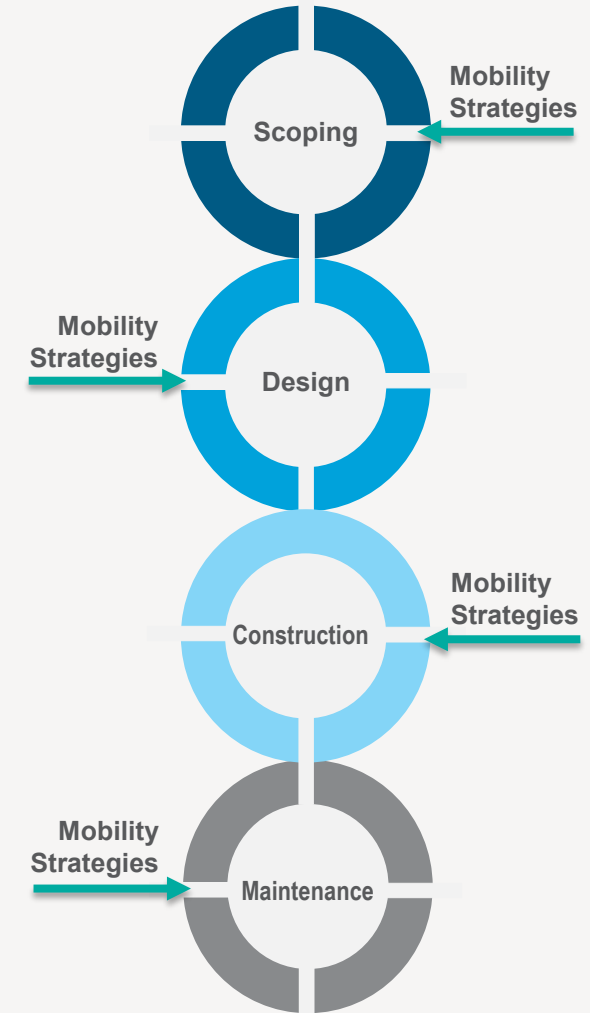
What is TSMO?

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.”

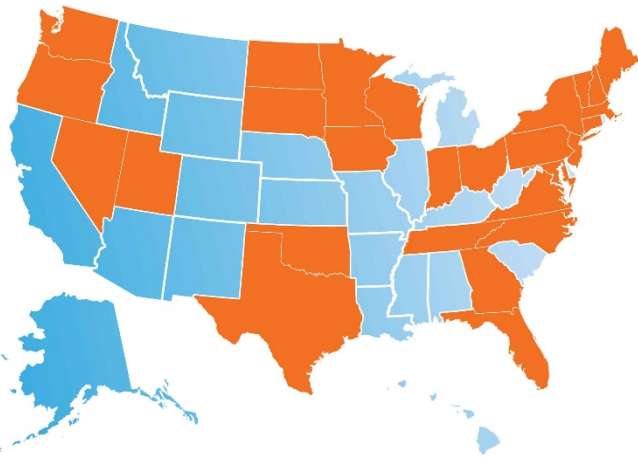
What is TSMO?

- 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

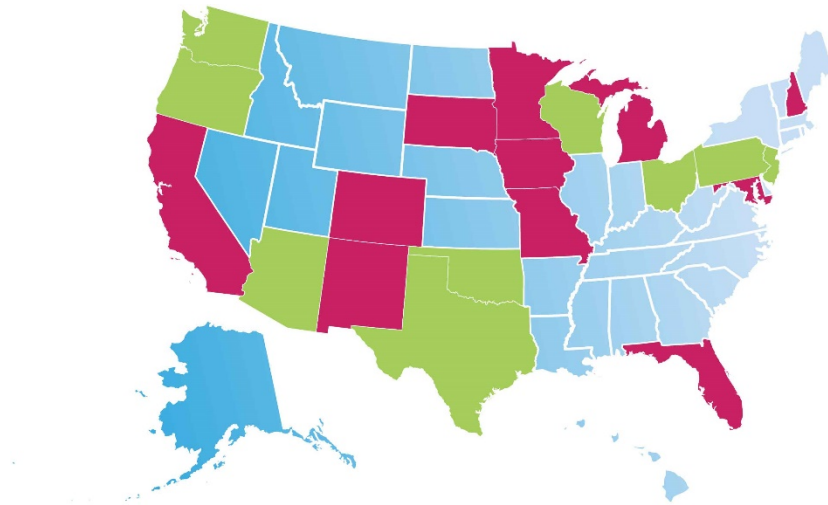


Methodology State-wide Strategic Plan

National State of the Practice, 2016

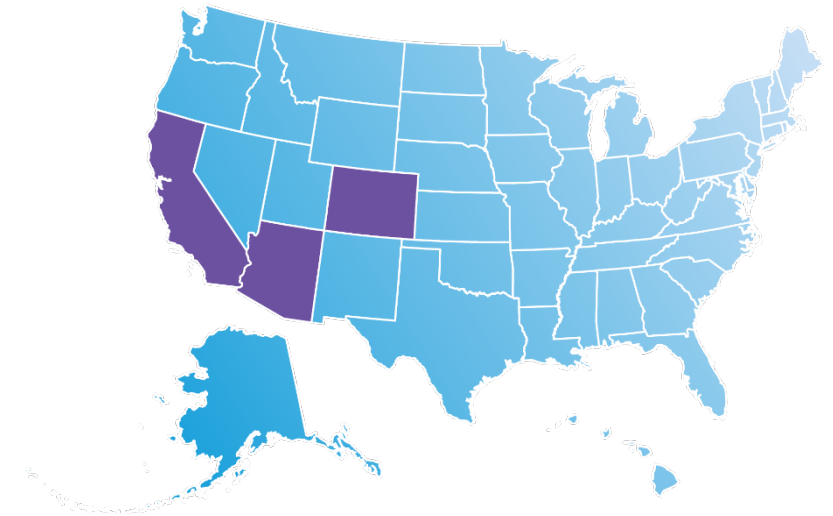


States with a Traffic Operations Division (54%)



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%)

■ Statewide TSM&O Plan Online ■ MPO, COG, or similar with TSM&O Plan



Capability Maturity Model (CMM)

Business Processes



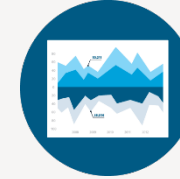
Planning, budgeting, procurement, and process development that is required for TSMO programs.

Systems & Technology



Planning, construction, operations, and maintenance of systems and technology ensures operational needs are met.

Performance Measures



Used to evaluate the effectiveness of mobility strategies and whether changes need to be made to achieve mobility goals.

Culture



Organizational culture in which TSMO messaging is communicated internally and externally.

Organization and Workforce



Qualified staff and organizational structure which unifies TSMO activities in project delivery.

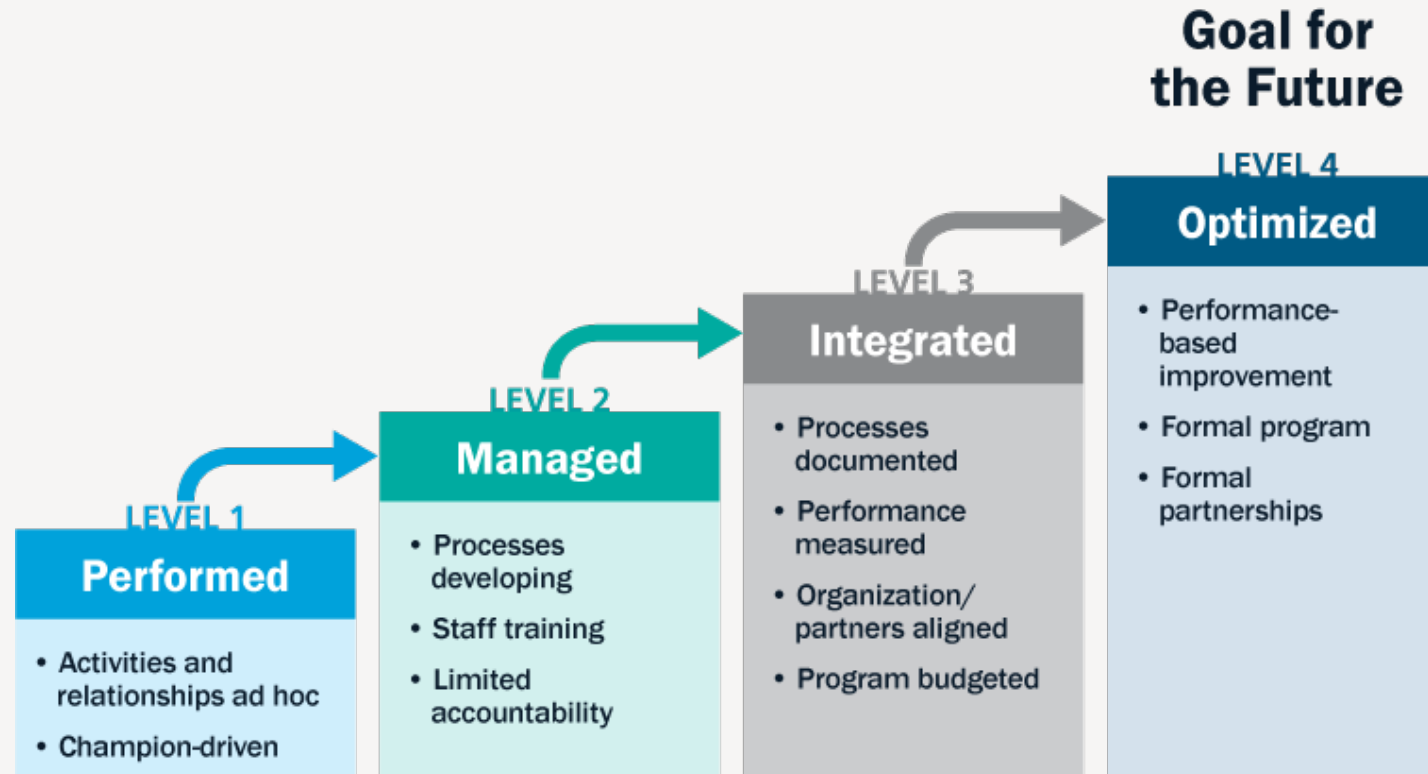
Collaboration



The ability of divisions, districts, partner agencies, and other stakeholders to work together to achieve TSMO activities.

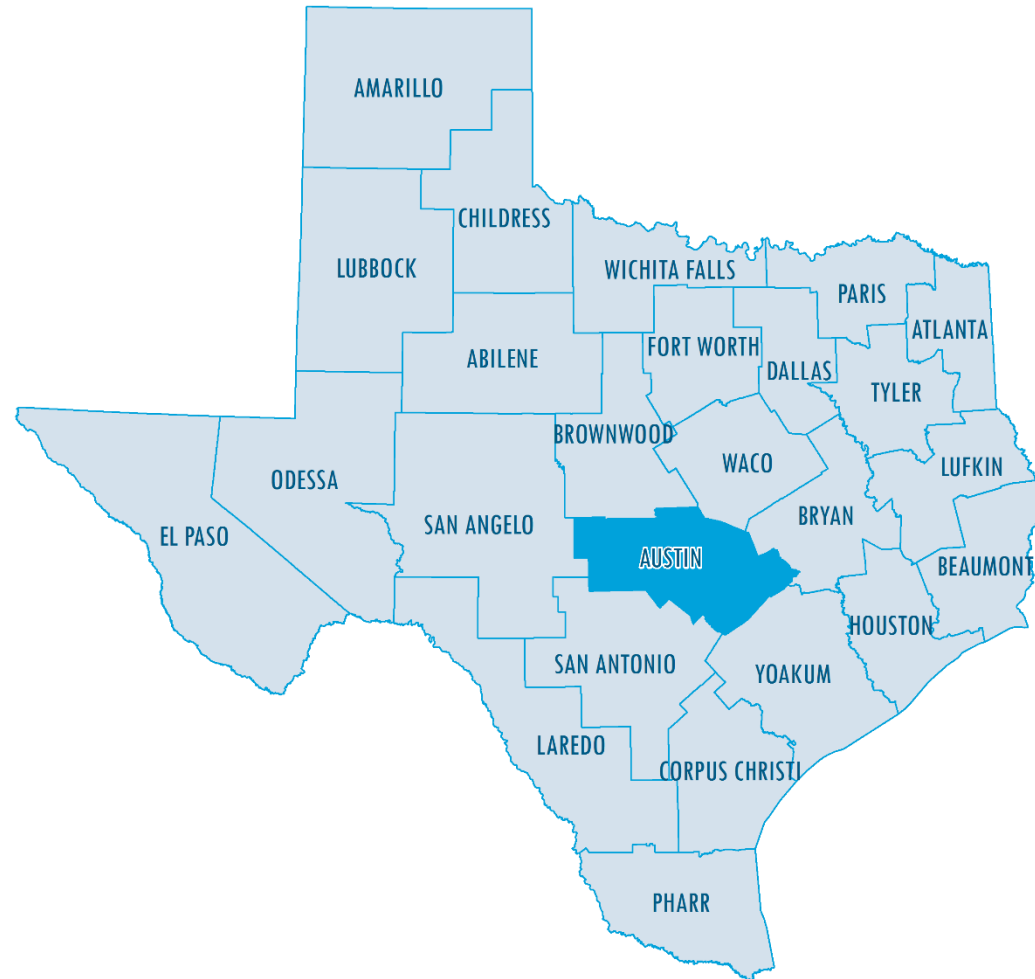


Capability Maturity Model (CMM)

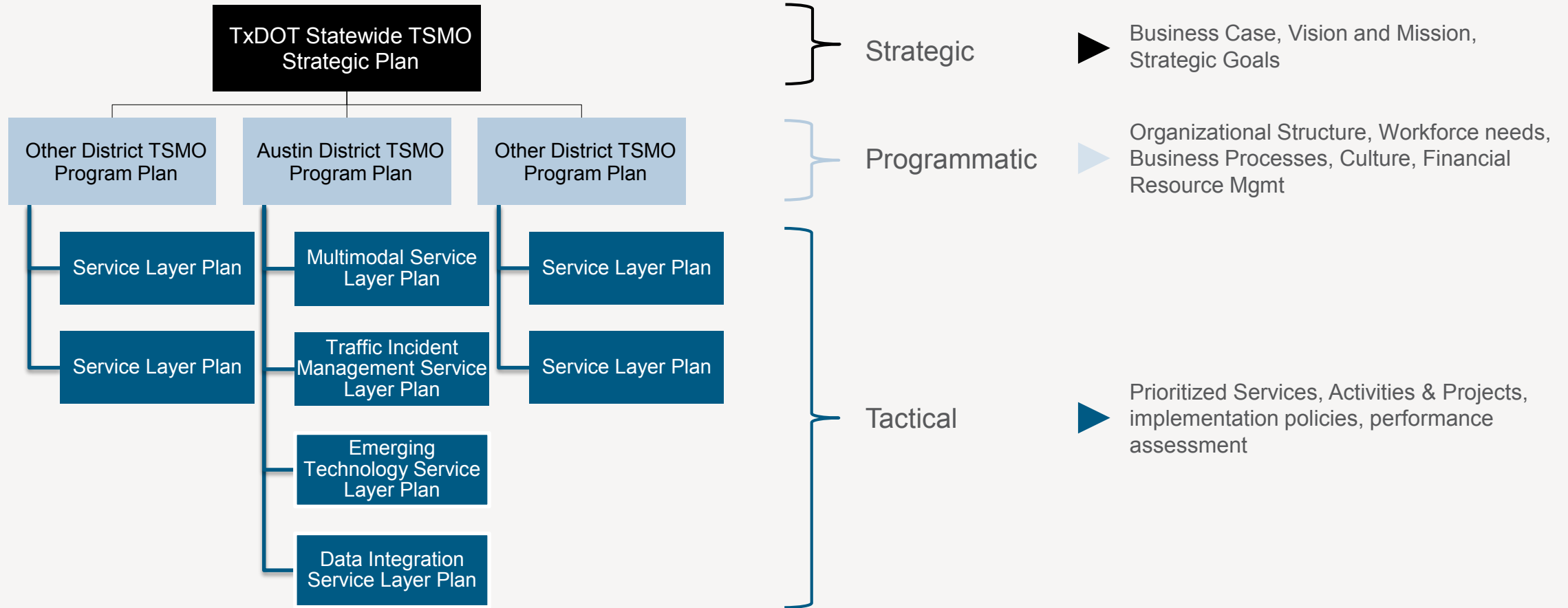


TxDOT Structure

- 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



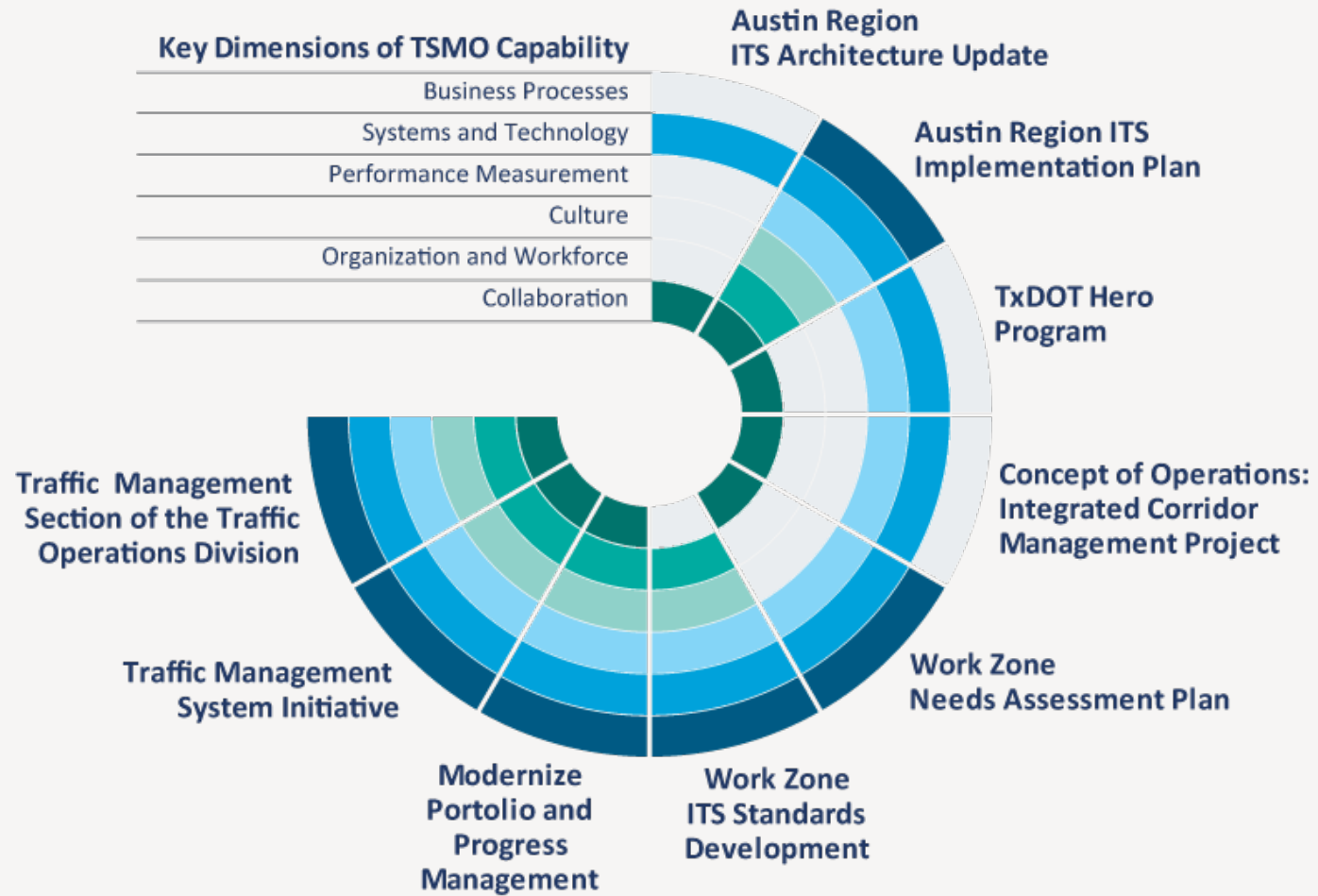
Source: FHWA Primer for Program Planning



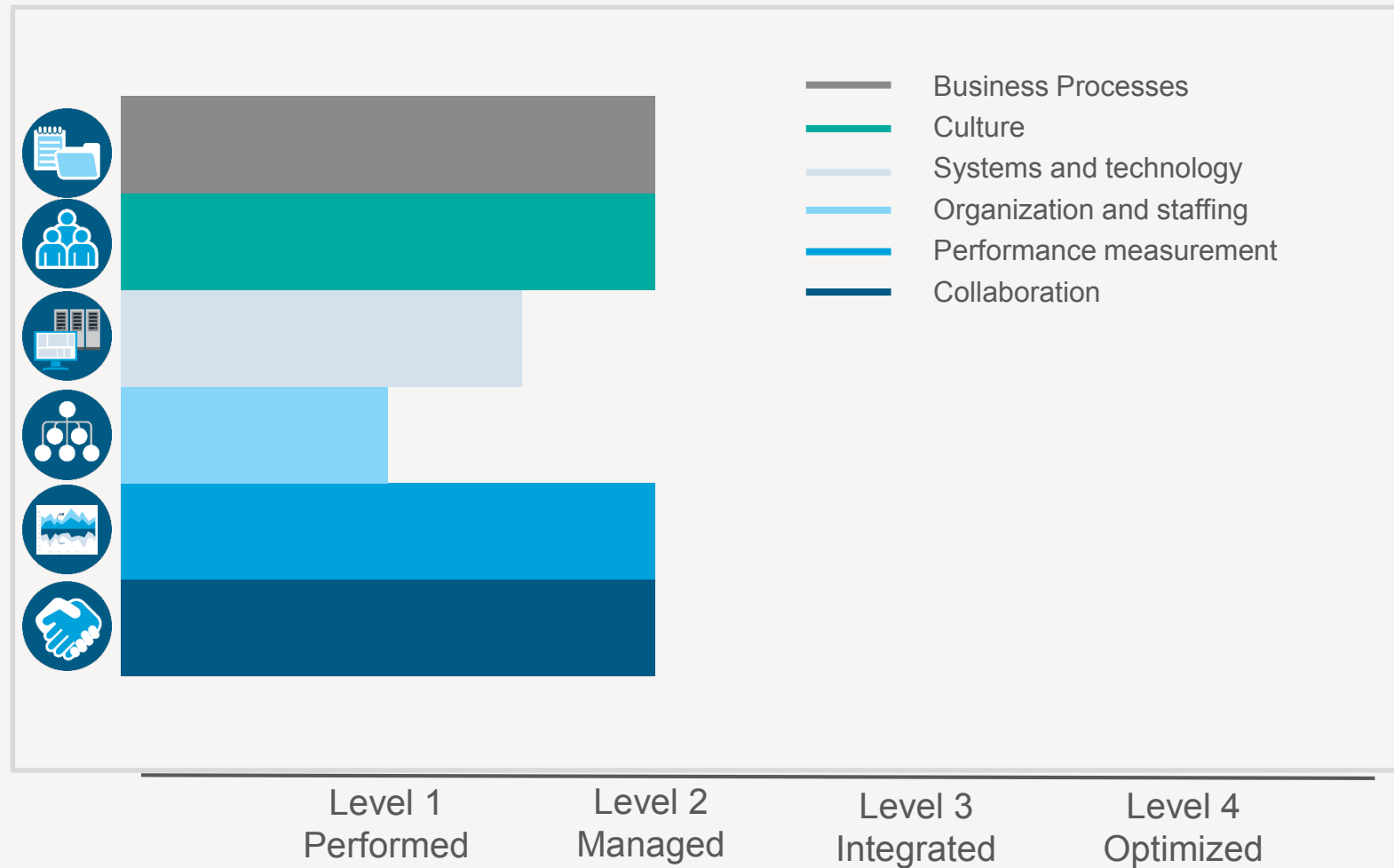
Methodology

Austin District Program Plan

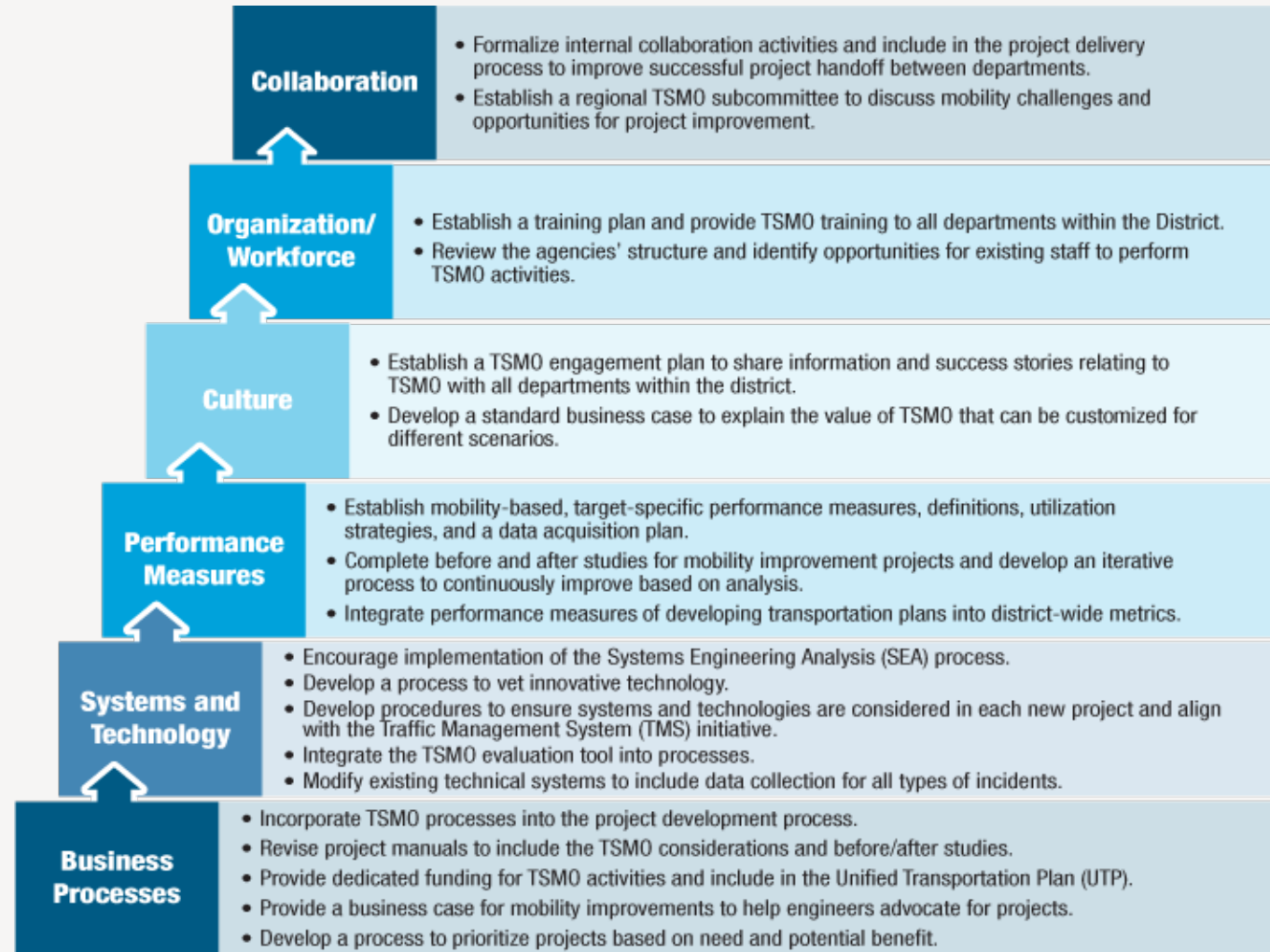
State of the Practice



Capability Maturity Model (CMM)



State of the Practice



Program Plan Development

Business Processes



Maturity Level	Level 1 Ad-Hoc	Level 2 Processes Developing, Staff Training, Limited Accountability	Level 3 Processes Documented, Performance Measured, Partners Aligned, Program Budget	Level 4 Performance Based Improvement, Formal Program, Formal Partnerships
Plan				
Needs Identification	*Coordinate with area stakeholders to ensure compatibility with regional transportation plans.	Ensure scoping 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.	Use Traffic Management Center data to identify network improvement opportunities for ongoing or planned construction projects.	Employ region-wide interagency historical traffic data and highlight future corridor improvements based on regional mobility and safety performance goals
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 project's performance and value and analyze them against conventional solutions.



Program Plan Development

Performance Measures



TSMO Project Performance Measures BEFORE ANALYSIS

This worksheet is designed to initiate the consideration of performance measures **before** 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 challenges?

What crash types do you expect to address?

What modes (example: vehicular, pedestrian, 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 type: 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. The formal definition is being determined by TRF
- Secondary incidents: the number of secondary incidents occurring using the FHWA 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?

TxDOT Austin District TSMO Program Plan Draft 85

TSMO 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 this project improve safety?

What are lessons learned in terms of addressing safety on this project?

If data is available, the following performance measures should be determined:

- Crash rates: rate of crashes, fatalities, and serious injuries
- Specific crash type: rate of each crash type
- Work zone crashes: number of crashes when work zone is in place
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- Secondary incidents: the number of secondary incidents occurring using the FHWA definition of a secondary crash

Reliability

Did this project meet its travel time reliability objectives?

What are 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 dependability and consistency of travel time along a section of roadway.
 - o Travel time index: ratio of the period travel time to the free flow travel time
 - o Planning time index: ratio of 95 percentile travel time to the free flow travel time

TxDOT Austin District TSMO Program Plan Draft 89



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.



TSMO
Regional
Stakeholder
Liaison



TSMO
Connections
Liaison



TSMO
Maintenance
Liaison



TSMO
Transportation
Systems and
Technical Services
Liaison



TSMO
Construction
Liaison



TSMO
Project Design
Liaison



TSMO
Planning
Liaison

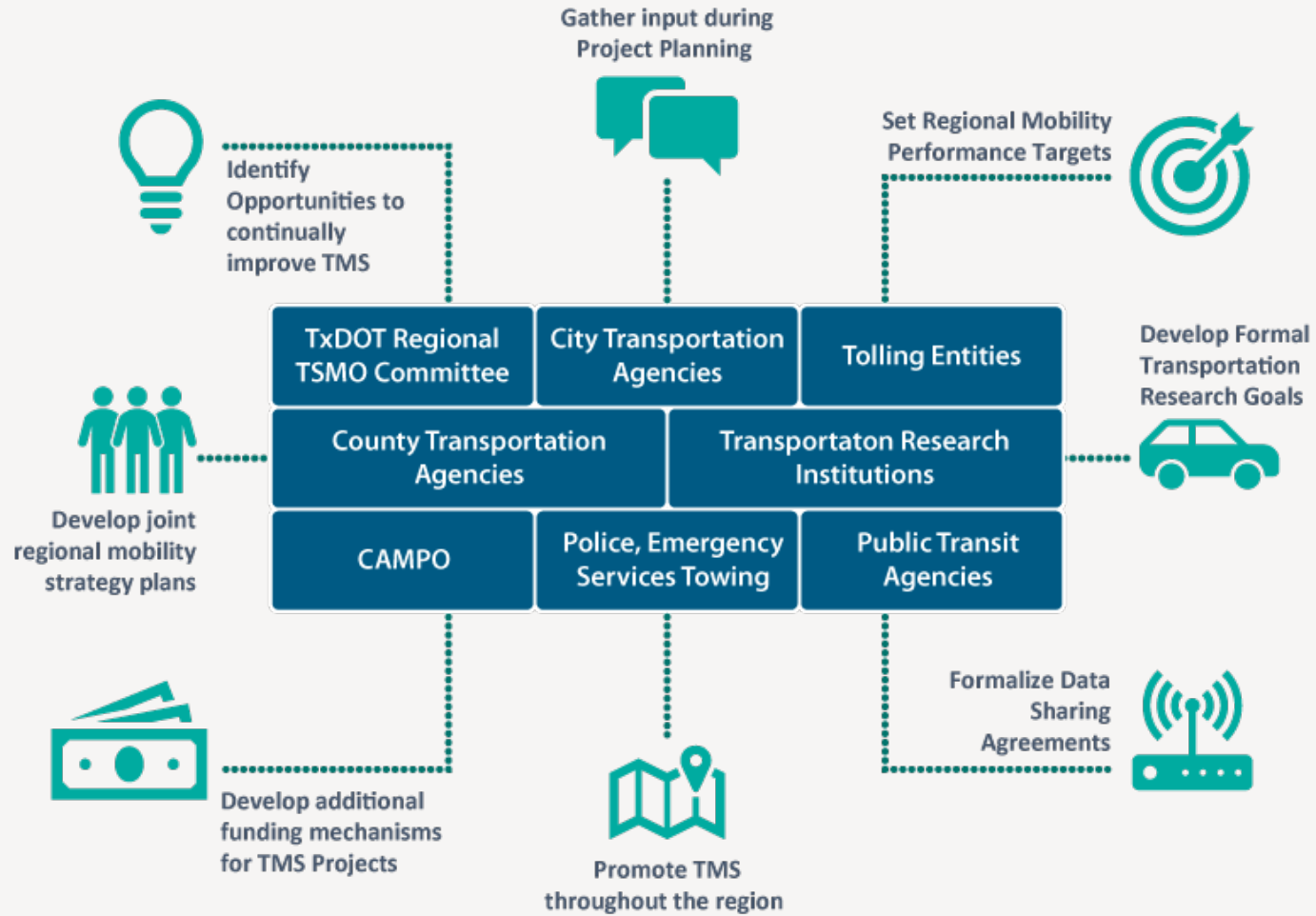
External

We established a regional TSMO committee



Program Plan Development

Stakeholder Collaboration



Implementation

State-wide – Central Office Responsibilities



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.



Monitor performance measures regularly



Provide summary of achieving performance measures at Statewide TSMO Meeting



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.





Austin District – Quick Reference Guide

- 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.

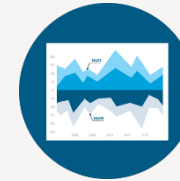
Task Lead: Project Manager

Oversight: TSMO Planning Liaison

Evaluation Metric: Provide update in annual TSMO Report

This is a continuous task

Reference: AUS
Program Plan 8.3.3



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 8.2.4



Traffic Operations

[Home](#) > [Inside TxDOT](#) > [Divisions](#)

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](#)

Law Enforcement

- [CRASH System](#)

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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