TxDOT Statewide TSMO Funding Analysis

February 2021

Version 3.1

Prepared By

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7-30-20	0.5	Internal Review (Prepared by HDR)
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11-23-20	2.0	Final Report (Addresses TxDOT Review Comments on 11 20 20)
1-15-21	3.0	Addresses AECOM Review Comments
2-08-21	3.1	Minor formatting edits

List of Acronyms

Acronym	Definition
AIM	Accelerating Innovative Mobility
ATCMTD	Advanced Transportation and Congestion Management Technologies Deployment
BUILD	Better Utilizing Investments to Leverage Development
CMAQ	Congestion Mitigation and Air Quality
CMM	Capability Maturity Model
COVID	Coronavirus Disease
FAQ	Frequently Asked Questions
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HSIP	Highway Safety Improvement Program
ICM	Integrated Corridor Management
IMI	Integrated Mobility Innovation
INFRA	Infrastructure for Rebuilding America
ITS	Intelligent Transportation Systems
LRTP	Long Range Transportation Plan
MPO	Metropolitan Planning Organization
NHPP	National Highway Performance Program
NHS	National Highway System
NOFO	Notice of Funding Opportunity
NSFHP	Nationally Significant Freight and Highway Projects
O&M	Operations and Maintenance
SHRP	Strategic Highway Research Program
STBG	Surface Transportation Block Grant
TA	Transportation Alternatives

Acronym	Definition
TCRP	Transit Cooperative Research Program
TDM	Transportation Demand Management
TIM	Traffic Incident Management
TIP	Transportation Improvement Program
TSMO	Transportation Systems Management & Operations
TTP	Texas Transportation Plan
TxDOT	Texas Department of Transportation
UTP	Unified Transportation Program
USDOT	United States Department of Transportation

Executive Summary

Transportation Systems Management & Operations (TSMO) is a way of approaching transportation infrastructure focused on addressing operational limitations in a holistic manner. The Texas Department of Transportation (TxDOT) is working to systematically integrate TSMO across its own activities and in partnership with Districts, metropolitan planning organizations (MPOs), cities, counties, and other stakeholders.

This TSMO Funding Analysis report supports the TxDOT Statewide TSMO Strategic Plan, which was originally released in 2017 and was updated during May 2020. The report begins by explaining the connection between the broader statewide TSMO effort and the current funding context. Next, it summarizes critical discretionary and formula-based Federal funding sources, followed by the state's Unified Transportation Program (UTP) funding categories – in all cases, explaining the funding program's connection with TSMO. The report then demonstrates the overlaps between identified funding sources and TSMO operations strategies. The final section includes a strategic discussion focused on leveraging the existing funding framework and distribution process in the service of advancing TSMO capabilities. The report concludes with recommendations for securing additional Federal and state funds in the service of TSMO.

1.0 TSMO Funding Context

1.1 Definition

TxDOT has adopted a TSMO vision and mission statement as presented below.

- **TSMO Vision Statement** - Improve safety and mobility for all modes of transportation by integrating planning, design, operations, construction, and maintenance activities and acknowledging all opportunities for innovation.
- **TSMO Mission Statement** - Through innovation, collaboration, and performance-based decision making, transportation facilities are developed, constructed, maintained, and operated cost-effectively, with the end user in mind.

TxDOT's TSMO goals and objectives are consistent with the Federal Highway Administration (FHWA) TSMO definition, "…the use of strategies, technologies, mobility services, and programs to optimize the safety, mobility, and reliability of the existing and planned transportation system. A significant cause of congestion and unreliable travel is non-recurring events, such as crashes, and transportation network disruptions, such as bad weather, and special events. TSMO enables agencies to target the underlying operational causes of congestion and unreliable travel through innovative solutions that typically cost less and are quicker to implement rather than adding capacity. TSMO expands the range of mobility choices available to system users, including shared mobility and nonmotorized options." [i]

1.2 TSMO

TSMO is best understood as a paradigm shift in the sense that it requires re-thinking the life cycle of transportation systems to focus on addressing specific capacity issues through systems and communication as well infrastructure. FHWA articulates some examples of this paradigm shift as follows:

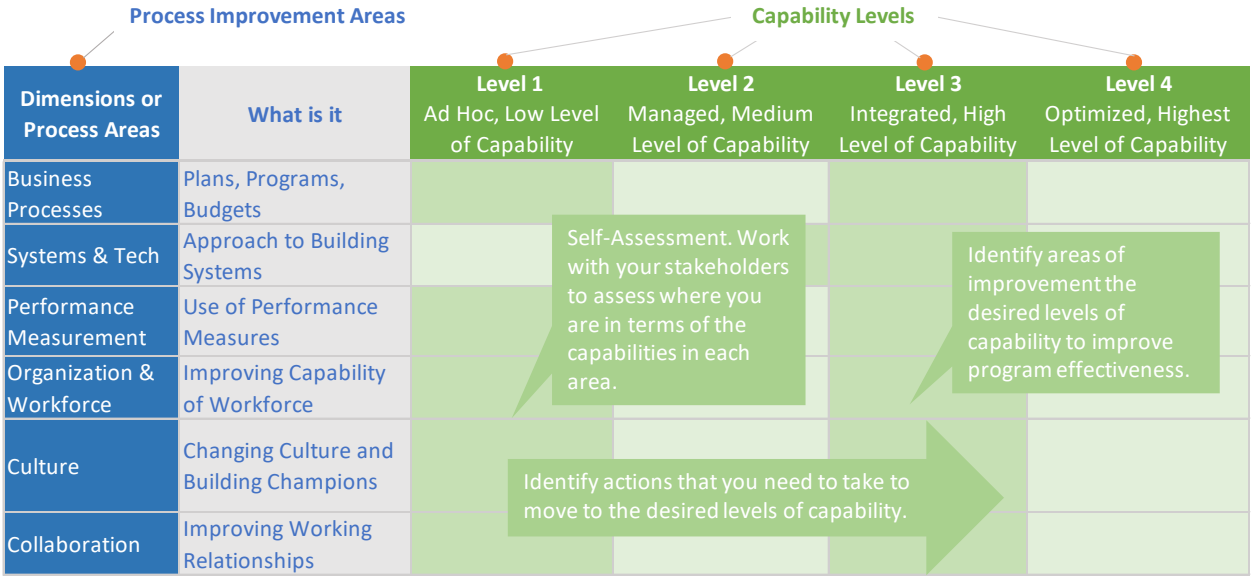
Table 1: The TSMO "Paradigm Shift"

Traditional Method	TSMO
Operating Completed Projects	Integration throughout the Project Life Cycle • Planning • Project Development • Construction • Maintenance
Static and Reactive	Responsive, Proactive, and Predictive
Average Travel Time, Level of Service	Also Travel Time Reliability
Adding Capacity	Preserving and Restoring Existing Capacity as an asset to manage
Focus on Individual Facilities and Jurisdictions	Entire Transportation System

Source: FHWA, "What is TSMO?" Organizing and Planning for Operations. Available at: https://ops.fhwa.dot.gov/tsmo/#q4

TSMO mobility strategies can be relatively low in cost compared to adding capacity, require less time to implement, and potentially offer higher benefit-cost ratios.[ii] As a result, this approach offers an opportunity to improve the transportation system in a cost-effective and timely manner.

The pathway to achieve this TSMO-oriented paradigm shift is defined by the Capability Maturity Model (CMM). This process, visualized in Figure 1, helps agencies diagnose existing TSMO capabilities and strategize for greater incorporation. The six capability dimensions are: business processes, systems & technology, performance measurement, organization and workforce, culture and collaboration. The CMM process is described in greater detail in the TxDOT Statewide TSMO Strategic Plan.



Source: TxDOT Statewide TSMO Strategic Plan

Figure 1: Capability Maturity Model (CMM)

1.3 TSMO Projects

Specific TSMO projects include systems-level approaches (such as traffic management centers), operational tactics (such as pre-planned detour routes) as well as physical infrastructure improvements (such as intersection geometric enhancements). Table 2 shows the framework that TxDOT uses, including fourteen general categories to organize possible TSMO strategies:

Table 2: TSMO Operations Strategies

TSMO Operations Strategies	
Work Zone Management	Traffic Signal Coordination
Traffic Incident Management	Traveler Information
Service Patrols	Ramp Management
Special Event Management	Managed Lanes
Road Weather Management	Active Traffic Management
Transit Management	Integrated Corridor Management
Freight Management	Rural Emergency Response

Each category could include a wide variety of specific projects and project elements. For example, tactics in service of "Special Events Management" could include physical infrastructure such as contraflow lanes as well as operational approaches such as pre- and post-event stakeholder coordination.

The fully realized version of the TxDOT Statewide TSMO Strategic Plan calls for a holistic approach, where a coordinated effort between state, regional, and local agencies identifies and implements the most efficient suite of TSMO strategies. This effort requires an integrated approach to mitigating bottlenecks in the system across disciplines including planning, design, construction, and incident response.

2.0 TSMO Funding Sources

2.1 Applicability of Federal Funding for TSMO

Many important infrastructure projects that could have substantial positive impacts on Texas communities and the economy are held back due to limited availability of funds. The federal government provides several discretionary and formula funding programs for projects, including TSMO improvements. This section describes the federal funding that is available and potentially relevant for TSMO projects in Texas.

The federal funding sources described below reflect existing grant programs. The current federal transportation authorization legislation for these programs (Fixing America's Surface Transportation Act, or the FAST Act) was scheduled to expire on September 30, 2020; however, it has since been extended for one year. Based on prior transportation authorization legislative history, it is likely that most, if not all, of these programs will continue. TxDOT assumes continuation of funding in their planning forecast. Section 4.3 provides an overview of the current House and Senate reauthorization bills.

2.2 *Federal Discretionary Grants*

2.2.1 United States Department of Transportation (USDOT) Better Utilizing Investments to Leverage Development (BUILD) Discretionary Grant Program (https://www.txdot.gov/government/legislative/federal-affairs/build.html)

Replacing the USDOT's Transportation Investment Generating Economic Recovery (TIGER) grant program, which had provided grants for surface transportation projects through nine application rounds, the first round of BUILD grant awards was announced in December 2018. The most recent round of BUILD application cycle ended on May18, 2020 and are currently being evaluated based on merit criteria that include safety, economic competitiveness, quality of life, environmental sustainability, state of good repair, innovation, and partnership. This is generally consistent with previous BUILD rounds, as well as previous TIGER grant evaluation criteria.

Fiscal year (FY) 2020 BUILD Transportation grants are for planning studies and capital investment projects in surface transportation infrastructure and will be awarded on a competitive basis for projects that will have a significant local or regional impact. BUILD funding can support roads, bridges, transit, rail, ports or intermodal transportation. To better address the needs of rural America, which has historically been neglected, USDOT intends to award 50 percent of BUILD grant awards to projects located in rural areas that deliver positive benefits for these communities. It is anticipated that BUILD grant awards will be announced later in 2020. Because of the focus and merit criteria of this grant program, TSMO projects, both planning projects and infrastructure investment projects, may be well suited as a potential funding source.

2.2.2 USDOT Infrastructure for Rebuilding America (INFRA) Discretionary Grant Program

The FAST Act established the Nationally Significant Freight and Highway Projects (NSFHP) program, which provides competitive grants, known as INFRA grants, to nationally and regionally significant freight and highway projects that align with the following goals:

- Improve the safety, efficiency, and reliability of the movement of freight and people.
- Generate national or regional economic benefits and an increase in global economic competitiveness.
- Reduce highway congestion and bottlenecks.
- Improve connectivity between modes of freight transportation.
- Enhance the resiliency of critical highway infrastructure and help protect the environment.
- Improve roadways vital to national energy security.
- Address the impact of population growth on the movement of people and freight.

INFRA has been authorized through FY 2020, with its most recent round of available funding requiring completed applications in February 2020. To be eligible for an INFRA grant, a project must be:

- a highway freight project carried out on the National Highway Freight Network (23 U.S.C. 167);

- a highway or bridge project carried out on the National Highway System (NHS) including projects that add capacity on the Interstate System to improve mobility or projects in a national scenic area;
- a railway-highway grade crossing or grade separation project; or
- a freight project that is:
  - an intermodal or rail project, or
  - within the boundaries of a public or private freight rail, water (including ports), or intermodal facility, is a surface transportation infrastructure project necessary to facilitate direct intermodal interchange, transfer, or access into or out of the facility, and will significantly improve freight movement on the National Highway Freight Network. For these projects Federal funds can only support project elements that provide public benefits.[iii]

A larger project that includes TSMO components may be appropriate for INFRA grants. The program emphasizes innovation, which could include public-private partnerships, or innovative technology, such as broadband deployment and intelligent transportation systems (ITS), which are expected to improve our transportation system.[iv]

2.2.3 FHWA Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD)

https://www.txdot.gov/government/legislative/federal-affairs/atcmtd.html#:~:text=The%20FAST%20Act%20established%20the,and%20infrastructure%20return%20on%20investment.

The FAST Act established the ATCMTD program to make competitive grants available for the development of model deployment sites for large scale installation and operation of advanced transportation technologies to improve safety, efficiency, system performance, and infrastructure return on investment. As a result, this funding may be appropriate for TSMO projects. A grant recipient may use up to 5 percent of the funds awarded each fiscal year to carry out planning and reporting requirements under the program.[v]

Eligible Activities for ATCMTD funding include:

- Advanced traveler information systems.
- Advanced transportation management technologies.
- Infrastructure maintenance, monitoring, and condition assessment.
- Advanced public transportation systems.
- Transportation system performance data collection, analysis, and dissemination systems.
- Advanced safety systems, including vehicle-to-vehicle and vehicle-to-infrastructure communications.
- Technologies associated with autonomous vehicles, and other collision avoidance technologies, including systems using cellular technology.
- Integration of ITS with the Smart Grid and other energy distribution and charging systems.

- Electronic pricing and payment systems.
- Advanced mobility and access technologies, such as dynamic ridesharing and information systems to support human services for elderly and disabled individuals. [23.U.S.C. 503(c)(4)(E)]

The table below provides a summary of projects that have recently been awarded ATCMTD grants that are consistent with the TSMO definition, including TxDOT's I-10 Corridor Coalition Truck Parking Availability System (I-10 Corridor Coalition TPAS). A shown in the table grant awards have ranged between $1.0 million and $12.0 million and have been awarded to State DOTs, regional transportation entities, and a university.

Table 3: Recently Awarded ATCMTD Grants

Applicant	Project Name	Grant Award
University of Alabama	Advanced Connected Transportation Infrastructure & Operations Network (ACTION)	$8,034,003
Contra Costa Transportation Authority (CCTA)	Bay Area Mobility-On-Demand	$8,000,000
Colorado Department of Transportation	Wolf Creek Pass Advanced Technology Deployment	$2,366,298
Delaware Department of Transportation	Artificial Intelligence Enhanced Integrated Transportation Management System (AIITMS) Deployment Program	$4,996,949
Georgia Department of Transportation	GDOT Connected Vehicles	$2,500,000
Nebraska Department of Transportation	Multi-State Rural Integrated Corridor Management	$2,755,000
Oregon Department of Transportation	Oregon Smart Mobility Network	$12,000,000
Pennsylvania Department of Transportation	Work Zone Reservation and Traveler Information System	$2,697,750
Texas Department of Transportation	I-10 Corridor Coalition Truck Parking Availability System (I-10 Corridor Coalition TPAS)	$6,850,000
Utah Department of Transportation	Utah Connected	$3,000,000
Florida Department of Transportation	I-4 Florida's Regional Advanced Mobility Elements (FRAME)	$10,071,600
Hawaii Department of Transportation	Implementing Cellular V2X Technology to Improve Safety and ITS Management in Hawaii	$6,855,000

Applicant	Project Name	Grant Award
Metropolitan Washington Council of Governments (MWCOG)	Deployment of Personalized and Dynamic Travel Demand Management Technology in the Washington, D.C.-Baltimore, MD-Richmond, VA Megaregion	$2,970,000
Michigan Department of Transportation	Intelligent Woodward Corridor Project	$5,500,000
Missouri Department of Transportation	I-270 Predictive Layered Operation Initiative (PLOI)	$1,000,000
North Carolina Department of Transportation	NCDOT Multimodal Connected Vehicle Pilot	$2,117,750
Ohio Department of Transportation /DriveOhio	I-70 Truck Automation Corridor	$4,400,000
Tennessee Department of Transportation	Artificial Intelligence-Powered Decision Support Tools for Integrated Corridor Management	$2,617,653
Virginia Department of Transportation	AI Meets ICM: Realizing the Next Generation of Regional Mobility	$4,355,000
Washington Department of Transportation	Deployment of the Washington State Virtual Coordination Center (VCC) for Multimodal Integrated Corridor Management	$3,424,36

2.2.4 Federal Transit Administration (FTA) Accelerating Innovative Mobility (AIM) Initiative

The Accelerating Innovative Mobility (AIM) initiative is part of the FTA's general strategy to incentivize new approaches to improving transit system design, service, and financing. As part of the initiative, FTA included an emphasis on innovation in all its competitive grant programs (totaling $615 million for fiscal year 2020).

The initiative also includes a specific AIM Challenge Grant, focused on creating a set of "AIM Incubators." In the notice of funding opportunity (NOFO), the program's goals are characterized as an attempt to fund pilot efforts to "accelerate the development, implementation and adoption of innovative technologies, practices, and service models to improve mobility and enhance the rider experience, with a focus on innovative service delivery models, creative financing, novel partnerships, and integrated payment solutions."[vi]

The AIM Challenge Grant presents a broad range of possible TSMO applications, including developing partnerships to improve service delivery (with both the private and public sectors). "Innovation," as it is defined by FTA in this context, is closely connected with the overall TSMO approach of thinking holistically about system optimization.

2.2.5 FTA Integrated Mobility Innovation (IMI) Grant Program

FTA's Integrated Mobility Innovation (IMI) Program fits within the broader AIM initiative, but includes a specific pool of funds available to projects that "demonstrate innovative and effective practices, partnerships and technologies to enhance public transportation effectiveness, increase efficiency, expand quality, promote safety

and improve the traveler experience."[vii] The projects funded through the fiscal year 2019 IMI cycle included efforts to demonstrate the potential of mobility on demand, autonomous vehicles, and mobile payment integration. These kinds of projects require a careful consideration of TSMO principles to maximize benefits. While there is a clear need for collaboration with technology providers, there is also an opportunity to optimize systems and cultivate a workforce that can adapt to these potentially significant changes to transit service provision.

2.2.6 FTA Public Transportation Innovation – 5312 Grant Program & Transit Cooperative Research Program (TCRP) - 5312(i) Grant Program

The Public Transportation Innovation – 5312 and TCRP - 5312(i) Grant programs focuses on research activities. Funds are available to agencies as well as universities and non-profits for the purpose of demonstrating or evaluating innovative approaches to transit (especially those that use emerging technologies) of "national significance."[viii] TCRP is a more specifically defined applied contract research program that covers a broad range of transit issues as part of the Transportation Research Board.

As the state works to integrate TSMO across all agencies and organizations, these research opportunities can build and/or strengthen collaborative relationships with academic institutions. These studies can also be a way to fund efforts to understand and articulate organizational changes.

2.2.7 FTA Access and Mobility Partnership Grant Program

The Access and Mobility Partnership grant program focuses on improving transit service delivery (particularly in the context of specialized transportation serving disadvantaged populations) by creating new partnerships among public agencies, human service providers, and other organizations. The program disperses funds through a few specific funding opportunities. In 2018, these included the Innovative Coordinated Access and Mobility (ICAM) Pilot Program and Human Services Coordination Research (HSCR) grants. These grant programs create opportunities to further the TSMO aim of collaboration, although transit service projects focused on system optimization could also fit the criteria.

2.3 Federal Formula Grants

The following provides an overview of FHWA and FTA formula grant programs that could be pursued separately or in combination with the previously described competitive grant programs. These programs fund a wide variety of project types, including many relevant to TSMO. In addition to capital projects, several formula grant programs include training, education, and workforce development activities as eligible expenses[1] and all of these are critical steps in an agency's or department's internal development and advancement of the CMM process.

While there is no limitation on the number of federal funding programs that can be included in a project's financial strategy, the maximum federal funding participation that can be used on a project is 80 percent of the total capital costs. Funding from these FHWA programs is allocated to State Departments of Transportation and Metropolitan Planning Organizations. For TxDOT and MPOs in Texas, these formula programs provide the federal funding share for the twelve funding categories that are defined in UTP (See Section 5).

[1]https://www.fhwa.dot.gov/innovativeprograms/centers/workforce_dev/504e_state_core_programs_guidance_0318.aspx

2.3.1 FHWA Congestion Mitigation and Air Quality (CMAQ)

CMAQ provides funding for state, as well as local, governments for transportation projects and programs that help meet Clean Air Act requirements. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter for non-attainment areas as well as former non-attainment areas that are now in compliance as maintenance areas.

TSMO projects are appropriate for this funding source because they often improve traffic flow and signalization, construct high occupancy vehicle (HOV) lanes, improve intersections, or add turning lanes. Additionally, eligible activities include TSMO strategies that mitigate congestion and improve air quality, and implement ITS and other CMAQ eligible projects, including projects to improve incident and emergency response or improve mobility, such as real-time traffic, transit, and multimodal traveler information.[ix]

2.3.2 FHWA Surface Transportation Block Grant Program (STBG)

These block grants offer flexible funding that may be used to improve the condition and performance of any federal-aid highway, bridge and/or tunnel project on a public roadway, pedestrian and bicycle infrastructure, and transit capital project. STBG projects are typically funded with an 80 percent federal and 20 percent state and local share.

Further, STBG funds can be used for TSMO projects including highway operational improvements, as well as for capital and operating costs associated with traffic monitoring or management and control facilities and programs. Examples of TSMO projects include ITS capital improvements, advanced truck stop electrification, and employee workforce and training programs.

2.3.3 FHWA STBG: Transportation Alternatives (TA) Subcategory

STBG-TA, or just "TA", is a funding program designed to provide federal monies for projects that provide non-motorized "transportation alternatives" such as pedestrian and bicycle facilities, recreational trails, safe routes to schools, historic preservation, and environmental mitigation. Similar to the STBG program, TA projects are typically funded with an 80 percent federal and 20 percent state or local share. To the extent that a TSMO project supports the broader goals of the TA, these non-motorized elements may be eligible for funding as part of a broader project.

2.3.4 FHWA National Highway Performance Program (NHPP)

NHPP funds are authorized by the FHWA for use on projects that support the condition and performance of the National Highway System (NHS), construct new facilities on the NHS, or ensure that investments of federal transportation funds in highway construction support progress towards meeting performance targets established in state asset management plans for the NHS. NHPP projects on the Interstate system are typically funded with a 90 percent federal and 10 percent state share, while non-Interstate projects are typically funded with an 80 percent federal and 20 percent state share, and a sliding scale applies.

TSMO projects that support operational improvements of NHS segments are eligible for this funding. These may include capital improvements for installation of traffic surveillance and control equipment, computerized signal systems, traveler information systems, integrated traffic control systems, incident management programs, and transportation demand management facilities, strategies, and programs. Capital and operating costs for traffic and traveler information, monitoring and management programs, and infrastructure-based ITS capital projects would also be eligible.[x]

2.3.5 FHWA Highway Safety Improvement Plan (HSIP)

HSIP funds are available for transportation projects that achieve safety outcomes, specifically significant reductions in traffic fatalities and serious injuries. Projects on any public road, including non-state-owned and tribal roads are eligible. HSIP projects are funded with a 90 percent federal and 10 percent state share.

TSMO projects may be eligible for funding if, for example, they involve the installation of a priority control system for emergency vehicles at signalized intersections. TSMO projects that involve collecting, analyzing and generally improving safety data are also potentially eligible, as are those that focus on organizational development in the service of reducing crashes. Finally, planning integrated, interoperable emergency communications equipment, operational activities, or traffic enforcement activities (including police assistance) relating to work zone safety could also be funded through the HSIP.[xi]

2.4 Current Federal Legislative Initiatives

As of August 2020, there are several current legislative initiatives related to federal funding of transportation infrastructure. Given the broader context of upcoming elections and ongoing debate among policymakers, the specific dollar amounts and distribution mechanisms are likely to remain in flux. However, analysis of the current draft transportation reauthorization legislation offers a preview of how the Federal surface transportation funding framework is likely to evolve over the next several years, both in terms of the way certain project and program types are prioritized as well as the possible scale of the funding pool.

A brief description of current Senate and House transportation reauthorization bill is provided below, along with more general observations related to TSMO.

2.4.1 America's Transportation Infrastructure Act of 2019

America's Transportation Infrastructure Act of 2019, United States Senate bill S.2302, is the largest amount of funding provided for highway reauthorization legislation in history[2]. It authorizes $287 billion in investments from the Highway Trust Fund over five years to maintain and repair the nation's roads and bridges. The legislation includes provisions to improve road safety, accelerate project delivery, improve resiliency to disasters, reduce highway emissions, and grow the economy. It was introduced in the Unites States Senate in July 2019, and its written report was filed by Senator Barasso in January 2020. Among other things, the bill:

[2] https://www.capito.senate.gov/imo/media/doc/ATIA%20-%20Summary.pdf

- Increases funding for the existing Highway Safety Improvement Program and includes a new safety funding supplemental of $500 million per year distributed to states based on their current formula share to support projects that would lower driver and pedestrian fatalities;
- Reauthorizes several transportation programs from FY2021-FY2025, including the federal-aid highway program and the transportation infrastructure finance and innovation program;
- Increases funding for tribal and federal lands transportation programs;
- Provides for a bridge investment program to award competitive grants to certain governmental entities for projects that improve (1) the condition of bridges and (2) the safety, efficiency, and reliability of the movement of people and freight over bridges;
- Requires USDOT to encourage each state to develop a voluntary plan that provides for the immediate and long-term personnel and workforce needs of the state to deliver transportation and public infrastructure projects;
- Establishes a two-year goal for the completion of environmental review with respect to highway projects and a 90-day timeline for related project authorizations;
- Sets forth several new climate-related grant programs, including for resiliency, carbon reduction, charging and refueling, alternative road user fees, carbon capture, and diesel emissions;
- Expands the flexibility and eligible uses of formula funds provided out of the Highway Trust Fund, and
- Prioritizes the research and development of animal detection systems that reduce the number of wildlife-vehicle collisions.[3]

Of potential relevance to TSMO projects, the bill increases the funding for INFRA (described previously). The bill also increases the minimum amount of INFRA funds dedicated to smaller projects, from 10 to 15 percent. There are few other provisions of the bill that appear likely to enhance funding availability for TSMO.

2.4.2 Investing in a New Vision for the Environment and Surface Transportation (INVEST) in America Act

The INVEST in America Act is a 5-year, $494 billion investment in transportation infrastructure. In July 2020, the bill was passed by the House of Representatives. It includes four general categories which are briefly described below.

1. *Highways Investments*

   $319 billion is dedicated to highway investments, with a goal of prioritizing fixing existing infrastructure, including 47,000 structurally deficient bridges, before building new highway capacity. In addition, the bill is focused on:

[3] https://www.congress.gov/bill/116th-congress/senate-bill/2302/actions

- Modernizing infrastructure with funding to address gridlock and the most impactful projects and bottlenecks that affect local regions and the national transportation network.
- Measuring state-by-state greenhouse gas emissions, with incentives for best performers in carbon pollution reduction.
- Enacting a new program to fund resilient infrastructure that can withstand the impacts of climate change.
- Increasing funding for development of charging stations and other alternative fueling options for electric and zero-emissions vehicles.
- Improving safety for pedestrians and bicyclists by requiring states with the highest death rates to set aside funds for multimodal facilities.

2. Transit Investments

$105 billion is dedicated to transit. Specifically, the bill would:

- Increase funding for transit agencies to add new routes and provide more reliable service.
- Create a Mobility Innovation program to permit transit agencies to collaborate on mobility on demand services.
- Strengthen Buy America provisions in an effort to increase the number of domestic jobs in rail and bus manufacturing.
- Increase investment in zero-emission buses to reduce carbon pollution.
- Streamline project delivery by reforming the Capital Investment Grants program.
- Provide funding to address the backlog of transit maintenance needs.

3. Passenger Vehicle and Commercial Motor Vehicle Safety Investments

$10 billion in funding is dedicated to safety improvements. Specifically, the bill increases funding for highway safety programs under the National Highway Traffic Safety Administration, providing $5.3 billion over five years. It also increases funding for truck and bus safety programs under the Federal Motor Carrier Safety Administration, providing $4.6 billion over five years.

4. Rail Investments

$60 billion in funding would be made available to:

- Improve and expand the nation's passenger rail network, including the Northeast Corridor (NEC) and the National Network by tripling funding for Amtrak to $29 billion over five years.
- Invest in Amtrak stations, facilities, services, and modernization of its equipment.

- Improve and expand passenger rail by optimizing performance and supporting intercity passenger rail. Specifically, the bill creates a new $19 billion program, the Passenger Rail Improvement, Modernization and Expansion (PRIME) grant program to address these issues.
- Increase funding for the Consolidated Rail Infrastructure and Safety Improvements (CRISI) grant program to $7 billion to fund passenger and freight rail projects. It also expands program eligibilities and allows commuter rail authorities to compete for funds.
- Help communities improve safety at rail crossings with a new $2.5 billion grade separation grant program.
- Address "long trains," trains longer than 7,500 feet, as well as train crossings that are blocked more than 10 minutes, which impact local traffic and emergency response times.
- Prohibit USDOT from allowing the transport of liquified natural gas by rail tank car until extensive safety analysis is performed and additional conditions are met.

3.0 TxDOT Unified Transportation Program Funding Categories

3.1 Unified Transportation Program (UTP) Funding Category Analysis

TxDOT uses twelve funding categories to develop its Unified Transportation Program (UTP). The projects included in the UTP predominantly comprise capital improvements (although it does detail planned operational improvements as well). Generally speaking, TSMO can be incorporated as part of projects in any of the twelve categories. However, some of the funding categories explicitly prioritize TSMO projects, whereas others simply allow for the possibility of TSMO as part of a broader scope of work.

The UTP funding categories with selection criteria most closely aligned with TSMO strategies include:

- Category 2 - Metropolitan and Urban Corridors
- Category 4 - Connectivity Corridors
- Category 5 - Congestion Mitigation and Air Quality
- Category 7 - Metropolitan Mobility and Rehabilitation
- Category 11 – District Discretionary*
- Category 12 – Strategic Priority*

**Selection criteria are open-ended, allowing TSMO to be incorporated as part of funded projects.*

In the high-level project descriptions included in the 2020 UTP, there are several scope elements that are particularly relevant to TSMO. Those include: ITS, Managed Lanes, Intersection Improvements, Ramp Improvements, Auxiliary Lanes, and Operational Improvements. Note, however, that in a broader view, TSMO could play a role in any project through tactics such as work zone management plans or better coordination between agencies. In the same way, the most fully realized version of TxDOT's strategic plan requires an approach to TSMO at the systems and agency level, as opposed to project-by-project.

3.1.1 Preventive Maintenance and Rehabilitation

Category 1 addresses preventive maintenance and rehabilitation of the existing state highway system, including pavement, signs, traffic signals, and other infrastructure assets. Funds are intended for the repair of existing main lanes, structures, and frontage roads. ‘

Relevance to TSMO includes the possibility of using these funds for optimizing traffic operations, particularly when installing new traffic signals as well as modernize existing signals.

3.1.2 Metropolitan and Urban Area Corridor Projects

Category 2 addresses mobility and added capacity projects on urban corridors to mitigate traffic congestion, as well as traffic safety and roadway maintenance or rehabilitation. Projects must be located on the state highway system.

This category was designed primarily to address “mobility and capacity” on urban corridors, which applies to many TSMO strategies (i.e., Integrated Corridor Management).

3.1.3 Non-Traditionally Funded Transportation Projects

Category 3 serves as a unique funding source that is not constrained in the same way as traditional sources (e.g., Design-Build, Local Funds, TMF Funding). As a result, the applicability of TSMO will vary depending on the nature of the individual project, although the lack of restriction on this category allows for effective incorporation of TSMO as an overarching philosophy.

3.1.4 Statewide Connectivity Corridor Projects

Category 4 addresses mobility on major state highway system corridors. These corridors include areas that serve the state’s highest travel demand, but also those that connect key destinations or serve special purposes (such as hurricane evacuation routes). Because the actual substance of the project scope for this funding category is very open-ended (focusing instead on the project location), TSMO can be easily incorporated. Strategies that apply to high-capacity facilities (such as managed lanes) are likely to be especially relevant.

3.1.5 Congestion Mitigation and Air Quality Improvement

Category 5 addresses attainment of National Ambient Air Quality Standard in non-attainment areas (currently the Dallas-Fort Worth, Houston, San Antonio, and El Paso metro areas). *This category aligns with the Federally defined CMAQ program described in Section 4 of this report.*

3.1.6 Structures Replacement and Rehabilitation

Category 6 addresses bridge improvements through the following sub-programs: the Highway Bridge Program, the Bridge Management and Improvement Program, and the Bridge System Safety Program. This funding category is less likely to be relevant to TSMO, although strategies could be employed in construction phases.

3.1.7 Metropolitan Mobility and Rehabilitation

Category 7 addresses transportation needs within the boundaries of MPOs with populations of 200,000 or greater. This funding can be used on any roadway with a functional classification greater than a local road or rural minor collector. Because of this open-ended definition, TSMO could be incorporated to address mobility needs, depending on the specific prioritization strategies of the individual MPO.

3.1.8 Safety

Category 8 addresses highway safety improvements through the sub-programs relevant to safety considerations. These include state and local programs, as well as the Federal HISP program (detailed in Section 4). Operational and intersection improvements are relevant to TSMO – to the extent that infrastructure improvements reduce the number of incidents, these also qualify.

3.1.9 Transportation Alternatives Set-Aside Program

Category 9 handles the federal Transportation Alternatives (TA) Set-Aside Program. *This category aligns with the Federally defined CMAQ program described in Section 4 of this report.*

3.1.10 Supplemental Transportation Programs

Category 10 addresses a variety of transportation improvements through various sub-programs. Among these, the Federal supplementation transportation projects (such as the BUILD and INFRA programs described in Section 4) are most likely to be relevant to TSMO.

3.1.11 District Discretionary

Category 11 addresses TxDOT district transportation needs through the following State programs: District Discretionary, Energy Sector, and Border Infrastructure. In this case, the needs and priorities of the individual districts will determine the applicability of TSMO funding.

3.1.12 Strategic Priority

Category 12 addresses projects with specific importance to the State. These include a wide range of project purpose areas, including congestion management, economic development, and emergency response. These priorities align with TSMO approaches in many cases – some explicit (such as the focus on emergency response) and others more generally (e.g. congestion management, which TSMO works to address through operational improvements as opposed to capacity expansion).

4.0 Existing Performance Measures

4.1 State Measures (http://www.dot.state.tx.us/dashboard/index.htm)

Through the Statewide Long-Range Transportation Plan (SLRTP), which covers a 30-year planning horizon, TxDOT sets the long-term transportation priorities for the state. The SLRTP defines three statewide strategic goals for the transportation system: to promote safety, preserve TxDOT's assets, and optimize system performance for drivers in urban and rural areas. The SLRTP also establishes six performance measures and approved targets to achieve these goals:

- Fatalities per year
- Fatality rate
- Pavement condition
- Statewide bridge condition score
- Urban congestion
- Rural reliability index

TSMO is particularly relevant to the final strategic goal in optimizing performance and its accompanying performance measures related to urban congestion and rural reliability. In fact, any TSMO project will address this goal by definition.

4.2 Regional Considerations

For funding sources where allocation determinations are made by regional or local entities (such as MPOs or municipalities), specific consideration will need to be made for the goals and measures identified in those local-area plans. However, there are some general ways of approaching the incorporation of TSMO project elements that differ depending on the characteristics of specific regions.

In particular, TSMO functions very differently in urban versus rural contexts. For urban regions, strategies that focus on overcoming limitations of space within existing right-of-way (such as traffic signal optimization or mode-shift approaches) will prove most valuable. For rural regions, TSMO will likely serve to address incident-based disruptions in the operations of roadway facilities. These strategies would include emergency response plans and active traveler information programs.

5.0 Applicability of Funding Sources to TSMO Categories

The matrix below presents a general sense of how the key federal and state funding categories align with the TSMO project types. This summary is meant to show the breadth of funding possibilities derived from the detailed analysis found in previous sections.

		TSMO Project Categories													
Funding Categories	***Distribution Framework (state/federal)***	Work Zone Management	Traffic Incident Management	Service Patrols	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	Rural Emergency Response
Preventive Maintenance and Rehabilitation	*S*	■	■	■		■			■	■	■	■		■	■
Metropolitan and Urban Area Corridor Projects	*S*	■	■	■		■	■	■	■	■	■		■	■	
Non-Traditionally Funded Transportation Projects	*S*	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Statewide Connectivity Corridor Projects	*S*	■	■	■		■		■	■	■	■	■	■	■	■
Congestion Mitigation and Air Quality Improvement	*S*	■	■	■		■	■	■	■	■	■	■	■	■	
Structures Replacement and Rehabilitation	*S*	■									■				■
Metropolitan Mobility and Rehabilitation	*S*	■	■	■		■	■	■	■	■	■		■	■	
Safety/HISP	*S*	■	■	■		■		■	■	■	■	■	■	■	■
Transportation Alternatives Set-Aside Program	*S*	■	■	■		■	■		■	■	■		■	■	■
Supplemental Transportation Programs	*S*	■	■	■		■		■	■	■	■	■	■	■	■
District Discretionary	*S*	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Strategic Priority	*S*	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Surface Transportation Block Grants	*F*	■	■	■		■	■	■	■	■	■	■	■	■	■
INFRA	*F*	■	■	■		■	■	■	■	■	■	■	■	■	■
BUILD	*F*	■	■	■		■	■	■	■	■	■	■	■	■	■
ATCMTD	*F*	■	■	■		■	■	■	■	■	■	■	■	■	■
NHPP	*F*	■	■	■			■	■	■	■	■	■	■	■	■

6.0 TSMO Funding Strategies and Recommendations

The following section focuses on the relationship between existing funding categories and the adoption of TSMO across each of the six CMM dimensions. Then, it presents three overarching recommendations to advance funding for TSMO across the state.

6.1 Strategies

Business Processes

Because so many existing funding categories already incentivize the optimization of existing systems through management and operational approaches, adopting TSMO at the "ground floor" of day to day business processes inherently improves an agency's ability to access these funds.

Incorporating TSMO not only allows for an operational focus to defining capital projects, but also can help to facilitate a systematic and proactive way to package related improvements, anticipate future need, and leverage limited local funds. For example: One way that TxDOT is adopting TSMO as part of its business process is current efforts in developing operational procedures for transportation management centers.

Systems and Technology

Systems and technology represent the CMM dimension most directly connected to capital improvement projects. Because of this, nearly all funding categories discussed here can be applied in the context of TSMO. At the State level, several funding categories encourage a TSMO-based approach almost by definition, encouraging improvements that focus on holistic operations in corridor or system settings. This is especially true for UTP Category 2: Metropolitan and Urban Corridors and UTP Category 4 - Connectivity Corridors.

Performance Measures

Performance measures can directly link the funding allocation process and TSMO-oriented goals, particularly in terms of operational performance. Funding is allocated based on federal apportionment. However, mechanisms for which decision-making authority is left in the hands of MPOs, such as UTP Category 7 -Metropolitan Mobility and Rehabilitation, may be well suited to the introduction of performance measures that help incentivize projects with a strong TSMO focus.

Organization and Workforce

While most existing state and federal funding programs focus on capital improvements, there are some opportunities to fund organizational improvements. As discussed previously, the FAST Act allows for the use of several funding sources (including STBG, HISP, and CMAQ) for workforce development, training, and education activities. This presents an opportunity to pursue funding for administrative efforts to embed TSMO principles in the day-to-day activities of local agencies that might otherwise find it difficult to justify the investment.

Culture

Programs funded through the same mechanisms described in the preceding paragraph designed to establish a cultural focus on TSMO might include training or gamification efforts that encourage an instinctual focus on operations and management.

Collaboration

In the context of funding TSMO efforts, collaboration is best understood as a qualitative prerequisite for success. While collaborative activities themselves are unlikely to meet the criteria for existing funding categories, TSMO frequently necessitates collaboration among peer agencies as well as across jurisdictional hierarchies. In that sense, enhanced collaboration can be seen as a pathway to leveraging TSMO funds, especially in the context of cross-jurisdictional systems integration efforts.

In some cases, effective TSMO strategies also involve collaboration with other kinds of partners, such as first responders or private entities (those responsible for major special events, for example)[4]. As local jurisdictions work to establish these partnerships, some existing funding categories, at Commission Discretion, may prove applicable in the support of TSMO initiatives.

[4] https://ops.fhwa.dot.gov/tsmo/#q3

6.2 Recommendations

Recommendation 1: Pilot a TSMO funding program

Because of funding limitations facing many local agencies, developing TSMO capabilities can be a challenge, particularly in the context of lengthy maintenance backlogs. At the Statewide level, a pool of funds could be set aside to implement a pilot project to help cities and counties in districts with comparatively fewer resources to develop strong institutional foundations for integrating TSMO, such as Traffic Incident Management teams.

This program could be open to individual districts or a combination of rural districts and could include the development of training programs and systems/technology upgrades. Such a program would likely fit within the purpose of the existing UTP Category 12 - Strategic Priority.

Example: AIM Initiative

The FTA AIM Challenge Grants (described in Section 4.1 of this report) offer a model for incentivizing the creation of pilot programs that offer lasting lessons for agencies beyond the participants. A hypothetical TSMO pilot program at the state level would be most successful if it includes rigorous documentation and opportunities for further adoption of best practices. For example, Houston Metro recently was awarded an AIM grant to develop and deploy an automated and electric mid-size bus.

Recommendation 2: Designate TSMO criteria as part of existing UTP funding categories

To further encourage the CMM process and resulting TSMO Project, TxDOT should modify the descriptions of existing selection criteria for UTP categories and consider appropriate upgrades to the Decision Lens prioritization tool. This approach could also be used in defining specific operational performance measures to provide guidance on the type and level of TSMO enhancements consistent the TxDOT Statewide Strategic Plan. This guidance for operational performance measures could be incorporated by MPOs/Districts for relevant UTP categories (including Categories 2, 4, 5, 7, 9, 11).

Example Partnership: TxLTAP

The effort to help agencies with limited internal resources access state and federal funds requires dedicated support. The nationwide Local Technical Assistance Program (LTAP) provides training, professional development, communications, and other resources to local agencies.

The Texas Local Technical Assistance Program (TxLTAP)[xii] is managed by the University of Texas Arlington's Public Works Institute and is ideally positioned to support local agencies compete for discretionary grant funds that prioritize TSMO. Tools available to TxLTAP include trainings, publications, and events (such as workshops).

Recommendation 3: Incentivize adopting a TSMO philosophy through connection with existing funding programs.

Incentivize local agencies and districts to adopt a CMM approach and define a TSMO project or TSMO elements of larger project by setting aside a portion of each UTP funding category for TSMO. This concept reflects that TSMO actually fits very well within the criteria for the existing UTP categories. Because of this, it's possible that one way to incentivize local agencies to adopt a TSMO approach is by explaining that doing so creates eligibility for the subcategory of funds within the UTP categories. Also note that this way of thinking – a holistic approach that integrates activities, anticipates future problems, builds strategic partnerships, etc. – aligns with a more general philosophical direction of federal and state funding priorities. This means that advancing along the TSMO CMM likely sets an agency up for broader synchronicity with funding opportunities at the Federal and state levels.

Appendix A: 2021 UTP Funding Categories

TABLE 5

Common Project Types in the UTP Funding Categories

The tables below list the most common project types funded through each category in the 2021 UTP, as well as the statewide strategic goals that each project type addresses. All 12 UTP funding categories address all three strategic goals to varying degrees.

	% OF PROGRAMMED FUNDS	STRATEGIC GOALS: PROMOTE SAFETY	PRESERVE OUR ASSETS	OPTIMIZE PERFORMANCE
CATEGORY 1 - PREVENTIVE MAINTENANCE AND REHABILITATION				
Roadway surface treatment	46%	○	●	○
Roadway rehabilitation and restoration	40%	○	●	○
Traffic signals, lighting, signs	3%	●	○	
Rural passing lanes (Super 2)	3%	○		●
All other project types	8%			
CATEGORY 2 - METROPOLITAN AND URBAN CORRIDORS				
Road widening (freeway or non-freeway)	71%	○	○	●
Interchange improvements	15%	○	○	●
Roadway operational improvements	7%	○		●
All other project types	7%			
CATEGORY 4 - CONNECTIVITY CORRIDORS				
Road widening (freeway or non-freeway)	68%	○	○	●
Interchange improvements	10%	○	○	●
New-location rural highway	8%			●
Roadway operational improvements	7%	○		●
Rural passing lanes (Super 2)	5%	○		●
All other project types	2%			
CATEGORY 5 - CONGESTION MITIGATION AND AIR QUALITY				
Intersection or interchange improvements	52%	○	○	●
Bike and pedestrian infrastructure	28%	○		●
Traffic management technology	11%	○		●
Public transit and commute alternatives	8%			●
All other project types	1%			
CATEGORY 6 - STRUCTURES (BRIDGE)				
Bridge replacement	88%	○	●	○
Bridge maintenance	6%	○	●	
Bridge rehabilitation or widening	6%	○	●	○

	% OF PROGRAMMED FUNDS	STRATEGIC GOALS: PROMOTE SAFETY	PRESERVE OUR ASSETS	OPTIMIZE PERFORMANCE
CATEGORY 7 - METROPOLITAN MOBILITY AND REHABILITATION				
Road widening (freeway or non-freeway)	52%	○	○	●
New-location urban roadway	16%			●
Roadway operational improvements	7%	○		●
Roadway rehab and restoration	4%	○	●	○
Bridge improvements	4%	○	●	○
All other project types	17%			
CATEGORY 8 - SAFETY				
Medians, guard rails, barriers	37%	●	○	
Shoulders, turn lanes, passing lanes	21%	●		○
Traffic signals, lighting, signs	18%	●	○	
Intersection or rail crossing improvements	17%	●	○	○
Rumble strips	6%	●		
All other project types	1%			
CATEGORY 9 - TRANSPORTATION ALTERNATIVES				
Bike and pedestrian infrastructure	84%	○		●
Public transit	12%			●
Safety rest areas	3%	●	○	
All other project types	1%			
CATEGORY 10 - SUPPLEMENTAL TRANSPORTATION PROGRAMS				
State park roads	22%		●	
Border crossing infrastructure	21%	○		●
Sidewalk accessibility	16%	●		
Road widening (includes federal earmarks)	16%	○	○	●
Landscape enhancement	2%		●	
All other project types	23%			
CATEGORY 11 - DISTRICT DISCRETIONARY				
Roadway rehabilitation and restoration	51%	○	●	○
Road widening (freeway or non-freeway)	17%	○	○	●
Rural passing lanes (Super 2)	13%	○		●
Roadway surface treatments	10%	○	●	○
All other project types	9%			
CATEGORY 12 - STRATEGIC PRIORITY				
Road widening (freeway or non-freeway)	75%	○	○	●
Interchange improvements	13%	○	○	●
New-location roadway	6%			●
All other project types	6%			

● PRIMARY GOAL ADDRESSED

○ SECONDARY GOAL ADDRESSED

Note: All Percentages are approximate

Appendix B: Relevance of UTP Funding Categories to TSMO

The table below lists the twelve TxDOT UTP funding categories, along with some defining characteristics associated with their funding and distribution. For each category, it lists the most common projects types in the 2020 UTP. In order to illustrate the possible applicability of TSMO, these project types are characterized in one of three ways: projects that include TSMO by definition (meaning the project explicitly covers one or more TSMO strategies), projects that could include TSMO (meaning the project's scope could be defined in such a way that it incorporates TSMO strategies), or neither (meaning the project is unlikely to be relevant to TSMO).

	Funding Category	Most Common Project Types[xiii] (*=TSMO by definition, ^=Could include TSMO)	Applicability to TSMO	Allocation/ Distribution	Selection Guidelines	Source of Funding[xiv]
1	**Preventive Maintenance and Rehabilitation**	Roadway resurfacing^ Roadway rehabilitation and restoration^ Added passing lanes (Super 2)^ Signals, lighting, signs, striping, etc.^	Funds can be used for "minor roadway modifications to improve operations" and install/upgrade traffic signals.	Formula	Projects selected by Districts.	Federal, State
2	**Metropolitan and Urban Area Corridor Projects**	Road widening (freeway or non-freeway)^ Interchange improvements^ Roadway operational improvements* Roadway resurfacing or rehabilitation^	Designed primarily to address "mobility and capacity" on urban corridors, which applies to many TSMO strategies (in particular Integrated Corridor Management).	Formula	Projects selected by MPOs in consultation with TxDOT.	Federal, State
3	**Non-Traditionally Funded**	Open-ended^	Varies.	Discretionary	Determined by legislation, Commission	State, Local/Other

	Funding Category	Most Common Project Types[xiii] (*=TSMO by definition, ^=Could include TSMO)	Applicability to TSMO	Allocation/ Distribution	Selection Guidelines	Source of Funding[xiv]
	Transportation Projects				approved Minute Order, and local government commitments.	
4	**Statewide Connectivity Corridor Projects**	Road widening (freeway or non-freeway)^ Interchange improvements^ New-location roadway^ Roadway operational improvements* Added passing lanes (Super 2)^	Focus is on addressing mobility in certain locations (designated connectivity corridors) – TSMO strategies could be incorporated in many project types along these corridors.	Formula	Corridors selected by Commission. Districts select projects along corridors in consultation with MPOs, Transportation Planning and Programming Division and TxDOT Administration.	Federal, State
5	**Congestion Mitigation and Air Quality Improvement**	Intersection or interchange improvements^ Local transit, commute alternatives* Bike and pedestrian infrastructure^ Traffic management technology* HOV/Managed lanes*	Highly relevant to TSMO in that funds explicitly cannot be used to add capacity for single-occupancy vehicles (meaning the goal is inherently to improve operations for vehicles or encourage mode shift).	Formula	Projects selected by MPOs in consultation with TxDOT.	Federal
6	**Structures Replacement and Rehabilitation**	Bridge structure replacement Bridge repair or maintenance	Less likely to be relevant to TSMO, although strategies	Discretionary	Projects selected by the Bridge Division.	Federal, State

	Funding Category	Most Common Project Types[xiii] (*=TSMO by definition, ^=Could include TSMO)	Applicability to TSMO	Allocation/ Distribution	Selection Guidelines	Source of Funding[xiv]
		Bridge rehabilitation or widening^	could be employed in construction phases.			
7	**Metropolitan Mobility and Rehabilitation**	Road widening (freeway or non-freeway)^ New-location roadway^ Roadway resurfacing or rehabilitation^ Interchange improvements^ Local transit, commute alternatives*	Open-ended (based on MPO prioritization process) – TSMO could be incorporated to address mobility needs.	Formula	Projects selected by MPOs in consultation with TxDOT.	Federal
8	**Safety**	Medians, shoulders, pavement width^ Signals, lighting, signs, etc.^ Guard rails and safety grates Rumble strips and pavement markings	Operational and intersection improvements are relevant to TSMO – to the extent that infrastructure improvements reduce the number of incidents, these also qualify.	Discretionary	Projects selected by Traffic Operations Division.	Federal, State
9	**Transportation Alternatives Set-Aside Program**	Bike and pedestrian infrastructure^ Safety rest areas	Less likely to be relevant to TSMO, unless alternate mode projects can demonstrate a meaningful reduction in demand on the roadway network.	Less than $200K – Formula | More than $200K – discretionary	Less than $200K - Projects selected by MPO's | More than $200K - Project list recommended by PTN Division and selected by Commission.	Federal

	Funding Category	Most Common Project Types[xiii] (*=TSMO by definition, ^=Could include TSMO)	Applicability to TSMO	Allocation/ Distribution	Selection Guidelines	Source of Funding[xiv]
10	**Supplemental Transportation Programs**	Border highway infrastructure^ State park road maintenance^ Emergency repairs^ Bike and pedestrian infrastructure^ Ferry boats and facilities^	Category includes several sub-programs. Among these, the Federal supplementation transportation projects (such as the BUILD and INFRA programs described in Section 4) are most likely to be relevant to TSMO.	Project Specific	Project Specific	Federal, State
11	**District Discretionary**	Roadway resurfacing or rehabilitation^ Added passing lanes (super 2)^ Road widening (non-freeway)^ Roadway operational improvements*	Open-ended (based on MPO prioritization process) – TSMO could be incorporated to address mobility needs.	Formula – additional funds available on a discretionary basis	Selected by Districts	Federal, State
12	**Strategic Priority**	Road widening (freeway or non-freeway)^ Interchange improvements^ New-location roadway^	Open-ended (based on Transportation Commission prioritization process) – TSMO could be incorporated to address mobility needs.	Discretionary	Projects selected by The Texas Transportation Commission based on candidate projects identified by districts and MPOs.	Federal, State

References

[i] https://ops.fhwa.dot.gov/tsmo/#q4

[ii] A benefit-cost ratio represents what a $1 investment in a project will yield in terms of public benefits.

[iii] https://www.transportation.gov/policy-initiatives/infra/infra-grants-faqs

[iv] https://www.transportation.gov/buildamerica/financing/infra-grants/infrastructure-rebuilding-america

[v] https://ops.fhwa.dot.gov/publications/fhwahop19040/chapter5.htm

[vi] https://www.transit.dot.gov/funding/applying/notices-funding/accelerating-innovative-mobility-aim-challenge-grants-2020-notice

[vii] https://cms7.fta.dot.gov/IMI

[viii] https://www.transit.dot.gov/funding/grants/public-transportation-innovation-5312

[ix] https://ops.fhwa.dot.gov/publications/fhwahop19040/chapter5.htm

[x] https://ops.fhwa.dot.gov/publications/fhwahop19040/chapter5.htm

[xi] https://ops.fhwa.dot.gov/publications/fhwahop19040/chapter5.htm

[xii] http://www.txltap.org/about.cfm

[xiii] 2020 UTP, p. 24

[xiv] 2020 UTP, p. 34