# Atlanta Regional Transportation Systems Management and Operations (TSMO) Strategic Plan

2020

ARC

**Acknowledgements**

The Atlanta Regional Commission and consulting team would like to thank the Steering Committee members from the following organizations who provided key input and review to shape this document:

- Atlanta Regional Commission (ARC)
- Atlanta-Region Transit Link Authority (ATL)
- Georgia Department of Transportation (GDOT)
- Georgia Regional Transportation Authority (GRTA)
- Metropolitan Atlanta Rapid Transit Authority (MARTA)
- State Roads and Tollway Authority (SRTA)

**Prepared by:**

ICF

with support from

Kimley»Horn

and

Consensus Systems Technology and Lumenor Consulting Group

Note: Cover image of Highway Emergency Response Operators (HERO) truck provided courtesy of Georgia Department of Transportation

# Table of Contents

# List of Figures

# Executive Summary

As one of the fastest growing regions in the country, the Atlanta region has long recognized the importance of not only developing a world-class infrastructure but also undertaking active efforts to manage and operate those transportation systems. Today, a robust Intelligent Transportation Systems (ITS) infrastructure and experience with transportation system management and operations (TSMO) exists in the region, built on a strong collaborative partnership between agencies.

While the Atlanta region has tremendous strengths in TSMO, there is an important need to look toward future opportunities. Transportation technology has undergone a significant transformation with the rapid proliferation of services, modes, and business models that would have scarcely been considered possible a decade ago. This transformation is changing the expectations and behavior of travelers, freight, businesses, and public agencies. It is also opening up vast amounts of public and private sector data that can be used to enhance traveler information, expand travel choices, and optimize transportation system performance. Today, there is a real need to imagine the collective future in light of the new opportunities and real uncertainties posed by this transformation.

This TSMO Strategic Plan lays out a **vision** for TSMO in the Atlanta region and identifies a **ten-year strategic course of action** that will help move the region toward this TSMO vision.

## Vision, Goals and Foundational Elements

Building on extensive stakeholder engagement, this play lays out a TMSO vision for the Atlanta region to support the region's overarching strategy to "Win the Future" through World Class Infrastructure, a Competitive Economy, and Healthy Livable Communities:

**Atlanta Regional TSMO Vision**

*Transportation systems across the Atlanta region are managed and operated to optimize safe, reliable, and efficient travel for all system users—people and freight—contributing to sustainable economic growth and a high quality of life.*

This TSMO vision focuses on achieving five overarching goals:

**Optimizing Safety** – *Applying technology and context-sensitive approaches to achieve zero fatalities.*

**Reliable Travel Times** – *Managing planned and unplanned disruptions to reduce unexpected delays.*

**Efficient, Seamless Travel** – *Coordinated systems across jurisdictions and modes, and accessible, real-time travel information.*

**Equitable Access** – *People of all ages, abilities, languages, backgrounds, and incomes have access to safe, reliable, efficient mobility options.*

**Environmental Benefit** – *Applying technology to reduce energy consumption, improved air quality, and reduced greenhouse gas emissions*.

These goals will be achieved and delivered through a strong foundation of the following organizational elements:

A regional **operations philosophy focused on moving people and goods**, rather than moving traffic or vehicles, resulting in priority to higher-occupancy modes.

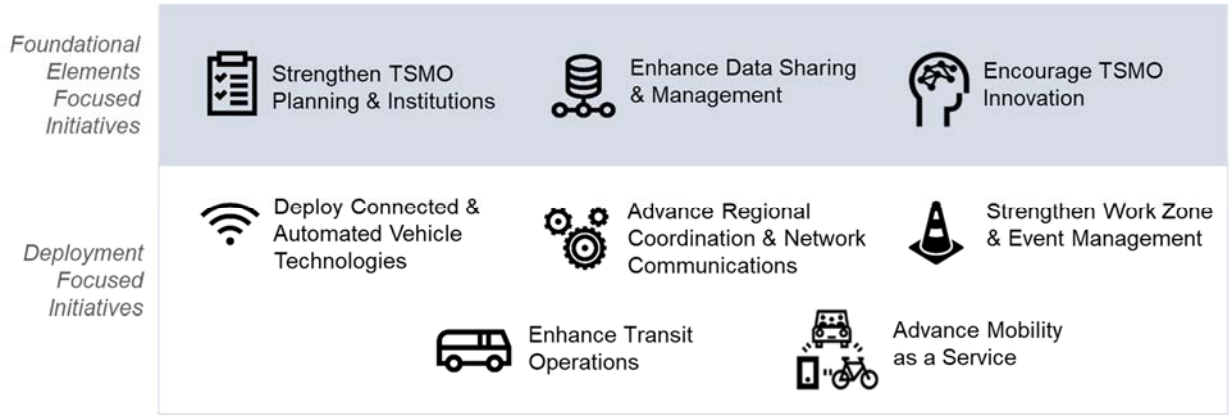
**Collaboration** across jurisdictional boundaries, public and private sectors, and service providers.

**Data sharing** across public and private data providers and users.

Advancing application and deployment of innovative technologies and approaches, and fostering **a culture of innovation** and adaptability to change.

## Strategic Framework and Regional Initiatives

Building on an assessment of the region's current strengths and opportunities in TSMO, this plan includes a framework of eight (8) **TSMO Strategic Initiatives** to be advanced over a ten-year period by transportation agencies and partners within the region:




These initiatives are broad regional areas of focus that are *multi-organization* in scope and will play a key role in advancing the region's TSMO implementation to achieve its goals. Three of the initiatives focus on foundational elements for the region to achieve the TSMO vision, and five are focused on deployment. It is important to note that these initiatives are not ordered in priority and that they are mutually supportive. There are also many linkages among the initiatives.

For each of the eight initiatives, this plan identifies **Priority Actions**, which include actionable steps or activities that are recommended for advancing the initiative. These actions are defined as *program-level actions or sets of actions conducted by many entities* across the region – often working collaboratively – rather than individual projects.

Highlights of each of the initiatives, and their supporting priority actions, are presented next.

### Initiative 1: Strengthen TSMO Planning and Institutions

This initiative focuses on establishing and strengthening TSMO institutional structures, including enhancing integration of TSMO into decision making within regional planning, programming, and project development.

*Priority Actions:*

1.1. Establish and sustain a diverse regional TSMO committee.
1.2. Demonstrate the value and need for TSMO by making TSMO initiatives and projects more visible to the public and decision makers.
1.3. Develop tools and guidance for local agencies and partners to advance TSMO strategies.
1.4. Integrate TSMO into local and regional planning and development processes.
1.5. Incorporate freight into TSMO planning activities.
1.6. Set regional targets and strengthen TSMO project prioritization.

### Initiative 2: Enhance Data Sharing and Management

This initiative focuses on enhancing data sharing and management to support enhanced data collection, curation, access and archiving capabilities for improved performance measure analysis and real-time systems management and operations.

*Priority Actions:*

2.1. Establish a long-term regional data governance framework.
2.2. Develop a centralized data broker and analytics hub for curated safety and operations data.
2.3. Improve/develop data curation and sharing strategies.
2.4. Develop data-driven methodologies to assess equity and environmental conditions and impacts of TSMO strategies.
2.5. Develop or leverage existing crowdsourced applications.

### Initiative 3: Encourage TSMO Innovation

This initiative focuses on establishing mechanisms to promote innovation and research that will spur the next generation of innovative TSMO ideas and lower the risks of testing new concepts. Innovations may include development of new tools, algorithms, methods, and technologies.

*Priority Actions:*

3.1. Share information and develop structures to advance innovative procurement strategies.
3.2. Support more efficient design, operations, and maintenance through a focus on analytics/data and automation of processes.
3.3. Fund innovative TSMO/technology pilot projects through ARC and/or other agency and private sector funding.
3.4. Develop an innovative TSMO solution focused on a particular problem or community issue of regional significance.

### Initiative 4: Deploy Connected and Automated Vehicle Technologies

This initiative focuses on the vast potential for leveraging connected and automated vehicle (CAV) technologies to implement innovative strategies.

*Priority Actions:*

4.1. Study and share the potential impacts of connected and automated vehicles.
4.2. Leverage connected vehicle technologies to improve safety and mobility for all travelers.
4.3. Leverage connected vehicle technologies to enhance safety through improved incident response.

**Initiative 5: Advance Regional Coordination and Network Communications**

This initiative focuses on integration among different systems, communication networks, modes, and organizations to advance regional system performance.

*Priority Actions:*

5.1. Advance Integrated Corridor Management (ICM) systems.
5.2. Develop better tools for communications among emergency responders and between event management tools and traveler information outlets.
5.3. Modernize the communications network architecture.

**Initiative 6: Strengthen Work Zone and Event Management**

This initiative focuses on implementing work zone strategies that help improve safety, support collaboration, and disseminate accurate, timely information to travelers.

*Priority Actions:*

6.1. Improve coordination of work zone and special event activities.
6.2. Implement smart work zone strategies.
6.3. Enhance communications and implement targeted demand management strategies (e.g., incentives) for special event management.

**Initiative 7: Enhance Transit Operations**

This initiative focuses on implementing TSMO strategies to support access to transit and enhance the convenience, customer experience, and performance of transit.

*Priority Actions:*

7.1. Advance implementation of high capacity premium transit service strategies including transit signal priority.
7.2. Develop regional, interoperable transit operations and fare payment systems.
7.3. Support local transit agencies in deploying technologies to support better planning, services and communications with customers.

**Initiative 8: Advance Mobility as a Service**

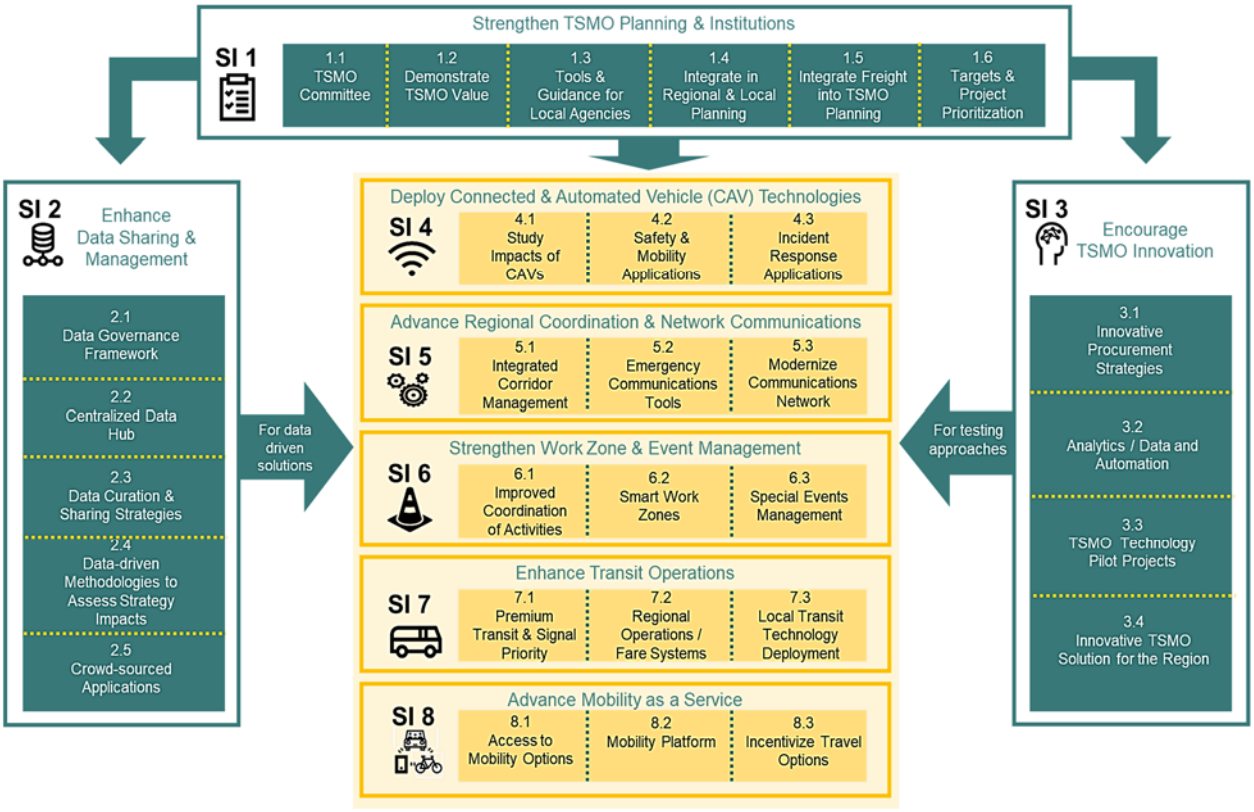
This initiative focuses on implementing Mobility as a Service (MaaS) strategies that support alternatives to driving alone, including bicycling and walking, use of transportation network companies, and mobility options for first mile/last mile connections to transit.

*Priority Actions:*

8.1. Promote and increase access to safe, affordable and environmentally friendly mobility options.
8.2. Develop a mobility platform that includes an integrated, multimodal trip planning and electronic payment and booking system.
8.3. Identify opportunities to further incentivize sustainable travel options.

## Connections Across Initiatives and Actions

The initiatives and actions are linked together, with Strategic Initiatives (SI) 1, 2, and 3 focusing on foundational elements that support each of the deployment-focused initiatives. While each of these initiatives provides a unique area of focus, there are many connections between the priority actions. For instance, the actions related to deployment of connected and automated vehicles (under SI 4) will support advancement of integrated corridor management, premium transit and signal priority, and other priority actions (under SI 5, 6, 7, and 8).




## Implementing this Strategic Plan

Implementing this plan will require concerted efforts and collaboration among many partners at different level of government, as well as with partners from the private sector, academia, and others. To be successful, the implementation of this plan will require champions to take the lead and undertake the important task of advancing specific actions. The Atlanta Regional Commission (ARC) is committed to playing a key role in this effort through the formation of a TSMO Committee that is intended to support the implementation of this plan. ARC in concert with partners will track progress toward the actions outlined in the plan. ARC will also continue to monitor and report on transportation system performance outcomes in order to assess progress toward the vision and goals of this plan for safer, more reliable, and efficient mobility for all system users, contributing to sustainable economic growth and a high quality of life.

# 1 Introduction

## 1.1 Background and Purpose of this Plan

As one of the fastest growing regions in the country, the Atlanta region has long recognized the importance of not only developing a world-class infrastructure but also undertaking active efforts to manage and operate those transportation systems. Since the early 1990s, the Atlanta region has been at the forefront of implementing Intelligent Transportation Systems (ITS) and Transportation Systems Management and Operations (TSMO) initiatives, with groundbreaking deployments for the Olympics, continued investment in traffic management, congestion-reduction demonstration projects, and regional traffic signal management. Today, a robust ITS infrastructure and TSMO capability exists in the region built on a strong collaborative partnership between different agencies in the Atlanta region.

As the region continues to grow and seek opportunities to advance TSMO strategies, there has been a dramatic shift in the transportation landscape. Transportation technology has undergone a significant transformation with the rapid proliferation of services, modes, and business models that would have scarcely been considered possible a decade ago. This transformation is changing the expectations and behavior of travelers, freight, businesses, and public agencies. It is also opening up vast amounts of public and private sector data that can be used to enhance traveler information, expand travel choices, and optimize transportation system performance. Today, there is a real need for the stakeholders in the Atlanta region to take stock of the successes to date and imagine the collective future in light of the new opportunities and real uncertainties posed by this transformation.

This TSMO Strategic Plan lays out a **vision** for transportation systems management and operations in the Atlanta region – built on significant stakeholder input from transportation agencies, local governments, transportation service providers, the private sector, and other partners – in order to create an agreed upon set of goals and foundations for the region. It identifies a **10-year strategic course of action** with priority initiatives and actions that will help move the region toward this TSMO vision. This forward-looking, multimodal, multi-agency roadmap for TSMO is designed to position the Atlanta region to maintain and enhance its role as a leader in accelerating the benefits of transformative technology while managing the risks associated with deployment. The result is an actionable framework that ties regional systems, processes, technology, and people together to support the region's overarching vision to Win the Future.

## 1.2 What is TSMO?

Transportation Systems Management and Operations is a set of integrated transportation strategies focused on optimizing the performance of the existing transportation network. Essentially, TSMO focuses on getting the most performance out of the transportation infrastructure that we already have. It involves a wide array of strategies applying technology, coordinating across jurisdictional boundaries, and actively managing transportation demand and supply.

*TSMO involves actively managing the multimodal transportation network to optimize performance and deliver improved safety and mobility outcomes.*

By deploying TSMO solutions, agencies and departments strive to achieve a range of benefits, including ensuring smoother and more reliable traffic flow, improving safety, reducing congestion, decreasing fuel consumption, enabling cleaner air, increasing economic vitality, and providing for a more efficient use of resources. TSMO requires knowledge, skills, and techniques to implement comprehensive solutions quickly and at relatively low cost. This approach enables transportation agencies to 'stretch' their funding,

benefiting more areas and travelers, as well as helping agencies provide flexible solutions to an ever-changing transportation landscape by leveraging technology and collaboration.

The importance of TSMO is recognized in Federal transportation law, which seeks to create a more performance-based Federal transportation program. The Moving Ahead for Progress in the 21st Century Act (MAP-21) included an enhanced definition of TSMO, noting that TSMO means "*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."* (23 U.S.C. 101(a)(30)). The subsequent Fixing America's Surface Transportation (FAST) Act—signed into law in December 2015—further supports TSMO and recognizes the importance of TSMO initiatives. The FAST Act promotes an efficient and performance-based program to address safety, mobility, and reliability challenges that transportation systems and agencies across the nation face.

The Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and other organizations encourage states, metropolitan planning organizations (MPOs), and local governments to focus on TSMO as a cost-effective set of strategies to address transportation challenges. As the MPO for the Atlanta region, ARC has developed a coordinated approach to TSMO for the Atlanta metropolitan area.

Implementing TSMO strategies lead to increased safety, reduced congestion, and improved system performance. Some examples TSMO strategies include (*FHWA, What is TSMO? https://ops.fhwa.dot.gov/tsmo/*):

- Work Zone Management
- Traffic Incident Management
- Special Event Management
- Road Weather Management
- Transit Management
- Freight Management
- Traffic Signal Coordination
- Traveler Information
- Ramp Management
- Congestion Pricing
- Active Transportation and Demand Management
- Integrated Corridor Management
- Access Management
- Improved Bicycle and Pedestrian Crossings
- Connected and Automated Vehicle

It is important to note the distinction between Intelligent Transportation Systems (ITS) and TSMO. While some TSMO solutions may leverage ITS technologies for more efficient, effective management and operations of transportation networks, TSMO goes beyond just the technology side of implementable solutions. A robust TSMO approach requires continued management and operations following implementation as well as improved communication, collaboration, and efficient use of resources among transportation partners. This is a multimodal approach, focused on optimizing efficiency and performance for all modes of transportation.

## 1.3 Why does the Atlanta Region Need TSMO?

### TSMO Addresses Key Transportation Issues of Importance to the Region

The Atlanta Metro area is the ninth largest and one of the fastest-growing metro areas in the nation (https://www.metroatlantachamber.com/resources/reports-and-information/executive-profile). People enjoy everything this diverse region has to offer and have continued to make the region a leading place to do business. The transportation network is a foundational element to this continued appreciation, growth, and opportunity. The residents of Metro Atlanta recognized the importance of transportation and identified it as their top concern in the 2019 Metro Atlanta Speaks Survey, which included 5,400+ respondents

throughout the 13-county region where the survey is conducted on an annual basis—see Figure 1. This is the sixth year in a row that transportation was identified as the greatest concern for participants.

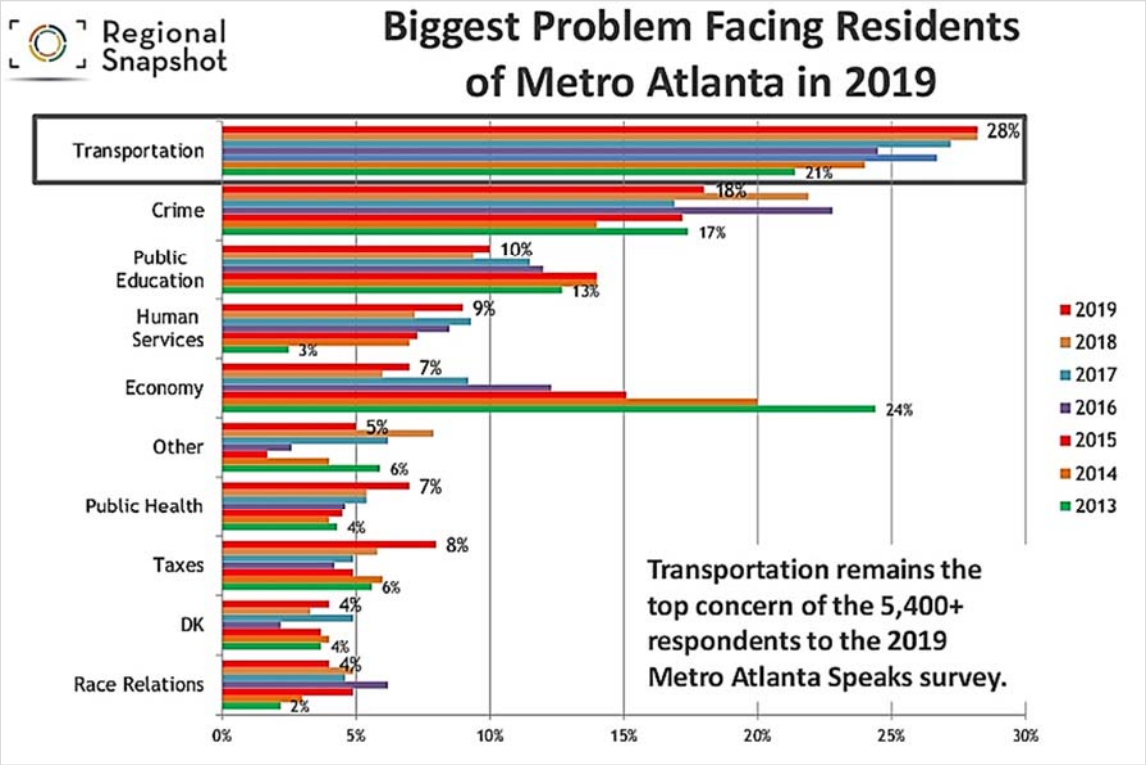



**Figure 1. 2019 Metro Atlanta Speaks Survey**
(https://atlantaregional.org/atlanta-region/regional-data-resources/metro-atlanta-speaks-survey-report/)

Safe and efficient transportation is an established goal and focus area for those working and living within the metro Atlanta area. In 2018, the State of Georgia suffered over 1500 fatalities due to crashes, with 484[1] of those taking place in the ARC region.[2] Opportunities to increase safety are critical to supporting an effective transportation network.

Likewise, congestion along freeways and arterial roads impact the majority of residents on a daily basis. Congestion creates significant costs to commuters, freight operators, service providers, and the public in the form of time, money, and quality of life. Atlanta has long suffered some of the nation's most congested roadways and if left to the current trend these conditions are only expected to get worse. According to the INRIX 2018 Global Traffic Scorecard[3] that analyzes and ranks over 200 urban areas (across 38 countries) based on congestion and other mobility trends, Atlanta ranks as the 71st worst globally and 11th in the United States. According to the scorecard, on average an Atlanta region resident loses 108 hours annually from being stuck in congestion (10% increase from 2017). This lost time equates to a congestion cost per driver of $1,505 (money wasted on time and fuel, higher costs for goods passed along to

[1] National Highway Traffic Safety Administration's Fatality and Injury Reporting System Tool (FIRST) https://cdan.dot.gov/query

[2] Henry County, City of Atlanta, Cobb County, Rockdale County, DeKalb County, Gwinnett County, Douglas County, Cherokee County, Fulton County, Fayette County, and Clayton County. https://www.gahighwaysafety.org/research/2018-georgia-traffic-fatality-data/county-data-rankings/

[3] https://inrix.com/scorecard/?

consumers, and other expenses). A 2015 travel survey for downtown Atlanta[4] found that over one quarter of individuals alter the time they leave daily to avoid congestion and the same number of respondents change their routes every day in an attempt to avoid congestion. Traffic congestion contributes to air pollution, with the region experiencing an average of 17 to 18 "code orange" or worse days every summer in the last ten years (2010-2019) and increased medical issues for residents such as an asthma rate of 11% for the city's children (almost twice the average rate seen in the U.S.).

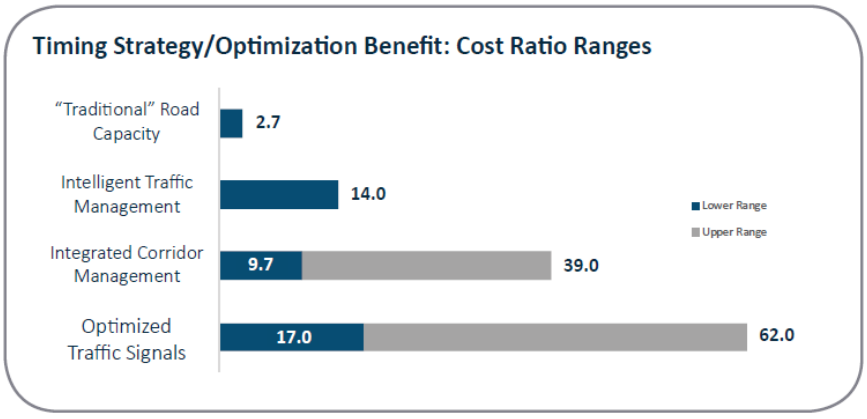
As one of the nation's largest hub cities, Atlanta also experiences significant heavy-duty freight vehicles operating within and passing through the city. The American Transportation Research Institute[5] provides an annual measure of freight performance across the United States. Three of the ten most congested roadways for freight vehicles occurred within Atlanta. Ranked number two on this top ten list was Atlanta's I-285 at I-85 (North) intersection often referred to as the "Spaghetti Junction". This area's average speed is approximately 34 miles per hour but can drop to 22 during times of peak use.

With limited funding for transportation, it is critical that regional partners work together to optimize the performance of the transportation network and get the most of the existing system. TSMO strategies can play an important role in managing travel demand on the network, enhancing safety, and improving reliability.

## TSMO is Cost-Effective

TSMO directly addresses some of the primary causes of traffic congestion and reliability issues, which are difficult to address with traditional transportation solutions. Roadway incidents, weather conditions, work zones, and special events are generally responsible for over half of the delay on the transportation network in urban areas, according to FHWA. Transportation capacity strategies do not directly address these sources of delay, and often require considerable costs. In contrast, TSMO strategies such as incident management, road weather management, and work zone management have been demonstrated to be very cost-effective in addressing these issues directly.

The benefits of TSMO tend to come at a lower cost as compared to traditional capacity expansion, and with higher returns on investment. Figure 2 provides an example of the anticipated benefit to cost ratios of signal timing strategies versus traditional road expansion.




SOURCE: Intelligent transportation systems. Capitol Research. Council of State Governments, April 2010: Transport for London, 2007; Intelligent transportation system benefits, costs, deployment, and lessons learned desk reference: 2011 update, US Department of Transportation, September 2011; Urban mobility plan, Seattle Department of Transportation, January 2008; McKinsey Global Institute analysis

**Figure 2. Example TSMO Benefit: Cost Ratio Ranges**

[4] https://www.atlantadowntown.com/_files/docs/downtown-atlanta-travel-survey-vf1.pdf
[5] https://truckingresearch.org/2019/02/06/atri-2019-truck-bottlenecks/

### TSMO Enhances the Traveler's Experience and Quality of Life

Finally, in addition to being cost-effective in addressing safety, delay, and reliability issues, TSMO strategies can enhance the customer experience. Today, people expect real-time information to help them make travel choices, and expect that transportation agencies should be using the best available information to manage systems. TSMO can help to ensure more seamless movement between travel options, across jurisdictional boundaries, and simply make life easier for people by improving their experience in transit, on roadways, in bicycling and walking, and in making connections to help them access life's opportunities.

## 1.4 Process of Developing the Plan

This TSMO Strategic Plan is the result of a collection of efforts that took place over the course of 18 months, starting on October 2018. These efforts occurred in three key phases, with extensive stakeholder engagement throughout:

- **Developing a Common Vision** – Regional stakeholders worked together to articulate a TSMO vision for the region and goals that would serve as the basis for the Strategic Plan
- **Defining the Building Blocks** – The consultant team worked with stakeholders to develop a baseline inventory of ITS infrastructure, explore best practices in transportation data governance and data exchange, develop an update to the region's ITS architecture, and conduct a technological assessment of the region's existing strengths and potential opportunities for advancing toward the region's goals.


**Figure 3. Process Used for Developing the TSMO Strategic Plan**

- **Leading to Effective Deployment** – The consultant team worked closely with ARC and regional stakeholders to 1) identify pilot concepts that could be advanced in the near-term; 2) identify an evaluation process to help support identification and prioritization of future pilots; 3) develop a Local Agency Deployment Guide to help localities increase their understanding of TSMO strategies and their value; and finally,5) develop this Strategic Plan.

These efforts yielded a series of technical documents that explore the region's assets, practices, and capabilities, available on the ARC website at https://atlantaregional.org/TSMO/:

- A baseline inventory of regional assets.
- A summary of best practices and recommendations for a regional data governance framework.
- An update of the Regional ITS Architecture.
- A set of recommendations for future pilots technologies.
- A guide for local agencies that seek to deploy ITS/TSMO solutions.
- An assessment of the region's strengths and opportunities related to TSMO.

These documents and this resulting Strategic Plan were supported by a wide array of stakeholder engagement activities, including working group meetings, surveys, interviews, and four (4) stakeholder workshops, as detailed below:

- **Survey of Stakeholders on Regional Strengths and Weaknesses** (November 2018 – January 2019) – The web-based survey was broadly distributed to hundreds of stakeholders, and received 140 responses, gathering input on existing activities and needs, regional strengths and weaknesses related to TSMO, and to support identification of key goals and objectives.

**TSMO Strategic Plan Workshop participants provided input on regional strengths and opportunities**

- **Workshop #1: Establishing the Regional TSMO/ITS Vision** (December 17, 2018) – This half-day workshop was used to gather input for development of the regional TSMO vision and goals.
- **Workshop #2: ITS Architecture** (March 19, 2019) – This full-day workshop supported development of the regional ITS architecture update by providing a forum to discuss current systems, services, and projects in the region, as well as future plans for ITS projects and services. The workshop also includes a discussion on data governance, and data needs.
- **Workshop #3: Transportation Technology** (July 15, 2019) – This workshop focused on identifying pilot concepts and brainstorming potential initiatives that could have the most impact on the region's transportation system and achievement of regional goals.
- **Workshop #4: TSMO Strategic Plan** (December 5, 2019) – This workshop built on an assessment of the region's TSMO strengths and opportunities, was used to gather input on specific ideas for strategic initiatives and activities that should be a priority of the next ten years.

**Workshop participants broke into groups to discuss collaboration and data sharing priorities**

- **Survey of Stakeholders on TSMO Strategic Plan Priorities** (January – February 2020) – This web-based survey was distributed to hundreds of stakeholders in order to gather input to assess level of priority for different types of activities, and to identify additional ideas and comments about specific activities.

Throughout the entire study process, the work products were shaped by input from a TSMO Steering Committee composed of members from the following organizations:

- Atlanta Regional Commission (ARC)
- Atlanta-Region Transit Link Authority (ATL)
- Georgia Department of Transportation (GDOT) – both Office of Planning and Office of Traffic Operations
- Georgia Regional Transportation Authority (GRTA)
  State Road and Tollway Authority (SRTA)

# 2 TSMO Vision and Goals for the Atlanta Region

## 2.1 TSMO Vision

As part of a strategic planning process, ARC convened stakeholders from across the region to develop a vision for the future of TSMO in the Metro Atlanta region. The resulting vision emphasizes outcomes that support the region's overarching strategy to "Win the Future" through World Class Infrastructure, a Competitive Economy, and Healthy Livable Communities.

The Atlanta region's TSMO vision is as follows:

**Transportation systems across the Atlanta region are managed and operated to optimize safe, reliable, and efficient travel for all system users—people and freight—contributing to sustainable economic growth and a high quality of life.**

## 2.2 TSMO Goals and Outcomes

This TSMO vision focuses on achieving five overarching goals or outcomes:

**Optimizing Safety** – *Applying technology and context-sensitive approaches to achieve zero fatalities.* This goal emphasizes that the way transportation systems are managed and operated should enhance safety of all travelers, including those in vehicles, transit, bicyclists, and pedestrians.

**Reliable Travel Times** – *Managing planned and unplanned disruptions to reduce unexpected delays.* This goal involves improving the predictability of travel times by reducing the disruptions associated with nonrecurring sources of delay, such as traffic incidents, weather conditions, work zones, and special events, as well as congestion that disrupts transit schedules and adversely affects on-time performance.

**Efficient, Seamless Travel** – *Coordinated systems across jurisdictions and modes, and accessible, real-time travel information.* This goal focuses on the day-to-day travel experience, including the efficiency and connectivity of travel. Strategies to support this goal include coordinated systems across jurisdictions and modes, as well as accessible, multimodal real-time information.

**Equitable Access** – *People of all ages, abilities, languages, backgrounds, and incomes have access to safe, reliable, efficient mobility options.* This goal focuses on ensuring that all people benefit from systems management strategies and that these strategies support access, both motorized and nonmotorized.

**Environmental Benefit** – *Applying technology to reduce energy consumption, improve air quality, and reduce greenhouse gas emissions*. This goal focuses on ensuring that TSMO strategies support environmental benefits, such as reducing vehicle travel delay and increasing use of transit, ridesharing, and non-motorized modes.

## 2.3 Foundational Elements

These outcomes will be achieved and delivered through a strong foundation of the following organizational elements:

- A regional **operations philosophy focused on moving people and goods**, rather than moving traffic or vehicles, resulting in priority to higher-occupancy modes.
- **Collaboration** across jurisdictional boundaries, public and private sectors, and service providers.
- **Data sharing** across public and private data providers and users.
- Advancing application and deployment of innovative technologies and approaches, and fostering **a culture of innovation** and adaptability to change.

These elements were viewed as critical to support the region's TSMO vision and should permeate how local agencies across the region think about transportation technology and TSMO strategy deployments. For instance, in working on strategies to manage traffic congestion, safety, and reliability, local agencies should look for opportunities to collaborate with other local governments and public and private transportation service providers. Collaboration may yield corridor-based or regional solutions, helping to ensure that overall system performance is improved, rather than only spot improvements. In addition, agencies should continually consider not only traffic movement but also how system operations can support the mobility of people and goods, resulting in solutions that may identify opportunities to prioritize the speed and reliability of transit, incentivize alternatives to driving alone, or enhance the safety of bicycling and walking.

# 3 Assessment of Regional Strengths and Opportunities

To support the development of this Strategic Plan, a technological assessment was conducted to examine the region's current technology deployment, application of TSMO strategies and services, and institutional structures, practices, and processes associated with TSMO. This assessment focused on conducting two comparisons:

(1) Assess the gap between the current state and the overarching TSMO vision.
(2) Compare the region's current state of the practice against national best practices.

This section of the plan summarizes the results of these comparisons, highlighting regional strengths and opportunities. This assessment served as a baseline for identifying regional initiatives and strategic actions to move toward the region's TSMO vision.

## 3.1 Regional Conditions in Relation to TSMO Goals

The assessment concludes that the Atlanta region is a national leader in many areas of TSMO. In particular, the region brings key strengths in coordinating traffic management, for instance through the Regional Traffic Operations Program (RTOP); emergency response services, such as Georgia DOT's successful Highway Emergency Response Operators (HERO) program to clear roadway traffic incidents quickly; regional transportation demand management program through Georgia Commute Options; and deployment of connected vehicle (CV) technology. At the same time, a number of opportunities, building on new and emerging technologies were identified, including more application of TSMO for transit and multimodal strategies, such as supporting improved bicycle and pedestrian safety and connectivity between services; work zone management; and freeway and arterial management integration.

Below is a summary of strengths and opportunities concerning each of the five (5) goals associated with ARC's TSMO vision.

### Optimizing Safety

The goal of *optimizing safety* focuses on applying TSMO strategies (including deployment of technologies) to reduce fatalities and injuries. The following are the region's strengths and opportunities related to this goal.

**STRENGTHS:**

The Atlanta region has actively implemented a number of TSMO strategies and deployed systems and services to support safety. Specifically, the region has:

- **Strong programs focused on incident management** to reduce emergency response times, including the HERO program, a freeway service patrol dedicated to clearing traffic-related incidents throughout the metro area, and the Coordinated Highway Assistance and Maintenance Program (CHAMP), which covers more outlying parts of the region. These efforts focus on quickly clearing incidents and have the benefit of reducing secondary crashes.
- **On-going modernization efforts to expand transit safety features**, such as MARTA Bus Security System Upgrades and camera upgrades by the Cherokee Area Transportation System (CATS).

- The recent USDOT award to GDOT to fund deployment of CV technologies in over 1,700 traffic signals and metered ramps (FHWA, 2019) will support implementation of critical safety systems.

**OPPORTUNITIES:**

There are opportunities to enhance safety through the use of TSMO strategies, particularly with a focus on pedestrians, bicyclists, and shared mode micromobility options (e.g., scooters). For instance:

- There are limited **technology deployments focused specifically on pedestrian and bicyclist safety**. ITS Architecture services packages that are not currently in the region include the *PT13-Vehicle Turning Right in Front of a Transit Vehicle* application and *PT11-Transit Pedestrian Indication* services. Bicycle/pedestrian detection is currently limited, although GDOT has plans for deployment of CV applications that support drivers with information about pedestrians in signalized crosswalks.

- Moreover, there are opportunities for **use of connected vehicle technologies to enhance incident response and safety** particularly along arterials. *PS05-Vehicle Emergency Response* and *PS07-Incident Scene Safety Monitoring* are not in the region's ITS Architecture, and these services could further improve incident management and emergency response times and safety. Emergency vehicle preemption offers potential for wide-scale application, as currently only Cobb County has an application of *PS03-Emergency Vehicle Preemption* within the region's ITS Architecture.

- **Safety warning systems** provide opportunities for further development. Queue warning, restricted lane warnings, curve speed warnings, and lane closure warnings are planned as future applications by GDOT, but are not currently in operation. Work zone safety technology and safety warning systems specific to trucks and freight are also opportunities for further development. *VS07-Road Weather Motorist Alert and Warning* services are not currently included in the regional ITS Architecture, and there may be opportunities to improve safety utilizing weather data. In addition, limited warning systems for *PS10-Wide Area Alert* or *PS14-Disaster Traveler Information* for MARTA are not in the regional ITS Architecture.

- **Speed harmonization**, which involves dynamically gradually lowering speeds before a heavily congested area in order to reduce stop-and-go traffic, also is identified as a future application for deployment by GDOT. Since stop-and-go traffic contributes to rear-end collisions, speed harmonization is a strategy to reduce crashes, while improving traffic flow.

## Reliable Travel Times

Enhancing *reliability* involves improving the predictability of travel times, particularly by reducing the disruptions associated with recurring and nonrecurring sources of delay. The following are the region's strengths and opportunities related to this goal.

**STRENGTHS:**

The Atlanta region has a number of major initiatives and deployments focusing on travel time reliability, including the active management of changes in travel conditions, incident management programs, and coordinated special events management. For instance:

- **Real time monitoring of traffic on state roads** occurs using the web-based GDOT NaviGAtor Advanced Transportation Management System (ATMS) application, which uses video detection, radar detectors, and closed-circuit television cameras to monitor traffic flow, and is accessible by most regional stakeholders.

- **The RTOP** is focused on reliable travel times; actively managing real-time traffic and developing a network of professionals collaborating throughout the region. In addition, the program structure and resources make it possible for the region to act swiftly during critical situations as was seen during the I-85 bridge collapse.

- **Strong programs focused on incident management** include the HERO program help to clear incidents quickly and reduce associated traffic delay. Georgia's Towing and Recovery Incentive Program (TRIP) pays performance incentives to skilled TRIP-certified towing and recovery companies for clearing commercial vehicle incidents within established time-frames, and has significantly reduced the time to clear major incidents.

- **Traffic signal detection on all major arterials** enables dynamic phasing and timing for individual signals.

    - GDOT manages and operates **the Automated Traffic Signal Performance Measures (ATSPM) website**,[6] which provides access to data throughout the state. Data is provided from vehicular and pedestrian detection and signal timing information. This real time information can be used to identify areas of concern, consider potential solutions, and to help optimize signal timings in some cases.

    - GDOT also manages and operates **the Measurement, Accuracy, and Reliability Kit (MARK 1) website,**[7] which provides tailored ATSPM reporting for the RTOP corridors throughout the region. Mark 1 pulls data from ATSPM, along with other sources (probe data sources such as RITIS and directly from field equipment). This site is used to support the management of the RTOP corridors, enhancing reliability through identifying trends and areas for further optimization.

- The region has an **expanding network of priced managed lanes**, which provide options for travelers to have faster and more predictable travel times when paying tolls to use these facilities. Current lanes in operation include the I-75 South Metro Express Lanes, I-85 and I-85 Extension, and Northwest Corridor Express Lanes, with new lanes in development along I-285 (Eastside, Top End, and Westside) and SR 400, and additional ones planed for future development. All Georgia Express Lanes use variable-priced tolling to maintain near free-flowing travel, even during peak travel times. The region also has a network of about 90 lane-miles of **high-occupancy vehicle (HOV) vehicle lanes** on I-75, I-85, and I-20, which help to provide faster, more consistent travel times for HOV vehicles.

- A number of different agencies throughout the region actively plan for and manage special events. **Special events management** has been effective during large events such as the Super Bowl.

**OPPORTUNITIES:**

While the region has a number of very strong programs, there are opportunities for further deployment, particularly in regard to improving reliability and travel times for transit buses. Specifically:

- Only two of the transit agencies in the region currently provide **Transit Signal Priority (TSP)**, and those are limited to the City of Marietta. Yet, with most intersections supported by centralized

---

[6] https://traffic.dot.ga.gov/ATSPM/

[7] https://atops.shinyapps.io/GDOT_MARK1/#section-one-month-summary

signal controllers, advanced TSP strategies could be initiated across the region for multiple transit agencies. There are a number of different agencies throughout the region who are interested in implementing TSP and are seeking opportunities to do so.

- There may be potential opportunities to enhance **work zone management** and **road weather management services,** including use of connected vehicle technologies to identify weather condition changes and impacts to road conditions.
- In addition, there are opportunities to employ TSMO strategies to enhance work zone management, particularly through the use of technology, rerouting, data retrieval and sharing, coordination and collaboration.

## Efficient, Seamless Travel

*Efficient, seamless travel* focuses on the day-to-day travel experience, including the efficiency and connectivity of travel. The following are the region's strengths and opportunities related to this goal.

**STRENGTHS:**

- The region has mature collaboration through the RTOP program to **optimize coordination of traffic signals** across jurisdictional boundaries to improve overall travel conditions.
- The region's ITS Architecture includes a wide array of **traffic management/network system services**, including *TM01-Infrastructure-based Traffic Surveillance, TM03-Traffic Signal Control*, *TM04-Connected Vehicle Traffic Signal Systems*, *TM05-Traffic Metering*, *TM06-Traffic Information Dissemination*, and *TM07-Regional Traffic Management,* as well as planned services such as *TM02-Vehicle-based Traffic Surveillance.* For instance, the region has one of the most extensive networks of **ramp meters** of any metro area in the country, with ramp meters at locations along many freeways (I-75, I-20, I-285, I-575, I-85, GA-400, and US-78); these meters provide a more consistent flow for merging vehicles, resulting in improved traffic flow, while also reducing merging accidents, fuel consumption, and vehicle emissions.
- The region has a robust **regional TDM program**, Georgia Commute Options, which provides services to help employers and commuters make travel choices that emphasize shared mode options, such as transit and ridesharing, as well as other options that reduce single-occupant vehicle use. The program also provides incentives to encourage travelers to try alternatives to driving alone.
- There has recently been a proliferation of **shared use bike and micromobility vehicles** to augment traditional mobility options such as driving, transit, and taxi. These options provide new, low-cost options that can help to improve connections to public transit and support more efficient trips.

**OPPORTUNITIES:**

- The Atlanta Region lacks an **integrated multimodal electronic payment and reservations system** for seamless payment (e.g., toll, transit, parking, electric charging stations, shared use micromobility vehicles).
- The region also lacks **multimodal trip planning tools** or a consolidated platform to share mobility option data including schedules and real time information related to shared use vehicles (bikes, e-scooters, and cars), microtransit, and TNCs/rideshare services. Currently, there are challenges with sharing multimodal schedule and real time information due to General Transit Feed Specification (GTFS) inconsistency and differing formats and quality.

- To date, the region has had limited application of **active demand management strategies** and **integration of transit and other modes in corridor management**. For instance, the region has not significantly integrated active information about transit, park-and-ride availability, and on-demand transit into corridor management throughout the region.

- While the growing proliferation of private sector mobility options (e.g., Uber/Lyft, scooters, bikes) is a strength, there are gaps or needs in terms of **infrastructure to address the use and interaction of new mobility options** to appropriately incentivize and recoup costs associated with these options, and to most effectively manage street space and reduce lanes blocked by private services or deliveries. There is a need to implement and enforce policies that are focused on curb management. There also are opportunities to advance use of these options as integrated components of the system to **improve first-mile last-mile connections to transit**.

- Use of technology for **active parking management** has only limited applications to date. While stakeholders are planning future smart parking services such as a parking management system for Hartsfield-Jackson Airport that shares real-time information with the GDOT traffic management center and a parking management system for CobbLinc park and ride lots, there may be opportunities for future deployments including provisioning a real time parking availability data feed that encompasses a broader network of parking facilities.

- While the Atlanta region is a major hub for freight movement and has done considerable work to advance freight planning and investments, there appear to be relatively few TSMO initiatives focused on **freight movement and operations**. There may be opportunities to advance, for instance, a tool that incorporates restrictions for routes, bridge clearance, weight, as well as real-time information on truck parking availability and travel conditions. Gwinnett County is considering a deployment of freight signal priority (FSP). In addition, there is an opportunity to implement CV based strategies for seamless movement of goods.

## Equitable Access

*Equitable access* means that people of all ages, abilities, languages, backgrounds and incomes having access to safe, reliable and efficient mobility options. The following are the region's strengths and opportunities related to this goal.

**STRENGTHS:**

While there are relatively few TSMO initiatives that focus specifically on advancing equity, there are programs designed to support access to travel options for people who often face barriers to mobility:

- ARC has a **strong focus on equity in all of its planning activities**, which provides opportunities for input by all aspects of the public, and its Transportation Equity Advisory Group (TEAG) provides a voice for the needs of vulnerable populations, which can also provide input in regard to TSMO investments, programs, and strategies.

- **PeachPass payments** may be made via money order or through cash at customer service centers (CSC), which is important for low-income people who do not have credit cards (although CSCs are limited in number).

- **Policies such as free HOV-3 and provision of express bus services** on some Express Lanes also allows low-income people to benefit from the faster speeds in the lanes without paying a toll.

- ARC has leveraged Federal Transit Administration (FTA) funding to support **voucher programs** that subsidize curb-to-curb trips, where fixed route transit is not available or where direct trips are needed, to make them more affordable.

**OPPORTUNITIES:**

Some barriers faced by vulnerable populations, and opportunities to use TSMO strategies to address these barriers, are noted below:

- While the region has paratransit services to support access for people with mobility limitations, ARC's human-service mobility plan, *Managing Mobility in the Atlanta Region,* notes that existing **paratransit services** do not provide full geographic coverage of the region. In addition, different agencies operate their own paratransit services, with unique access cards (i.e., no single/compatible card across agencies), and some trips extend beyond the geographic boundaries of an agency. Moreover, monthly transit passes and first mile-last mile options, such as transportation network companies (e.g., Uber/Lyft) and taxis, are often too expensive for low-income households. While the formation of the Atlanta-Region Transit Link Authority (the ATL) provides an opportunity to enhance coordination, there are currently **gaps in service and affordability** that could potentially be addressed through further partnerships across transit agencies and private sector service providers.

- All MARTA stations, trains and all buses in the region are Americans with Disabilities Act (ADA) accessible, and MARTA is required to provide accommodations when accessibility features are not working properly. However, individuals can still face challenges with access due to **lack of connections between bus stops and accessible sidewalks, malfunctioning elevators, or inconsistent stop announcements**. While these issues relate primarily to transit state of good repair and infrastructure rather than TSMO, some aspects of communications could be improved. For instance, there may be opportunities for improved collection, storing, and distribution of information on pedestrian and intersection navigable paths (including curb cuts) for use in mobile technologies, particularly those that support people with disabilities.

- There may be opportunities for enhanced **access to transit via technology**. ITS architecture service packages that are planned but do not yet exist in the region include *PT15-Transit Stop Request* and *PT16-Route ID for the Visually Impaired*. There also are opportunities for use of technology to increase **detection of vulnerable road users** (VRU) at intersections and bike lanes including detection of VRUs including older adults, parents with children, people with disabilities (mobility, visual, cognitive), and bikes and e-scooters in bike lanes.

## Environmental Benefits

*Environmental benefits* are part of the region's vision for TSMO implementation. TSMO strategies that reduce vehicle travel delay and strategies that increase use of transit, ridesharing, and non-motorized modes generally reduce motor vehicle emissions that contribute to air quality issues and climate change. The following are the region's strengths and opportunities related to this goal.

**STRENGTHS:**

The Atlanta Region currently deploys a wide array of TSMO strategies that are supportive of environmental benefits:

- The region's successful **TSMO initiatives, including RTOP, the HERO incident management program, and NaviGAtor** have demonstrated environmental benefits including reducing energy consumption and emissions by minimizing unnecessary delay.

- The region's strong **travel demand management programs** including Georgia Commute Options, the efforts of TMAs, and incentives programs support shifts from driving alone to transit, ridesharing, telework, and biking and walking, which yield environmental benefits.

- Atlanta has a strong **EV charging stations infrastructure** and culture. At the local level, the City of Atlanta has several policies that support EV adoption. For instance, the City requires 20 percent of spaces in new public and multi-family parking facilities and all new single-family homes must be EV ready (City of Atlanta, 2017). Georgia Power owns a network of charging stations and offers a variety of rebates to help customers offset the cost of EV ownership. While these EV efforts are not typically considered part of TSMO, they provide opportunities for enhanced mobility for EV users and help to support cleaner vehicle travel for those who drive. The region allows high occupancy and electric vehicles (HOV/E) to **use HOV lanes and travel for free on selected Express Lanes**, which provides incentives for both ridesharing and purchases of clean vehicles.

**OPPORTUNITIES:**

While the region has many strengths, there are also opportunities to enhance the focus on environmental outcomes within TSMO:

- The Atlanta region overall generally has a "**car culture**" compared to some other large metro regions, which creates challenges in encouraging alternatives to driving alone. As noted earlier, since many of the region's TSMO efforts have focused on optimizing travel on the road network, there are opportunities to expand the focus of TSMO further into **optimizing people movement via shared modes, including transit and ridesharing, and even avoiding trips altogether through telecommuting**. For instance, not all of the Express Lanes provide for HOV-3 free use, and there are opportunities to increase the focus on bicycle and pedestrian movement at intersections and along travel networks. Moreover, the COVID-19 pandemic has validated the feasibility of more people working from home, and there may be opportunities to increase the share of employees telecommuting over the longer term.

- There are also opportunities to integrate smart eco-friendly infrastructure into the region's transportation system. For instance, **managed roadside lighting** is operated by sensors that detect when travelers are present and activate the lights accordingly. Management of the lights as well as detecting the light "health" helps reduce energy consumption. Managing roadside lighting is not yet in place but is planned for deployment in several jurisdictions including Atlanta and Sandy Springs and by the State Road and Tollway Authority (SRTA).

- In addition, there is an opportunity to produce guidance which would support further electric vehicle infrastructure.

## 3.2 Regional Conditions in Relation to Foundational Elements

In addition to exploring the region's current state in relation to technology deployment and implementation of TSMO strategies, the region's strengths and opportunities were also explored in relation to the four foundational elements identified as being critical to the region's vision: 1) a regional operations philosophy focused on moving people and goods; 2) collaboration; 3) data sharing; and 4) fostering a culture of innovation. This assessment built on the region's TSMO Capability Maturity Model assessment conducted in 2016, the Data Governance research and supplemental efforts associated with this study, input from a survey of regional stakeholders conducted late 2018-early 2019, and input from stakeholder workshops.

**STRENGTHS:**

The Atlanta region has significant strengths to build upon across each of these foundational elements.

- There is strong **collaboration within the region via RTOP**, which manages traffic signals across 12 counties using advanced detection technologies, control strategies, and communications. RTOP involves collaboration between GDOT, local agencies, ITS vendors, and consultants.

- While relatively new, the region has a **strong venue for coordination across transit services via the Atlanta-Region Transit Link Authority (the ATL)**, which was developed to improve coordination in transit planning and connections between transit and private sector mobility options. The ATL collaborates with local transit agencies and should be a venue to support more seamless transit connections.

- The 2040 **Regional Transportation Plan** (updated May 2019) places an important focus on TSMO ("Getting the Most We Can From the Existing System", "Creative Reliable Travel Options with Express Lanes"), including travel demand management ("Innovative Solutions for Commuters"), and on solutions such as trip planning, wayfinding, and real-time information for transit travel. The region has several **strategic plans and programs for TSMO** or that support TSMO activities, such as the Strategic Regional Thoroughfares Program, which addresses high volume corridors that serve multiple ways of traveling, as well as RTOP, and TDM / Georgia Commute Options. These efforts provide a foundation, and "culture" that recognizes the value of TSMO.

- The Atlanta region has **focused on advanced technology** through development of its Regional Transportation Technology Policy Document, and through venues in which participants across the region have come together to explore emerging technology and innovations. ARC has convened ConnectATL summits, which bring together local government officials and industry experts to examine the impacts and potential of emerging transportation technologies. Organizations such as ITS Georgia also brings together leading experts, including staff from public agencies, consultants, and industry to explore emerging technologies.

- The region has a strong **foundation for data sharing** with GDOT's Connected Data Platform to share and analyze information.

**OPPORTUNITIES:**

- While the region has strong collaborative relationships, there is **no dedicated on-going ARC working group or committee focused on TSMO**, unlike some other metropolitan planning organizations. As documented in the ARC TSMO Capability Maturity Self-Assessment Workshop conducted in 2016, there are a wide number of agencies involved in system management and some silos between road and transit operations.

- The TSMO Capability Maturity Self-Assessment also noted an **inconsistent understanding of TSMO across the region** and among many partners (Note: the Local Agency TSMO Deployment Guide currently under development will help to address this gap).

- There are a large number of software platforms deployed through the region. However, **there is not an up-to-date inventory of available, currently in use platforms**. Getting a list of all the software platforms each stakeholder possess would provide a necessary step in selecting ICM corridors. This would allow the region to identify viable locations, as well as the gaps in software across and connections between stakeholders.

- During the course of this study, **gaps in data sharing** were identified. As part of Workshop #2,[8] participants identified data challenges, including inconsistent structures, formats, and semantics; inconsistent access; data responsibility; data restrictions; too much data; data quality; privacy; and ambiguous data needs, among others.
    - **Data Governance:** A process is underway to develop a data governance process to address data and data sharing challenges. Recommendations for initiating data governance are included in the Data Governance Best Practices report. Additional short term goals include developing a document data set which includes organization, content, lineage, contact, and other pertinent information, and meeting with peers to develop consensus based approaches for data content, formats, data elements (for data dictionary), and data distribution standards (e.g., Application Programming Interfaces). For example, in collecting the ITS inventory, we discovered that different stakeholders model and store their asset data in ways that are not consistent or compatible. Several agencies combined their cabinet and signal control assets as a single entity, while others separated the two. Additionally, the purpose of the asset was not well documented, so a sensor like a camera may be used for travel time or license plate detection.
    - **Data Platform and Distribution:** There is no centralized data hub to distribute modal information. In addition, with the forthcoming sizable CV deployments, there is not a data management structure in place. Several organizations like GDOT and the ATL are in the process of developing data analytic tools or data repositories that store and provide access to regional stakeholders.

[8] See "Data Governance Best Practices and Recommendations Report", Appendix B [24 May 2019] for detailed descriptions.

# 4 TSMO Strategic Plan Framework and Regional Initiatives

## 4.1 TSMO Strategic Plan Framework

This Strategic Plan builds on the assessment of current conditions, and takes a ten-year outlook (2020 to 2030) to develop recommendations for how the Atlanta region should move toward achieving the region's TSMO vision that "transportation systems across the Atlanta region are managed and operated to optimize safe, reliable, and efficient travel for all system users—people and freight—contributing to sustainable economic growth and a high quality of life."

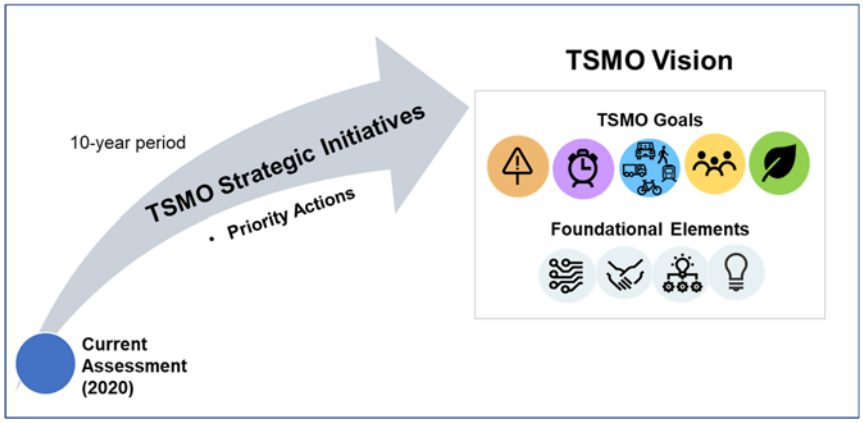



**Figure 4. TSMO Strategic Plan Framework with Strategic Initiatives and Priority Actions**

The plan is intended to provide actionable recommendations that can be implemented over a ten-year period by transportation agencies and partners within the region. The framework includes two components:

1. **TSMO Strategic Initiatives** – These are broad regional areas of focus that are *multi-organization* in scope and will play a key role in advancing the region's TSMO implementation to achieve its goals. The strategic initiatives are designed to *foster coordination and collaboration* among regional stakeholders, including public organizations responsible for transportation planning and operations, as well as the private sector, and advance other foundational elements, such as advancing data sharing, innovation, and a focus on moving people and goods rather than vehicles. This plan identifies eight (8) strategic initiatives that build on the region's current strengths and take advantage of new and emerging opportunities.
2. **Priority Actions** – For each of the eight strategic initiatives, this plan identifies actionable steps or activities that are recommended for advancing the initiative. These actions are defined as *program-level actions or sets of actions conducted by many entities* across the region – often working collaboratively – rather than individual project-level actions or ideas. The plan is designed to *generate momentum* by identifying actions that can be piloted and implemented within the near term and build on successes, providing building blocks to deploy more complex programs during mid-term and longer-term periods. The actions are designed to support transportation organizations at various levels of experience and needs for TSMO by *helping regional partners to leverage policies, procedures, tools, technologies, and lessons learned* from early adapters.

Building on identified strengths and opportunities, the ten-year outlook for this plan recognizes that while these initiatives as a whole are important to achieve the region's overarching TSMO vision, the specifics of actions will likely evolve as the mobility ecosystem and technologies advance and are adopted. As a result, the Strategic Plan itself provides a framework for regional collaboration around agreed upon priorities but is not meant to be prescriptive or limit experimentation. Rather, the plan is designed to inspire innovation and create cooperative problem solving that will evolve over the life of the plan.

## 4.2 TSMO Strategic Initiatives

This Strategic Plan focuses on eight (8) regional initiatives that will help to address key opportunities for moving toward the region's TSMO vision, as shown in Figure 5. Of these eight, three (3) focus primarily on supporting the foundational elements around regional coordination, data sharing, and fostering innovation that are critical to the region's successful application of TSMO strategies. The other five (5) focus primarily on deployment of technologies and strategies that will support the region's TSMO goals.


**Figure 5. TSMO Strategic Initiatives**

It is important to note that these initiatives are not ordered in priority and that they are mutually supportive. There are also many linkages among the initiatives.

Below are brief descriptions of each of the initiatives.

**Initiative 1: Strengthen TSMO Planning and Institutions**

This initiative focuses on establishing and strengthening TSMO institutional structures, including enhancing integration of TSMO into decision making within regional planning, programming, and project development.

**Initiative 2: Enhance Data Sharing and Management**

This initiative focuses on enhancing data sharing and management to support enhanced data collection, curation, access and archiving capabilities for improved performance measure analysis and real-time systems management and operations.

**Initiative 3: Encourage TSMO Innovation**

This initiative focuses on establishing mechanisms to promote innovation and research that will spur the next generation of innovative TSMO ideas and lower the risks of testing new concepts. Innovations may include development of new tools, algorithms, methods, and technologies.

**Initiative 4: Deploy Connected and Automated Vehicle Technologies**

This initiative focuses on the vast potential for leveraging connected and automated vehicle (CAV) technologies to implement innovative strategies.

### Initiative 5: Advance Regional Coordination and Network Communications

This initiative focuses on integration among different systems, communication networks, modes, and organizations to advance regional system performance, and for specialized applications, particularly related to events that may cause unplanned disruptions (e.g., incidents, weather conditions, emergency events).

### Initiative 6: Strengthen Work Zone and Event Management

This initiative focuses on implementing strategies for planned disruptions to typical travel conditions – specifically work zones and special events – in order to improve safety, mobility, and reliability; support collaboration; and disseminate accurate, timely information to travelers.

### Initiative 7: Enhance Transit Operations

This initiative focuses on implementing TSMO strategies to support access to transit and enhance the convenience, customer experience, and performance of transit.

### Initiative 8: Advance Mobility as a Service

This initiative focuses on implementing Mobility as a Service (MaaS) strategies that support alternatives to driving alone, including bicycling and walking, use of transportation network companies, and mobility options for first mile/last mile connections to transit.

# 5 TSMO Priority Actions

Each of the strategic initiatives is supported by a set of priority actions to be implemented over a ten-year timeframe. This section describes each of the priority actions, describing their value to the region, stakeholders involved, and providing a checklist of recommended steps. It is recognized that some of these actions may be prioritized differently throughout the region depending upon each jurisdiction's need, readiness, and resources. Therefore, it is expected that the schedules will vary depending upon jurisdiction. However, in general, it is anticipated that *Near Term* will represent 0-3 years, *Mid Term* will represent 4-8 years, and *Long Term* will represent 8-10 years.

## 5.1 Initiative 1: Strengthen TSMO Planning and Institutions

This initiative focuses on establishing and strengthening TSMO institutional structures, including enhancing integration of TSMO into decision making within regional planning, programming, and project development.

This initiative is important to support the ability for the region overall to advance and prioritize TSMO activities toward achieving its vision and ensuring the TSMO is coordinated and integrated among partner organizations for maximum benefit.

*Priority Actions:*

1.1. Establish and sustain a diverse regional TSMO committee.
1.2. Demonstrate the value and need for TSMO by making TSMO initiatives and projects more visible to the public and decision makers.
1.3. Develop tools and guidance for local agencies and partners to advance TSMO strategies.
1.4. Integrate TSMO into local and regional planning and development processes.
1.5. Incorporate freight into TSMO planning activities.
1.6. Set regional targets and strengthen TSMO project prioritization.

The following pages describe each priority action recommended to implement and support this initiative.

## Initiative 1: Strengthen TSMO Planning and Institutions

## ACTION 1.1: ESTABLISH AND SUSTAIN A DIVERSE REGIONAL TSMO COMMITTEE

**Description and Benefit to the Atlanta Region:**

The Atlanta region has a wide array of organizations that are responsible for TSMO, yet the region does not currently have an established on-going working group or committee focused on TSMO coordination and collaboration. Several other metropolitan planning organizations (MPOs) around the country have TSMO-focused committees that bring together diverse regional stakeholders to ensure coordination of activities, to advance information sharing, and advance deployment of ITS solutions.[9] A regional TSMO steering/implementation committee with representatives from public agencies, as well as the private and academia sectors, will serve as forum for advancing the region's TSMO vision by guiding the implementation of stated initiatives, supporting funding decisions, enhancing collaboration and information sharing, and tracking progress. This committee can coordinate with existing organizations such as ITS Georgia and events such as ConnectATL to support information sharing on TSMO and technology innovations.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Lead), GDOT, transit agencies, local agency stakeholders, academic institutions, and private service providers

| ACTION 1.1 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Reach out to potential members of the Steering Committee and seek their participation. |
| | N2 | Establish rules of practice and operating procedures for the committee; this may become a collaboration effort with existing committees rather than a traditional standing committee. |
| | N3 | Identify champions for each Initiative that will guide the implementation of the recommended actions. |
| MID | M1 | Hold meeting to assess impact of the committee and replace/add members if needed. |
| LONG | L1 | Continue to evolve the committee to meet current TSMO needs. |

[9] Examples include the Delaware Valley Regional Planning Commission's (DVRPC) Transportation Operations Task Force (TOTF), which meets two to three times per year (Philadelphia region); the Baltimore Regional Transportation Board's Traffic Incident Management for the Baltimore Region Committee (TIMBR), which meets quarterly; and the Maricopa Association of Governments' ITS Committee, which meets periodically (Phoenix region).

## Initiative 1: Strengthen TSMO Planning and Institutions

## ACTION 1.2: DEMONSTRATE THE VALUE AND NEED FOR TSMO BY MAKING TSMO INITIATIVES AND PROJECTS MORE VISIBLE TO THE PUBLIC AND DECISION MAKERS

**Description and Benefit to the Atlanta Region:**

While TSMO is vital to the region's overall vision and very cost-effective for advancing safety, mobility, and reliability, TSMO activities (e.g., traffic signal improvements, incident management, work zone safety) are typically less visible to the public and elected officials than new or expanded roadway or transit infrastructure and services. Targeted efforts to make TSMO initiatives, activities, and projects more visible and to communicate the benefits to travelers would translate into increased support for and deployment of TSMO strategies. This may involve identifying opportunities to draw attention to existing and new TSMO initiatives with the media (e.g., to "flip the switch" on new technology), and to tell the story about how TSMO matters to people – not only for travel time savings and safety but in terms of user experience (e.g., creating more seamless connections, reducing stress, and improving quality of life).

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Lead), GDOT, transit agencies, local agency stakeholders, academic institutions, and private service providers

| ACTION 1.2 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Develop an outreach plan that details the messaging guidelines for different outreach materials and events. |
| | N2 | Encourage evaluations and return-on-investment analysis to be completed for ARC-funded TSMO projects. |
| | N3 | Provide examples and shared resources to further encourage consistent TSMO project evaluations. |
| | N4 | Bring public information officers (PIO) into day-to-day operations of a transportation management center (TMC) to support information dissemination coordination. |
| MID | M1 | Continue conducting outreach activities according to the outreach plan. |
| | M2 | Update plan and materials as needed. |
| LONG | L1 | Integrate TSMO mind-set within common industry practices. |

## Initiative 1: Strengthen TSMO Planning and Institutions

## ACTION 1.3: DEVELOP TOOLS AND GUIDANCE FOR LOCAL AGENCIES AND PARTNERS TO ADVANCE TSMO STRATEGIES

**Description and Benefit to the Atlanta Region:**

Local transportation agencies, such as those operated by counties, cities, and municipalities, are faced with a daunting challenge of learning about and keeping up with a wide array of emerging technologies and service models. Some have limited staff and limited experience or understanding of some TSMO strategies. Even those with more sophisticated programs are looking for guidance or support to understand what approaches would be most effective to consider, to learn from other agencies within the region, and to understand what approaches would maximize both local and regional benefits. This action focuses on developing tools and guidance to help those local agencies and partners identify and advance TSMO strategies. This action would also involve promoting use of the regional ITS Architecture.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Lead), GDOT, transit agencies, and local agency stakeholders

| ACTION 1.3 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N1** | Develop TSMO Local Agency Deployment Guide. |
| | **N2** | Develop an inventory of agency current projects and/or needs such that potential collaboration efforts may be explored. |
| | **N3** | Engage directly with local agencies to build greater understanding of the region's goals. |
| | **N4** | Identify readily available or easily updateable support tools that small and medium-scale agencies can use to deploy/enhance TSMO strategies. |
| MID | **M1** | Develop new tools/guidance to address the needs of the local agencies, such as a guide on how to use/integrate the region's ITS Architecture. |
| LONG | **L1** | Update tools as needed. |

## Initiative 1: Strengthen TSMO Planning and Institutions

## ACTION 1.4: INTEGRATE TSMO INTO LOCAL AND REGIONAL PLANNING AND DEVELOPMENT PROCESSES

**Description and Benefit to the Atlanta Region:**

TSMO strategies will be more broadly and effectively applied if they are integrated early into local and regional planning and development processes. At a broad level, this action involves aligning state, regional, and local planning to support TSMO. Specifically, this will involve providing guidance and tools to integrate TSMO goals into local planning through the ***comprehensive transportation plan (CTP)*** program, since the CTPs provide an opportunity to lead to TSMO project concepts. In addition, TSMO goals and strategies should be advanced within the ***Livable Communities Initiative (LCI), corridor plans***, and other ***local planning activities***. This action also involves updating the ***Development of Regional Impact (DRI) process*** and studies to include consideration of TSMO strategies. By integrating TSMO into land use planning and development project reviews, mitigation measures for traffic should include strategies such as demand management, operational improvements to roadways, and transit operations. This action involves exploring business processes in each of these planning and development approval processes to better integrate consideration of TSMO strategies and ITS elements.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Lead), GDOT, the ATL, transit agencies, and local agency stakeholders

| ACTION 1.4 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Identify opportunities to integrate TSMO considerations within existing guidelines and manuals used in planning for the CTP program, LCI, corridor plans, the Atlanta Regional Transit Plan (ARTP) and other local planning activities. |
| | N2 | Identify opportunities to integrate TSMO considerations within existing guidelines for the DRI process and development reviews. |
| | N3 | Update relevant guidelines and manuals to reflect best practices; for instance, including a TSMO assessment as part of project plan/design checklists. |
| MID | M1 | Update planning guidance and plans as needed. |
| LONG | L1 | Update and evolve plans as needed. |

## Initiative 1: Strengthen TSMO Planning and Institutions

## ACTION 1.5: INCORPORATE FREIGHT INTO TSMO PLANNING ACTIVITIES

**Description and Benefit to the Atlanta Region:**

Goods movement is critical to the economic vitality of the Atlanta region, as well to meet the needs of the public and businesses for products, from groceries to high-tech equipment. While TSMO is often largely thought of in the context of moving people, freight and urban goods movement have unique needs and challenges where TSMO strategies can be applied. Taking these into consideration can enable/enhance freight specific solutions, which may include solutions such as curb management, real-time truck parking information, scheduling of off-peak deliveries, and freight access restrictions.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** GDOT (Lead), local agency stakeholders, freight companies, State Patrol, and ARC

| ACTION 1.5 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Identify the key stakeholders within the freight community and assess their needs. |
| | N2 | Cross-check the needs with known TSMO strategies and identify gaps and opportunities within the existing and planned TSMO strategies. |
| MID | M1 | Monitor freight safety and mobility metrics to assess impact of TSMO strategies. |
| LONG | L1 | Update tools as needed. |

## Initiative 1: Strengthen TSMO Planning and Institutions

## ACTION 1.6: SET REGIONAL TARGETS AND STRENGTHEN TSMO PROJECT PRIORITIZATION

**Description and Benefit to the Atlanta Region:**

Travel demand modeling that is typically used to identify needs and evaluate the potential impacts of transportation investments is limited in its ability to address many of the benefits of TSMO strategies, such as improvements in safety, reliability, and more seamless connections between modes. This action focuses on augmenting transportation demand models or supplementing the results with methodologies that are better able to assess the impacts of TSMO strategies and on outcomes that are important to people. In addition, supplementing the results of modeling with more robust datasets and analysis techniques could also help to better assess equity by exploring the impacts to different population groups and to identify the environmental benefits of TSMO strategies.

ARC uses systematic processes for prioritizing projects for funding as part of its Transportation Improvement Program (TIP) and Livable Communities Initiative (LCI). This action involves identifying ways to strengthen the project prioritization processes to further elevate the role of performance measures related to TSMO outcomes, such as safety, reliability, and efficient, seamless travel connections, as well as equity and environmental benefits that can be calculated in association with TSMO projects and activities. It also involves establishing regional targets for performance measures addressing these outcomes.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Lead), local agency stakeholders, transit agencies, TSMO Committee, and GDOT

| ACTION 1.6 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N0** | Link appropriate TSMO Strategic Plan Priority Actions with relevant USDOT TPM measures and targets set by Georgia/Atlanta Urbanized area (i.e., *travel time reliability, freight movement, on-road emissions, annual hours of peak-hour excessive delay per capita, percent of non-SOV travel*). |
| | **N1** | Identify additional regional performance measures and targets. |
| | **N2** | Work with TSMO Committee to review attainment of existing TPM targets and other voluntary targets. Also, reassess the targets every two years. |
| | **N3** | Revisit TIP solicitation application questions and data requirements from project applicants. |
| | **N4** | Identify potential modifications to the existing roadway TSMO project evaluation methodology (ARC TIP Project Prioritization Framework – "KDP2"), as well as additional data sources. |

| | | |
|---|---|---|
| MID | **M1** | Develop tools, models, and dashboards that generate performance measures of real-time or snapshots of current impacts. |
| | **M2** | Require and/or fund systems engineering analyses for potential ITS investments, prior to awarding federal funding for implementation. Systems engineering analyses shall identify which regional performance targets the proposed project is addressing, as well as how the project would contribute towards achieving the associated targets. Rely on systems engineering analysis to identify preferred project concept. |
| | **M3** | Base TIP solicitation and other project prioritization decision-making on how project concepts will impact regional targets. |
| | **M4** | Identify robust methodology, resources, and timelines for tracking performance after projects are implemented (corridor or sub-area level) to help guide future investment priorities. |
| LONG | **L1** | Update process as needed. |

## 5.2 Initiative 2: Enhance Data Sharing and Management

This initiative focuses on enhancing data sharing and management to support enhanced data collection, curation, access and archiving capabilities for improved performance measure analysis and real-time systems management and operations.

This initiative is important since data underlies so many TSMO strategies and applications, and effective data sharing and management play a key role in understanding existing and future conditions and needs, managing and operating transportation systems to optimize performance and user benefit, and deploying coordinated strategies. Data sharing for enhanced situational awareness is key to implementing many TSMO strategies; moreover, sharing real-time data and predictive analytics with the public and private sectors plays an important role in influencing travel decisions. High quality, consistent data that is managed over time and throughout its life is the foundational element of multi-agency, regional approaches to TSMO. Data sharing can also help to advance new innovative services and applications, and data management is critical in relation to cybersecurity and resiliency of the transportation system.

*Priority Actions:*

2.1. Establish a long-term regional data governance framework.
2.2. Develop a centralized data broker and analytics hub for curated safety and operations data.
2.3. Improve/develop data curation and sharing strategies.
2.4. Develop data-driven methodologies to assess equity and environmental conditions and impacts of TSMO strategies.
2.5. Develop or leverage existing crowdsourced applications.

## Initiative 2: Enhance Data Sharing and Management

## ACTION 2.1: ESTABLISH A LONG-TERM REGIONAL DATA GOVERNANCE FRAMEWORK

**Description and Benefit to the Atlanta Region:**

A wide array of public and private sector entities in the Atlanta region collect vast amounts of data regarding travel behavior and transportation system performance. A robust data governance framework would provide clear rules and guidelines on how to describe, organize, and share data, as well as describe data user- and owner-roles and access procedures. Such a framework helps to address challenges currently being faced in regard to inconsistent structures, formats, and semantics for data among organizations; inconsistent access to data; as well as challenges associated with data privacy.

**Goals:** **Foundational Elements:**

**Stakeholders:** GDOT (Co-Lead), ARC (Co-Lead), the ATL, SRTA, transit agencies, local agency stakeholders, academic institutions, and private sector service providers and data providers

| ACTION 2.1 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Develop data governance charter with organization roles/responsibilities. |
| | N2 | Create a Data Stewardship Steering Committee and define stakeholder roles and responsibilities. |
| | N3 | Develop a process for mapping project business needs (e.g., projects and pilots) to regional data curation and access procedures (for example, how and when to input data sets into a data catalog). |
| MID | M1 | Implement a data management maturity model to assess where each organization stands with respect to implementing certain data governance processes. |
| | M2 | Implement and measure continual improvement of data management and curation processes. |
| LONG | L1 | Update data governance charter and data curation processes as needed. |

## Initiative 2: Enhance Data Sharing and Management

## ACTION 2.2: DEVELOP A CENTRALIZED DATA BROKER AND ANALYTICS HUB FOR CURATED MULTIMODAL SAFETY AND OPERATIONS DATA

**Description and Benefit to the Atlanta Region:**

A centralized data hub creates easier access to curated data for regional planning, system management and operations, and performance assessment. The hub serves as both a data warehouse and a data broker for all data collected and shared in the region including from local agencies, transit agencies, other transportation organizations, and private sector data providers. This effort can build on the existing foundation of an emerging platform for sharing data, using existing infrastructure, data ingestion, and analysis tools.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** GDOT (Co-Lead), ARC (Co-Lead), the ATL, SRTA, private sector data providers, and local agency stakeholders

| ACTION 2.2 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Secure funding for the development of the integrated data broker and analytics hub. |
| | N2 | Conduct market research through a request for information (RFI) on best approaches for extending the current transportation analytics data platform. |
| | N3 | Develop foundational systems engineering documents for the data broker and analytics hub including specifications for data message formats and dictionary (meaning). |
| | N4 | Develop data curation and management policies, including quality checking and metadata description for all data sets that are ingested into the system. |
| MID | M1 | Procure and deploy integrated data broker and analytics hub. |
| | M2 | Update data curation and management policies. |
| LONG | L1 | Monitor data broker and analytics hub and update regulations as needed. |

## Initiative 2: Enhance Data Sharing and Management

## ACTION 2.3: IMPROVE/DEVELOP DATA CURATION AND SHARING STRATEGIES

**Description and Benefit to the Atlanta Region:**

This action involves improving existing tools, or developing new strategies, to collect, monitor, and share data, such as leveraging/pooling/sharing contracts for licensed data and software from/with other jurisdictions. The use of statewide tools could facilitate multi-agency collaboration and enable the efficient use of resources.

**Goals:** **Foundational Elements:**

**Stakeholders:** Data Stewardship Steering Committee (See Action 2.1) (Lead), GDOT, ARC, the ATL, SRTA, and local agency stakeholders

| ACTION 2.3 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N1** | Explore the needs of TMC operators for collecting and sharing information. |
| | **N2** | Assess enterprise-level solutions for common data management requirements such as establishing a common regional data dictionary and interface specifications. |
| | **N3** | Develop and populate on-line data set catalog that describes what, how and from whom to access regional transportation data. |
| MID | **M1** | Develop and pilot data sharing strategies. |
| | **M2** | Through the Data Stewardship Steering Committee, develop curation processes (e.g., collection, verification, access formats and more) to continually improve the consistency, quality and completeness of critical, regional transportation data sets. |
| LONG | **L1** | Move towards developing and implementing automation of data curation processes (including collection, cleaning, storing, discovery, dissemination). |

## Initiative 2: Enhance Data Sharing and Management

## ACTION 2.4: DEVELOP DATA-DRIVEN METHODOLOGIES TO ASSESS EQUITY AND ENVIRONMENTAL CONDITIONS AND IMPACTS OF TSMO STRATEGIES

**Description and Benefit to the Atlanta Region:**

Better data, and data-driven methodologies, are needed to help identify the needs, opportunities, and roles of TSMO strategies to advance equity and environmental benefits. For instance, there is a need for data to better assess travel activity across all modes – currently, most travel monitoring focuses on vehicles and traffic, and there is a limited understanding of the movement of people across all modes (private vehicles, shared vehicles, bicycling, walking, etc.). A more comprehensive understanding of travel activity would make an important contribution to understanding behavior to enhance mobility, and identify demands (e.g., where would people like to walk/bike but they currently cannot). Another example is data on near-misses: going beyond fatality and crash data to have better detection, particularly with bike/ped detection systems to identify possible safety enhancements. Understanding vulnerable road users, such as stress levels for bicyclists, also could help in identifying effects of strategies to improve conditions for these users.

These applications of data, and the development of data-driven methodologies to assess the impacts of projects and strategies on different population groups and the environment, will play an important role in achieving the region's vision for TSMO that is more inclusive than the traditional focus on vehicle traffic.

*Note: This action and Action 1.6 (Set regional targets and strengthen TSMO project prioritization) are linked.*

**Goals:**

**Foundational Elements:**

**Stakeholders:** ARC (Lead), Georgia Environmental Protection Division, the ATL, GDOT, and local agency stakeholders

| ACTION 2.4 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N1** | Identify key TSMO performance measures to monitor (see Action 1.6 N3). |
| | **N2** | Draft and test assessment methodologies. |
| MID | **M1** | Coordinate with key stakeholders for development of these methodologies. |
| | **M2** | Update manuals to reflect the integration of equity and environmental assessment approaches on TSMO product development. |
| LONG | **L1** | Review and update methodologies as needed. |

## Initiative 2: Enhance Data Sharing and Management

## ACTION 2.5: DEVELOP OR LEVERAGE EXISTING CROWDSOURCED APPLICATIONS

**Description and Benefit to the Atlanta Region:**
Crowdsourced applications help gather information from a large group of stakeholders, providing archived and real time data on the usage of facilities/infrastructures, whether they may be sparse (e.g., bike routes) or concentrated (e.g., urban roads, sidewalk conditions). This dataset can then be used to enhance transportation planning, operations and maintenance. These applications can be particularly valuable in relation to maintenance of systems, to identify issues with traffic signals and other technology.

**Goals:** **Foundational Elements:**

**Stakeholders:** ARC (Co-Lead), GDOT (Co-Lead), the ATL, local agency stakeholders, and private sector travel information providers

| ACTION 2.5 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N1** | Understand needs in the region related to the requirements for data collection (who, what, why, how often), how social media and crowdsourced applications are used, current collaboration activities, and gaps in data that may be best collected using social media tools. |
| | **N2** | Develop regional approach for sharing social media and leveraging crowdsourced data including procuring, deploying and piloting applications. |
| | **N3** | Develop regional policy for managing personal identifiable information, data license and sharing mechanism for collecting crowdsourced data. |
| MID | **M1** | Deploy or contribute to regional crowdsourcing platforms to target specific data needs (e.g., sidewalk conditions, event alerts, real time bus arrival time verification). |
| LONG | **L1** | Monitor application and update as needed. |

## 5.3 Initiative 3: Encourage TSMO Innovation

This initiative focuses on establishing mechanisms to promote innovation and research that will spur the next generation of innovative TSMO ideas and lower the risks of testing new concepts. Innovations may include development of new tools, algorithms, methods, and technologies.

This initiative is important since the field of technology is advancing so quickly, with a wide array of new and emerging applications, relying on Big Data, connectivity, automation, and other advances. In addition to technology, there are needs for advancements in the ways in which government agencies and transportation service providers do business, such as in regard to public-private partnerships, procurement strategies, and ways of testing new technologies and managing risks.

*Priority Actions:*

3.1. Share information and develop structures to advance innovative procurement strategies.

3.2. Support more efficient design, operations, and maintenance through a focus on analytics/data and automation of processes.

3.3. Fund innovative TSMO/technology pilot projects through ARC and/or other agency and private sector funding.

3.4. Develop an innovative TSMO solution focused on a particular problem or community issue of regional significance.

## Initiative 3: Encourage TSMO Innovation

## ACTION 3.1: SHARE INFORMATION AND DEVELOP STRUCTURES TO ADVANCE INNOVATIVE PROCUREMENT STRATEGIES

**Description and Benefit to the Atlanta Region:**

Traditional government procurement approaches may not be applicable when attempting to take advantage of new technologies and approaches. Alternative, innovative procurement strategies will offer the flexibility to pursue development or pilot type projects which can be less defined at the on-set of the project. The added flexibility will offer support and will encourage progressive TSMO growth.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Co-Lead), GDOT (Co-Lead), the ATL, SRTA, local agency stakeholders, transit agencies, academic partners, and private sector industry partners

| ACTION 3.1 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Convene a meeting to discuss existing procurement mechanisms and how they may be made more flexible. Collaborate to better understand all potential options and changes that would be required to implement more innovative procurement strategies, including legislative actions. |
| | N2 | Develop an Innovative Procurement Strategy Matrix as an outcome of the collaboration efforts in N1 for use throughout the region. |
| | N3 | Identify a TSMO project to support through an innovative procurement strategy as a proof of concept. |
| MID | M1 | Identify several TSMO projects to support through multiple innovative procurement strategies as a proof of concept. |
| | M2 | Share lessons learned through innovative procurement strategies throughout the region such that processes may become more efficient and effective. |
| LONG | L1 | Mainstream proven innovative procurement strategies. |

## Initiative 3: Encourage TSMO Innovation

## ACTION 3.2: SUPPORT MORE EFFICIENT DESIGN, OPERATIONS, AND MAINTENANCE THROUGH A FOCUS ON ANALYTICS/DATA AND AUTOMATION OF PROCESSESS

**Description and Benefit to the Atlanta Region:**

Automation and advanced analytics using data for not only monitoring performance but also for predicting future performance can enable advances in safety, mobility, and reliability of the transportation system, as well as positive impacts for communities and the environment. Advanced analytical methods and automation of processes can yield improved design, operation, and maintenance of systems and strategies based on a more complete understanding of current and anticipated conditions, more efficient analyses, and more cost-efficient solutions.

*Note: This action supports the long term actions of Action 2.3 (Improve/develop data curation and sharing strategies).*

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** GDOT (Lead), ARC, the ATL, SRTA, local agency stakeholders, transit agencies, academic partners, and private sector industry partners

| ACTION 3.2 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Assess current processes and identify those that could be partly or completely automatized. |
| | N2 | Develop strategies/approaches to partial/complete automation of selected analytical processes. |
| MID | M1 | Rollout new/improved analytics and processes. |
| | M2 | Train anticipated users and stakeholders how to use newly developed analytics and processes. |
| | M3 | Evaluate the effectiveness of the use of newly developed analytics/data and automated processes. |
| LONG | L1 | Update processes as needed. |
| | L2 | Continue training as needed. |

## Initiative 3: Encourage TSMO Innovation

## ACTION 3.3: FUND INNOVATIVE TSMO/TECHNOLOGY PILOT PROJECTS THROUGH ARC AND/OR OTHER AGENCY AND PRIVATE SECTOR FUNDING

**Description and Benefit to the Atlanta Region:**

Securing funds to invest on research and pilot projects can enable the necessary testing and development of new technologies that can yield positive benefits to the region. This can be accomplished by dedicating funding to innovative pilots, either via ARC or GDOT, or in working with partner organizations, including the private sector. This action would involve setting aside funding that would be used to help local governments, transit agencies, other transportation service providers, and/or the private sector to pilot ideas in local contexts or multi-jurisdictional contexts, which could be used as proof-of-concept to potentially apply more broadly in the future.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Co-Lead), GDOT (Co-Lead), the ATL, local agency stakeholders, transit agencies, academic partners, and private sector industry partners

| ACTION 3.3 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N1** | Develop list of priority needs and assess potential pilot projects that could address them. |
| | **N2** | Explore private sector partnerships and roles for pilot projects. |
| | **N3** | Provide information to regional stakeholders about funding approach, lessons learned, and additional opportunities. |
| MID | **M1** | Deploy pilot projects and evaluate their impact. |
| LONG | **L1** | If found beneficial, transition from pilot to a fully operational system. |

## Initiative 3: Encourage TSMO Innovation

## ACTION 3.4: DEVELOP AN INNOVATIVE TSMO SOLUTION FOCUSED ON A PARTICULAR PROBLEM OR COMMUNITY ISSUE OF REGIONAL SIGNIFICANCE

**Description and Benefit to the Atlanta Region:**

This action focuses on coordinating among regional and community partners to develop an innovative concept that could be the basis for a significant public-private partnership opportunity or that could be the basis for a potential future Federal grant or foundation funding. This idea is distinct from Action 3.3, which focuses on providing funding for pilots that could be proposed by local governments or other entities. In this case, ARC and partner agencies would come together to develop a broader scale concept focused on a particular problem or community issue and would work together to define the concept and seek out funding from a combination of Federal, State, local, and/or private/foundation funding.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Lead), GDOT (Lead), local agency stakeholders, transit agencies, academic partners, and private industry partners

| ACTION 3.4 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N1** | Identify a challenge that can be addressed with an innovative TSMO solution. |
| | **N2** | Develop a work plan that includes appropriate systems engineering, collaboration, and necessary evaluation plan. |
| MID | **M1** | Secure funding and implement innovative TSMO project. |
| | **M2** | Evaluate project outcome and share outcome widely in a reproducible format, for example, a "playbook" with step by step instructions that can be applied with regional support and tools. |
| | **M3** | Identify other challenges that can be addressed with an innovative TSMO solution; perform appropriate systems engineering. |
| LONG | **L1** | Secure funding and implement innovative TSMO projects; evaluate and share project outcomes (positive and negative). |

## 5.4 Initiative 4: Deploy Connected and Automated Vehicle Technologies

This initiative focuses on the vast potential for leveraging CAV technologies to implement innovative strategies. Many of these initiatives, particularly those that deal with connected vehicle technologies depend on deployment of infrastructure roadside equipment (RSE) and onboard equipment (OBE).

This initiative is important since CAV technologies are a foundation for many different applications and relate to the following other initiatives.

*Priority Actions:*

4.1. Study and share the potential impacts of connected and automated vehicles.

4.2. Leverage connected vehicle technologies to improve safety and mobility for all travelers.

4.3. Leverage connected vehicle technologies to enhance safety through improved incident response.

## Initiative 4: Deploy Connected and Automated Vehicle Technologies

## ACTION 4.1: STUDY AND SHARE THE IMPACTS OF CONNECTED AND AUTOMATED VEHICLES

**Description and Benefit to the Atlanta Region:**

CAV technologies are expected to have a significant impact on every aspect of transportation. However, there are still many technical, ethical, legal, and social unknowns about CAV technologies that must be addressed before widespread deployment is depended upon—this is especially true for automated vehicles. Clearly understanding the impact of deploying CAV technologies, as well as the data that will be produced by them, will help the development of conscious policies that can regulate and support the deployment of safe and tested technologies.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Lead), GDOT (Lead), local agency stakeholders, transit agencies, academic partners, and private sector industry partners

| ACTION 4.1 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N1** | Secure funding to research CAV issues specific to the region. |
| | **N2** | Perform systems engineering process to deploy pilot CAV technologies in the region. |
| | **N3** | Deploy CAV technologies within the region and measure their performance. |
| MID | **M1** | Develop regulations for CAV technology deployment and operations. |
| | **M2** | Deploy and evaluate additional pilot CAV strategies within the region. |
| | **M3** | Develop reports and guiding CAV deployment guidance documents. |
| LONG | **L1** | Update guidance and regulations as needed. |

## Initiative 4: Deploy Connected and Automated Vehicle Technologies

## ACTION 4.2: LEVERAGE CONNECTED VEHICLE TECHNOLOGIES TO IMPROVE SAFETY AND MOBILITY FOR ALL TRAVELERS

**Description and Benefit to the Atlanta Region:**
CAV technologies, based on Vehicle-to-Everything (V2X) communications, enable applications that can improve the safety and mobility for travelers, particularly vulnerable road users such as those walking and bicycling. This is particularly important for arterials within suburban and urban areas where human street activity is essential and there is an opportunity to enhance the viability of transit, walking, bicycling, and other micromobility options. Connected vehicles in particular can support a wide array of applications, including those that would reduce missed transit connections (e.g., via improved communications between bus services and/or rail), enhancements to the reliability of transit (e.g., via transit signal priority), emergency vehicle preemption to support faster emergency response, and freight applications as well.

*Note: This action supports several of the priority actions under Initiative 5: Advance Regional Coordination and Network Communications (specifically, 5.1 and 5.2); Initiative 6: Strengthen Work Zone and Event Management; Initiative 7: Enhance Transit Operations (specifically 7.1 and 7.3); and Initiative 8: Advance Mobility as a Service.*

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** Local agency stakeholders (Lead), ARC, GDOT, transit agencies, academic partners, and private sector industry partners

| ACTION 4.2 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Assess how CAV strategies for vulnerable road users, transit, and freight fit with other safety plans/efforts (e.g., vision zero). |
| | N2 | Plan for the deployment of CAV strategies within the region specific to different priority applications (e.g., transit, vulnerable road users), including requirements for technology, costs, data, performance, reporting, financial resources and evaluation. |
| | N3 | Deploy CAV strategies within the region and measure their performance. |
| MID | M1 | Evaluate solutions by measuring effectiveness (e.g., establish performance measures and assess total cost of operations). |
| LONG | L1 | Complete deployment and operate proven CAV strategies across region. |
| | L2 | Continue to measure performance. |
| | L3 | Review and renew approach; potential strategy or approach refresh. |

## Initiative 4: Deploy Connected and Automated Vehicle Technologies

## ACTION 4.3: LEVERAGE CONNECTED VEHICLE TECHNOLOGIES TO ENHANCE SAFETY THROUGH IMPROVED INCIDENT RESPONSE

**Description and Benefit to the Atlanta Region:**
Leveraging connected roadside equipment (RSE) and connected vehicles (CV) within the region has the potential to improve incident management through enhanced situational awareness and response capabilities (e.g., conflict monitor status, vehicle guidance, traffic signal optimization). Higher connectivity can also help automated vehicles (AVs) traverse through (or avoid) incidents by providing real time information on traffic status and incident response activities.

**Goals:**

**Foundational Elements:**

**Stakeholders:** GDOT (Lead), ARC, Georgia State Patrol, transit agencies, academic partners, and private sector industry partners

| ACTION 4.3 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Assess how incident management CV strategies fit with other safety plans/efforts (e.g., vision zero). |
| | N2 | Plan for the deployment of CV strategies within the region specific to incident management, including requirements for technology, costs, data, performance, reporting, financial resources and evaluation. |
| | N3 | Deploy incident management CV strategies within the region and measure their performance. |
| MID | M1 | Evaluate solutions (establish performance measures, total cost of operations criteria, etc. for measuring effectiveness). |
| LONG | L1 | Complete deployment and operate incident management CV strategies across region. |
| | L2 | Continue to measure performance. |
| | L3 | Review and renew approach; potential strategy or approach refresh. |

## 5.5 Initiative 5: Advance Regional Coordination and Network Communications

This initiative focuses on integration among different systems, communication networks, modes, and organizations to advance regional system performance.

This initiative is important for advancing strategies that enhance coordination across jurisdictional boundaries, modes, and roadway types (e.g., freeway and arterial management), and for specialized applications, particularly related to events that may cause unplanned disruptions (e.g., incidents, weather conditions, emergency events).

*Priority Actions:*

5.1. Advance Integrated Corridor Management (ICM) systems.

5.2. Develop better tools for communications among emergency responders and between event management tools and traveler information outlets.

5.3. Modernize the communications network architecture.

## Initiative 5: Advance Regional Coordination and Network Communications

## ACTION 5.1: ADVANCE INTEGRATED CORRIDOR MANAGEMENT (ICM) SYSTEMS

**Description and Benefit to the Atlanta Region:**

ICM systems increase the level of collaboration between systems, technologies and operations across agencies/jurisdictions. By bringing together regional stakeholders, ICM can increase reliability, safety, and person throughput on high-priority corridors, and be designed to effectively manage demand by shifting people to higher occupancy modes.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** GDOT (Lead), SRTA, and local agency stakeholders

| ACTION 5.1 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N0 | Develop, or update, an inventory of available, currently in use software platforms. |
| | N1 | Identify corridors that could benefit from implementation of ICM and coordinate with stakeholders to understand the system needs. |
| | N2 | Develop goals and measurable objectives, and conduct feasibility assessment. |
| | N3 | Develop a project management plan (PMP), System Engineering Management plan (SEMP), and concept of operations (ConOps) for the selected corridors. |
| | N4 | Identify stakeholders and access to data needed to implement ICM strategies. (These data needs may drive data collection and improvement processes in Action 2.3) |
| MID | M1 | Develop ICM strategies and playbook for selected corridors. |
| | M2 | Research procurement/grant options and presented to the group to support deployment of ICM strategies. |
| | M3 | Provide technical services to support deployment of ICM strategies. |
| LONG | L1 | Continue operations of the ICM system and update as needed. |
| | L2 | Update ICM strategies and playbook as needed as improvements in data quality, system automation and control are implemented (through innovations – Initiative 3). |

## Initiative 5: Advance Regional Coordination and Network Communications

## ACTION 5.2: DEVELOP BETTER TOOLS FOR COMMUNICATION AMONG EMERGENCY RESPONDERS AND BETWEEN EVENT MANAGEMENT TOOLS AND TRAVELER INFORMATION OUTLETS

**Description and Benefit to the Atlanta Region:**

Improved communications between responders and transportation agencies would strengthen their capabilities during emergency events and have a direct improvement in the execution of their actions. These partners may include police, fire, other emergency rescue operators, and roadway and transit operators. For instance, GDOT's Statewide Traffic Incident Management Enhancement (TIME) support contract manages the TIME taskforce and statewide Traffic Incident Management (TIM) teams, which encompass all first responders, firms, and agencies. Improved communications throughout member of this contract can enhance their ability to respond to new/unplanned events and disruptions, whether a major disruption to roadway travel, rail, or transit service. Furthermore, enhancing communication channels to disseminate traveler focused information will help increase situational awareness, reduce secondary crashes and optimize incident management strategies.

*Note: Dissemination of unplanned events may use the same information channels as those used for planned events such as special events and work zones (see Strategic Initiative 6).*

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** GDOT (Lead), HERO, CHAMP, first responders, police, local traffic operators, and transit agencies

| ACTION 5.2 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Identify key emergency response partners to plan and implement actions related to collaboration, policy and regulations, and technology development and integration. |
| | N2 | Identify needs of partners in terms of reporting devices, communication media, and event information automation. |
| | N3 | Develop plan for developing/deploying communications and reporting tools. |
| MID | M1 | Deploy communications and reporting tools as planned. |
| LONG | L1 | Update tools and communication agreements as needed as improvements in data quality, system automation, and predictive analytics (machine learning/artificial intelligence) are implemented (through innovations – Initiative 3). |

## Initiative 5: Advance Regional Coordination and Network Communications

## ACTION 5.3: MODERNIZE THE COMMUNICATIONS NETWORK ARCHITECTURE

**Description and Benefit to the Atlanta Region:**

The transportation industry continues to mature and become more sophisticated with emerging technologies that offer significant enhanced safety, mobility, and reliability – so too must our communications networks to support these complex and ever-increasingly critical systems. Modernizing the communications network architecture throughout the region will provide a robust, redundant, reliable, scalable network to better support our existing and future critical systems.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** GDOT (Lead), local agency stakeholders, transit agencies, and ARC

| ACTION 5.3 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Prepare high-level communications assessment of regional networks and identify key opportunities for modernization (redundancy, scalability, data segmentation, IP schemas, VLAN structures, security features, etc.). |
| | N2 | Lead agencies to develop high-level communications network modernization plans with dependencies and prioritization. |
| | N3 | Seek and provide training opportunities to increase awareness and understanding of the communication networks that our systems rely upon. |
| MID | M1 | Lead agencies to implement communications network modernization near-term priorities. |
| | M2 | Continue training and build expertise throughout the region. |
| | M3 | Lead agencies to implement communications network modernization mid and long-term priorities, including preparing for equipment replacement and security upgrades as needed. |
| LONG | L1 | Continue assessment of communication networks to ensure networks are staying up to industry standards. |
| | L2 | Continue training and build expertise throughout the region. |

## 5.6 Initiative 6: Strengthen Work Zone and Event Management

This initiative focuses on implementing strategies for planned disruptions to typical travel conditions – specifically work zones and special events – in order to improve safety, mobility, and reliability; support collaboration; and disseminate accurate, timely information to travelers.

This initiative is important since planned disruptions such as work zones and special events provide a unique opportunity to improve safety and mobility for the traveling public.

*Priority Actions:*

6.1. Improve coordination of work zone and special event activities.

6.2. Implement smart work zone strategies.

6.3. Enhance communications and implement targeted demand management strategies (e.g., incentives) for special event management.

## Initiative 6: Strengthen Work Zone and Event Management

## ACTION 6.1: IMPROVE COORDINATION OF WORK ZONE AND SPECIAL EVENT ACTIVITIES

**Description and Benefit to the Atlanta Region:**

This action focuses on improving coordination of work zone and special event (e.g., rallies, movie filming, big concert/sport event) activities among stakeholders and 3rd parties (e.g., WAZE and CAV manufacturers), including use of Work Zone Data Exchange (WZDx) specifications. This strategy also includes small and short term (e.g., utility, maintenance) and emergency maintenance work zones that do not warrant GDOT to go through robust pre-planning efforts.

**Goals:** **Foundational Elements:**

**Stakeholders:** GDOT (Lead), local agency stakeholders, transit agencies, ARC, U.S. Department of Transportation (USDOT), contractors, and 3rd party partners

| ACTION 6.1 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N1** | Establish regular work zone working group meetings of key stakeholders to coordinate construction and road closure project schedules and assess the impact to all modes (particularly transit and freight). |
| | **N2** | Establish procedures for convening meetings of a special event coordinating group including identifying stakeholders, timing and frequency of coordination meetings and activities. |
| | **N3** | Develop Special Event Standard Operating Procedures (SOP), which defines key stakeholders (including work zone management partners), tiers of response, high-level process, and emergency maintenance procedures. |
| | **N4** | Develop a regional construction and special event schedule on-line tool that integrates with infrastructure and operational data to efficiently coordinate planned work zone activities (horizon of activities may include 3 to 5-year period). |
| | **N5** | Participate in the USDOT Work Zone Data Initiative (WZDI) Peer Exchange and resource sharing webinars. |
| | **N6** | Create framework for data sharing with WZDx standards. |
| | **N7** | Seek funding through USDOT WZDx Demonstration Grant. |
| MID | **M1** | Develop methods to collect, verify, evaluate, archive, and disseminate work zone project and event data from the design phase through project closure as described in the USDOT Work Zone Data Initiative guidance (as described in documents from the WZDI Collaboration site: https://collaboration.fhwa.dot.gov/wzmp/default.aspx). It is envisioned that these methods will integrate with infrastructure and operational data such that the performance of specific strategies may be strengthened and management more effectively. |
| | **M2** | Develop contract language to standardize design and real time data for data collection, dissemination, and archiving purposes. |

| | | |
|---|---|---|
| | **M3** | Create a central repository of planned, real-time, and archived regional work zone activities. This effort can be coordinated with Action 2.2 (common data broker/analytics platform) and Action 5.2 (better tools of communication) for planned and unplanned events. |
| **LONG** | **L1** | Automate smart work zone data feeds to key stakeholders for coordination support and traveler information dissemination. |

## Initiative 6: Strengthen Work Zone and Event Management

## ACTION 6.2: IMPLEMENT SMART WORK ZONE STRATEGIES

**Description and Benefit to the Atlanta Region:**

Identifying and implementing smart work zone strategies in high need areas can better inform motorists of current conditions, encourage them to take alternate routes or modes (e.g., transit), reduce their frustrations, reduce freeway congestion, maintain efficient movement of goods, and enhance safety for motorists and workers.

**Goals:** **Foundational Elements:**

**Stakeholders:** GDOT and Contractors (Lead), Local Agency Stakeholders, Transit Agencies, ARC, USDOT, and 3rd Party Partners

| ACTION 6.2 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Develop criteria to incorporate smart work zone use for improving work safety, disseminating traffic information, and monitoring contract rules into construction, procurement, and permitting processes. |
| | N2 | Review current regional work zone data standards, collection, and dissemination strategies. |
| | N3 | Review national best practices work zone data standards, collection, and dissemination strategies. |
| | N4 | Enhance work zone data set and identify key opportunities to integrate with planning and operational practices. |
| | N5 | Identify and implement regional smart work zone pilot projects (e.g., dynamic lane merge systems, queue warning systems, AVL-equipped temporary traffic control devices, in-dash notification). |
| | N6 | Integrate with or create real-time dissemination of work zone data for traveler information. |
| MID | M1 | Develop smart work zone guidelines based on best practices and pilot project lessons learned. |
| | M2 | Develop smart work zone specifications based on best practices and pilot project lessons learned. |
| | M3 | Hold smart work zone training workshop for regional stakeholders. |
| LONG | L1 | Continue integration of smart work zone practices including leveraging CAV communication for information dissemination and safety systems. |
| | L2 | Using real-time work zone data, automate implementation of smart work zone strategies (i.e. system notification is sent to post messages or modify adjacent arterial traffic signal timing). |
| | L3 | Become a national leader in innovative smart work zone strategies. |

## Initiative 6: Strengthen Work Zone and Event Management

## ACTION 6.3: ENHANCE COMMUNICATIONS AND IMPLEMENT TARGETED DEMAND MANAGEMENT STRATEGIES (E.G., INCENTIVES) FOR SPECIAL EVENT MANAGEMENT

**Description and Benefit to the Atlanta Region:**

The Atlanta region is host to numerous special events throughout the region each year that bring activity and resources to the area. Managing transportation through targeted demand management strategies will offer a safer and more enjoyable experience for all by reducing traffic congestion, parking hassles, and other challenges.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Lead), local agency stakeholders, transit agencies, GDOT, SRTA, and 3rd party partners

| ACTION 6.3 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Coordinate key stakeholders to develop scenarios and playbook for near term special event management. |
| | N2 | Develop approach using lessons learned from previous special events to develop general playbook with checklists for future special events including tools for system monitoring, stakeholder coordination, marketing alternative TDM mode switch, marshalling multimodal service alternatives, realigning signal system coordination, etc. |
| MID | M1 | Continue to enhance special event playbook based on new and improved data, mobility services, and integrated mobility coordination including traveler information planning, integrated payment (see Action 8.2). |
| LONG | L1 | Enhance playbook with innovative tools (piloted in Strategic Initiative 2 and Action 6.1) such as predictive analytics, machine learning and data fusion techniques. |

## 5.7 Initiative 7: Enhance Transit Operations

This initiative focuses on implementing TSMO strategies to support access to transit and enhance the convenience, customer experience, and performance of transit.

This initiative is important since it supports the region's initiatives to improve transit and feature premium transit. It ensures that transit services are efficient, reliable, and seamless for customers to use.

*Priority Actions:*

7.1. Advance implementation of high capacity premium transit service strategies including transit signal priority.

7.2. Develop regional, interoperable transit operations and fare payment systems.

7.3. Support local transit agencies in deploying technologies to support better planning, services and communications with customers.

## Initiative 7: Enhance Transit Operations

## ACTION 7.1: ADVANCE IMPLEMENTATION OF HIGH CAPACITY PREMIUM TRANSIT SERVICE STRATEGIES INCLUDING TRANSIT SIGNAL PRIORITY

**Description and Benefit to the Atlanta Region:**
High capacity premium transit services provide transit customers with more reliable, frequent and efficient travel. The services are characterized by signal prioritization for buses and light rail using dedicated right-of-way, queue jump lanes, and express lane facilities. The services may also include other features such as level boarding, offline payment, and other technology-laden customer amenities (e.g., real-time information and WiFi on buses). In particular, transit signal priority systems provide more reliable and efficient transit service. TSP involves systems that reduce dwell time at traffic signals for transit vehicles by extending green lights or shortening red lights, resulting typically in reduced transit travel time and more reliable on-time performance. The premium transit and TSP strategies can be implemented on arterials and other roadways with traffic signals, in combination with services that use dedicated bus lanes and express lanes facilities.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** The ATL (Lead), transit agencies, GDOT, and local agencies (e.g., traffic signal operators)

| ACTION 7.1 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Plan high capacity premium transit service approach for the region including technology requirements and costs as well as data, KPIs, reporting, financial resources and evaluation. As part of this action, include TSP for both premium transit as well as for typical transit services. |
| | N2 | Establish regional coordination agreements for transit and signal operations (including all transit and traffic organizations). |
| | N3 | Procure TSP and high capacity premium transit service solution(s). |
| | N4 | Develop regional guidance and procurement models for high capacity premium service. |
| MID | M1 | Develop and deploy TSP solution in selected regions and along selected corridors. |
| | M2 | Evaluate solutions (establish performance measures, total cost of operations criteria, etc. for measuring effectiveness). |
| LONG | L1 | Complete and operate premium transit and TSP deployments across region. |
| | L2 | Continue to measure performance. |
| | L3 | Review and renew approach; plan for technology refresh (for transit vehicles and signal systems). |

## Initiative 7: Enhance Transit Operations

## ACTION 7.2: DEVELOP REGIONAL, INTEROPERABLE TRANSIT OPERATIONS AND FARE PAYMENT SYSTEMS

**Description and Benefit to the Atlanta Region:**
Develop tools and programs to promote transit service harmonization including transit operations coordination, regional fare policies and payment systems, a transit data broker for paratransit operations, customer facing systems and services (e.g., transit trip planning, real time status and real time data), and transit hubs.

**Goals:** **Foundational Elements:**

**Stakeholders:** The ATL (Lead), ARC, transit agencies, and paratransit organizations

| ACTION 7.2 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Develop plans for and initiate programs to collect, curate and share transit GTFS for all transit agencies, and GTFS-Real Time for all agencies with vehicle location technologies. |
| | N2 | Develop plans and agreements for and initiate programs to collect, curate and share transit ridership information for all transit agencies (ARC Lead). |
| | N3 | Convene transit coordination group to initiate regional fare policies and settlement processes to enable multiagency fare products and fare systems. |
| MID | M1 | Develop plans for providing a vehicle location platform for all transit vehicles in the region that feeds a transit data broker exchanging transit real time and status information not only to the public, but also to regional integration services such as Integrated Corridor Management systems (supports Action 5.1). |
| | M2 | Develop ecosystem to disseminate transit trip plan and real time information to the public that integrates first mile/last mile MaaS connections with transit service (supports Action 8.2). |
| | M3 | Deploy connected vehicle safety technologies for transit particularly to enhance intersection safety (related to Strategic Initiative 4). |
| | M4 | Develop regional, multiagency fare system (supports Action 8.2). |
| | M5 | Develop approach / acquire tools for generating transit performance measures with curated transit data, particularly GTFS, on-time performance data, ridership, etc. |
| | M6 | Develop transit broker for integrating demand-responsive services (including social services, paratransit, Medicaid) and service providers throughout the region. The broker may engage private sector mobility service providers such as Uber and Lyft to support underserved communities (see Action 8.2). |
| LONG | L1 | Develop or procure regional “mobility platform” that closes the gap in meeting key performance metrics including integrated, equitable payment system (for both customers and operators), first mile/last mile, on-demand mobility services, and reliable and automated transit services that serve multimodal and accessible transit (directly supports Action 8.2). |

## Initiative 7: Enhance Transit Operations

### ACTION 7.3: SUPPORT LOCAL TRANSIT AGENCIES IN DEPLOYING TECHNOLOGIES TO SUPPORT BETTER PLANNING, SERVICES AND COMMUNICATION WITH CUSTOMERS

**Description and Benefit to the Atlanta Region:**
Many smaller transit agencies do not have the resources or technical staff to procure and deploy advanced technologies and coordinate services. This initiative will leverage regional technologies and resources to provide: a) planning and operations tools; b) pooled procurements to lower the cost of technology deployment; and c) technology support opportunities. These would help address shortfalls in resources, technology skill sets and products. In particular, it will provide platforms for deploying innovative and transformation mobility solutions such as first mile/last mile services, including microtransit.

**Goals:** **Foundational Elements:**

**Stakeholders:** The ATL (Lead), transit agencies and ARC

| ACTION 7.3 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | **N1** | Set up or subscribe to planning, operational and analysis tools to support transit analysis and visualization tools; tools may also provide dashboard and on-line publication services. |
| | **N2** | Develop mechanism to pool procurement and/or services in support of smaller transit agency planning, operations, maintenance, training and management needs. |
| | **N3** | Establish a small agency user group to meet periodically to address program and resource needs that are not scalable, are not technically feasible in their environment, or cannot leverage tools/services used by larger transit agencies. |
| | **N4** | Develop coordination plans for health service transit (HST) providers to enhance their tools, integrate their services with multimodal information provisions, and offer more on-demand options for their customers. This action is closely related to Action 7.2 M6 and Initiative 8. |
| MID | **M1** | Continue with near-term initiatives and address geographical and technological barriers for smaller agencies. |
| LONG | **L1** | Enhance solutions from near and mid-term. |

## 5.8 Initiative 8: Advance Mobility as a Service

This initiative focuses on implementing Mobility as a Service (MaaS) strategies that support alternatives to driving alone, including bicycling and walking, use of transportation network companies, and mobility options for first mile/last mile connections to transit.

This initiative is important since it helps advance toward the region's vision of seamless travel between modes and by making it more convenient for the public to utilize options that reduce environmental impact.

*Priority Actions:*

8.1. Promote and increase access to safe, affordable and environmentally friendly mobility options.

8.2. Develop a mobility platform that includes an integrated, multimodal trip planning and electronic payment and booking system.

8.3. Identify opportunities to further incentivize sustainable travel options.

## Initiative 8: Advance Mobility as a Service

## ACTION 8.1: PROMOTE AND INCREASE ACCESS TO SAFE, AFFORDABLE AND ENVIRONMENTALLY FRIENDLY MOBILITY OPTIONS

**Description and Benefit to the Atlanta Region:**
Providing safe, affordable, and environmentally friendly mobility options can positively impact the use of alternatives to driving alone and increase multimodal linkages that support the USDOT's "Complete Trip" model.[1] This is particularly true for vulnerable or underserved populations, as well as populations not well served by transit where first mile/last mile transformative technology solutions may apply. This initiative will help the region achieve its goal of reducing congestion, lowering emissions, and providing equitable access to underserved populations. In addition, safety, including the perception of it, has a significant impact in the decision of travelers when selecting modes of transportation. As such, addressing any safety concerns could shift the modal split towards more environmentally friendly alternatives, such as transit and micromobility vehicles.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** The ATL (Lead), ARC, GDOT, transit agencies, other transportation services providers (e.g., shared use, micromobility)

| ACTION 8.1 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Assess, plan and conduct outreach to vulnerable and underserved communities to identify challenges and user safety concerns, as well as specific zones and areas that pose significant challenges. |
| | N2 | Implement policies/regulations to ensure that existing and new mobility alternatives provided in the region also serve vulnerable areas/populations. |
| | N3 | Develop action plan, remediation, and guidance on how transformative technologies and MaaS solutions may address mobility challenges. |
| | N4 | Develop public-private partnerships to deploy new/existing mobility alternatives in vulnerable areas. |
| MID | M1 | Invest in pilot projects that support action and corrective approaches to challenges (from near term review and assessment). |
| LONG | L1 | Expand coverage and update systems/hardware/infrastructure if needed. |

[1] See https://www.its.dot.gov/its4us/index.htm for definition of "Complete Trip"

## Initiative 8: Advance Mobility as a Service

## ACTION 8.2: DEVELOP A MOBILITY PLATFORM THAT INCLUDES AN INTEGRATED, MULTIMODAL TRIP PLANNING AND ELECTRONIC PAYMENT AND BOOKING SYSTEM

**Description and Benefit to the Atlanta Region:**
A Mobility Platform combines transportation services (public and private) through a one-stop gateway that enables the users to plan, manage and pay for trips, all from a single account. This simplified process could optimize travel within the region by making transit and other mobility alternatives more attractive when compared to driving alone. Initial development of this platform is related to the FTA Integrated Mobility Innovation (IMI) grant for a *Branded Multi-Modal Journey Planner*.

**Goals:** **Foundational Elements:**

**Stakeholders:** The ATL (Lead), transit agencies, SRTA, public/private parking providers, shared use mobility providers, and ARC

| ACTION 8.2 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Hold meetings with stakeholders to identify needs and "complete trip" scenarios (including accessible public right of way conditions, curb and micromobility vehicle management). |
| | N2 | Develop "Mobility Platform" System Engineering documents to apply for Federal Grants. |
| | N3 | Begin developing regional fare/fee policies (dependent on implementing regional transit fare policies, see Action 7.2). |
| | N4 | Develop preliminary customer-facing trip planning tools (e.g., open trip planner) for transit as a precursor. |
| MID | M1 | Implement real-time data fusion and integration platform for situational awareness for performance and operations of all modes. |
| | M2 | Procure development of common payment platform. |
| | M3 | Augment trip planner to include multimodal systems, seamless travel and transitions between legs of linked trips. |
| | M4 | Develop data governance policies and funding to sustain information, operations and maintenance of the system |
| LONG | L1 | Update and refresh system as needed |
| | L2 | Implement public sector regional fare/fee policies, media and sales channels and incrementally deploy in the common payment platform |

## Initiative 8: Advance Mobility as a Service

## ACTION 8.3: IDENTIFY OPPORTUNITIES TO FURTHER INCENTIVIZE SUSTAINABLE TRAVEL OPTIONS

**Description and Benefit to the Atlanta Region:**
Opportunities to promote environmentally sustainable travel options can be targeted to meet personal needs of each traveler. In conjunction with Action 8.2, this action involves developing incentives, subsidies and rewards to promote sustainable travel options such as use transit, first mile/last mile connection strategies, microtransit, carpools with preferred parking, and telework. Incentives can take various forms including toll discounts, transit discounts, reward programs, or gamification platforms that provide non-financial rewards.

**Goals:** 

**Foundational Elements:** 

**Stakeholders:** ARC (Georgia Commute Options) (Lead), the ATL, SRTA, GDOT, transit agencies, and private sector service providers / shared use mobility providers

| ACTION 8.3 CHECKLIST | | |
|---|---|---|
| **TERM** | **ID** | **ACTION** |
| NEAR | N1 | Develop playbook on alternative sustainable travel options including inclusion of underserved communities. |
| | N2 | Initiate pilot grant program to promote innovation in providing sustainable travel options. |
| | N3 | Secure funding to sustain program to meet long-term goals including sufficient quantity of vehicles to provide wheelchair accessible vehicles. |
| MID | M1 | Integrate pilots and proven strategies into mobility platform (Action 8.2) to provide wider opportunities across the region. |
| | M2 | Continue to evolve and test innovations through pilot grant program. |
| LONG | L1 | Evaluate program and update as needed. |

## 5.9 Key Connections across Strategic Initiatives and Priority Actions

Within this strategic plan, the eight strategic initiatives (SIs) include 30 priority actions, along with checklists that include short, mid and long term actions. Figure 6 lays out the eight initiatives, showing connections between them, most notably the strong role that the first three initiatives play in supporting all of the others. The first three initiatives focus on strengthening TSMO foundational elements – collaboration, data sharing, culture of innovation – while initiatives 4 through 8 primarily focus on deployment of strategies or proof of concepts that target key TSMO goals. As a result, SI 1, 2, and 3 advance key actions that are necessary to build solid institutional and data driven capabilities for the higher numbered SIs.

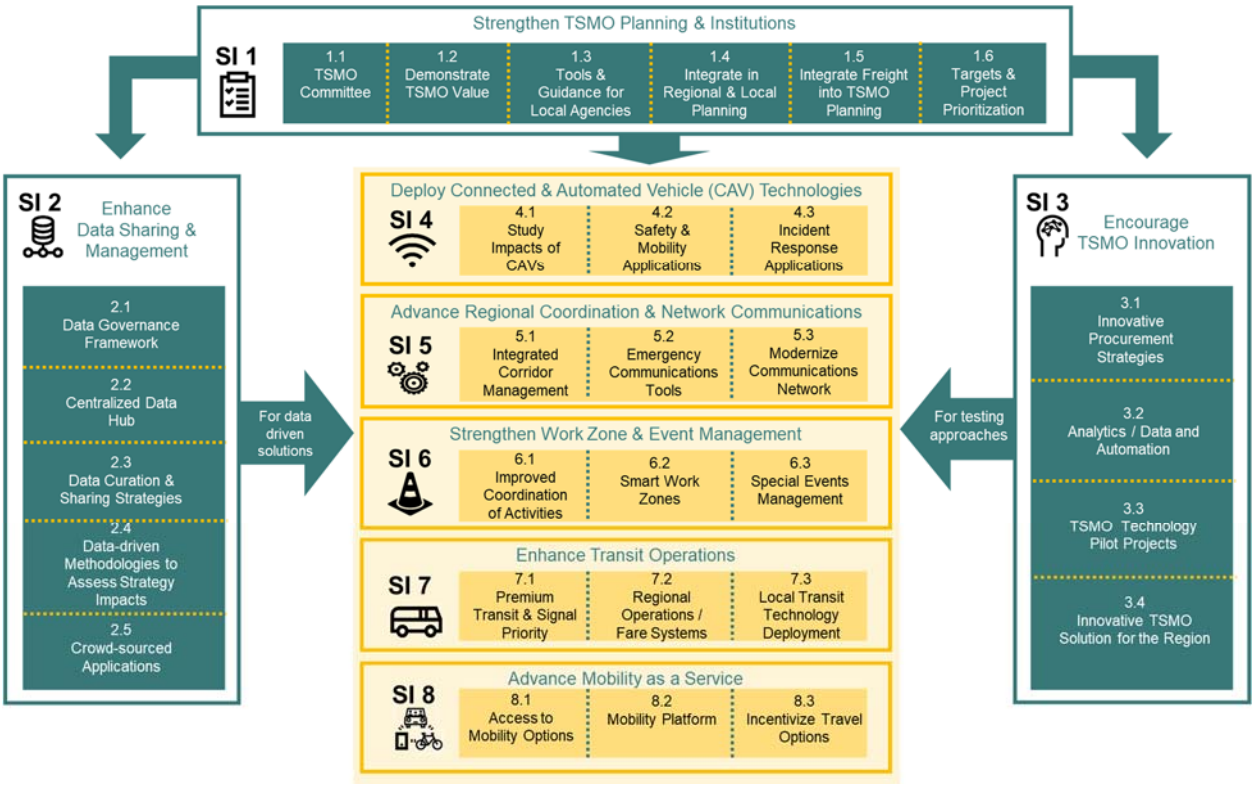



**Figure 6. Connections across Strategic Initiatives and Priority Actions**

Specifically --

**SI 1 – STRENGTHEN TSMO PLANNING AND INSTITUTIONS** supports establishing the environment and structures to support collaboration in planning, developing, and operating other actions including creating regional planning processes, funding and information sharing structures to promote TSMO goals. Effective implementation of the SIs depends on establishing this regional and collaborative institutional framework.

**SI 2 – ENHANCE DATA SHARING AND MANAGEMENT** actions establish a regional / enterprise data management framework so that when projects are deployed, the data created, generated, used and stored are interoperable and accessible for all downstream systems. For example, *improving data sharing strategies* (Action 2.3) will enable the deployment of Initiative 5, Advance Regional Coordination and Network Communications, particularly for data driven systems like Integrated Corridor Management (action 5.1). Whenever a tool is developed that relies on data, the data

governance structures in SI 2 apply. Even Action 7.2 actions to collect and provide GTFS and GTFS Real Time should apply similar data governance principles to managing the data. The data collection and distribution tools identified in SI 5 on regional coordination and SI 6 on work zone and event management are also data-driven systems that share information among regional stakeholders, and rely on applying data of the same or similar quality in order to ensure regional interoperability and access. Every action has a data element associated with it, and can contribute to the common data hub envisioned for Action 2.2.

**SI 3 – ENCOURAGE TSMO INNOVATION** actions are set up to enhance mid- and long-term program objectives by establishing an institutional framework in which project ideas may be conceptualized, tested, and shared throughout the region. In an innovative environment, taking risks in thinking outside the box in programs associated operational initiatives, whether in relationship to procurement approaches, policies, data analytics, or technology deployment are encouraged through actions described in this strategic initiative. These actions support testing or piloting of many of the actions within the central set of initiatives.

In addition, many actions build on each other, leveraging the progress, capability or decisions applied by other actions. Each of the initiatives in the center of the diagram (SI 4 through 8) have connections. For instance, Action 4.2 *Leverage Connected Vehicle Technologies to Improve Safety and Mobility for All Travelers* supports several of the priority actions under Initiative 5: *Advance Regional Coordination and Network Communications* (specifically, 5.1 focused on integrated corridor management and 5.2 on emergency communications tools); Initiative 6: *Strengthen Work Zone and Event Management* (all actions); Initiative 7: *Enhance Transit Operations* (specifically 7.1 on premium transit and signal priority and 7.3 on local transit technology deployment); and Initiative 8: *Advance Mobility as a Service* (specifically 8.2, with a mobility platform including a real-time data fusion). As another example, Action 7.2 *Develop regional, interoperable fare policies and fare payment system* provides the transit integration that is needed to implement the development of a multimodal electronic payment and booking system (Action 8.2).

When appropriate, the dependency, support or influence of specific time-based actions to other actions are detailed in the Action checklist.

# 6 Next Steps / Implementing this Plan

As a Strategic Plan, this document lays out a broad strategy for advancing a vision for how TSMO can continue to support the Atlanta region's sustainable growth. Implementing this plan will require concerted efforts and collaboration among many partners at different levels of government, as well as private sector partners. The Strategic Initiatives defined here lay out an actionable plan for achieving the region's vision, and the priority actions provide steps for moving forward. To be successful, the implementation of this plan will require champions to take the lead, and undertake the important task of coordination among many partners. The Atlanta Regional Commission will play a key role in this effort through the formation of a TSMO Committee that is intended to support the implementation of this plan.

At the same time, it is more apparent than ever that the world is changing rapidly and so while it is vital to plan ahead, it is important to remain nimble. Not only due to the rapid advances in technology, but as the massive disruptions of the COVID-19 pandemic have demonstrated, there are potential current and future risks that may alter thinking about travel behavior, safety and security, and mobility needs. All of these risks require considerations and highlight the critical role that transportation plays in moving goods and people to meet vital needs and in the resiliency of communities. As such, while the action lists should form a good starting point for regional coordination, it is anticipated that this will be a document that should be reviewed and updated over time.

ARC will track progress in relation to the actions outlined in the plan. By monitoring progress on actions and adjusting as needed, ARC and regional partners together will be able to reassess TSMO maturity and adapt as needs require and technology continues to evolve. Moreover, ARC will continue to monitor and report on transportation system performance outcomes in order to assess progress toward the TSMO vision and goals of this plan for safer, more reliable, and efficient mobility for all system users, contributing to sustainable economic growth and a high quality of life. As such, this plan provides a framework for advancing TSMO in ways that go beyond simply moving traffic, and to support the region in achieving its overarching aim to Win the Future by providing world-class infrastructure, building a competitive economy and ensuring the region is comprised of healthy, livable communities.