PILOT PROJECT SUMMARY

Transportation System Management and Operations (TSMO) Vision and Regional Intelligent Transportation Systems (ITS) Architecture Update

FINAL — 01/20/20
TASK 5

Prepared for

ARC

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1 Introduction

To support and encourage innovation throughout the Atlanta region and a framework for the region's transportation future, the Atlanta Regional Commission initiated the Transportation System Management and Operations (TSMO) Vision and Regional Intelligent Transportation Systems (ITS) Architecture Update. While ARC currently has a robust process for evaluating and prioritizing transportation projects for metro Atlanta's Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP), previous iterations of project criteria and corresponding metrics did not actively support TSMO strategies or deployments outside of roadway specific projects. The criteria also was not flexible enough to enable ARC to efficiently evaluate TSMO projects as new technologies come online, limiting this desired innovation.

In early summer 2019, ARC issued a call for pilot project ideas from the region's private and public sectors to better understand the region's interest and needs within TSMO. The response to the call for projects demonstrated the region's strong interest in TSMO deployments as well as enabled the study team to determine a methodology for how to assess these types of projects. This screening methodology was used to select projects that would provide case studies for further consideration and also vet the evaluation process that ARC will use in future TIP solicitations. While no funds were dedicated to deploy these pilot projects, sponsors of these projects were provided the data and information collected by the study team during the project assessment.

The following sections provide an overview of the process that was used to develop recommendations for the ARC TIP Project Evaluation Framework for TSMO projects.

2 Project Screening

To effectively evaluate and adapt the current project prioritization framework to consider the ever-changing spectrum of TSMO technologies, ARC conducted a call for pilot projects ideas to test the current process (Figure 1). Fifty-six projects were submitted by a variety of state, county, and municipal entities as well as private sector consultants and vendors. These projects included ideas for vehicular mobility, freight, transit, data sharing, Smart Cities, and bike/ped/shared mobility deployments. The study team consolidated the types of projects into five overarching categories (number of projects submitted), with Connected Vehicle technologies receiving the most submissions in the call of project ideas.

Figure 1: Call for Pilot Project Ideas

- Connected Vehicle (20)
- Application (10)
- Data (9)
- Smart City (5)
- Autonomous (4)

Once projects were categorized by type, the study team developed a screening methodology to assess projects using a variety of factors to determine project feasibility and value to the region's TSMO future. Those criteria include cost, alignment with regional goals, level of complexity, anticipated regional impact, and conceptuality, which are defined in the table below.

The screening methodology assessed submitted projects at a high-level to identify five projects—representative of the spectrum of TSMO strategies and technologies—for further consideration and vetting.

Table 1: Pilot Project Case Studies Selections

CRITERIA	DEFINITION
COST	Cost, in terms of both time and monetary investment, was used to assess projects in order to consider the feasibility of the idea as a pilot case study. Assessed in terms of high, medium, and low cost.
GOALS	Projects were assessed for their alignment to the regional TSMO goals identified for this study. Evaluated for applicability to Safety; Efficient, Seamless Travel; Equitable Access; Reliable Travel Times.
COMPLEXITY	To assess complexity, the study team determined if the project idea would build on an existing initiative and/or infrastructure or if it required significant research, development, and/or coordination to implement and integrate. Assessed in terms of high, medium, and low complexity.
REGIONAL IMPACT	The study team determined if the project was anticipated to provide impact only to the immediate, local jurisdiction, to multiple jurisdiction, or across the region. Assessed in terms of high, medium, and low regional impact.
CONCEPTUALITY	Project conceptuality was used to assess how developed the project was and the level of work that had previously been conducted prior to the call for projects. Assessed based on categories of conceptuality: Builds off existing initiative and/or infrastructure; Location/goal defined; Idea moderately refined, further development required; Deployment requested, needs extensive research beforehand; Study/research/non-deployment project.

These criteria were not thought as scores or limits; this screening process was focused on determining the breadth and potential areas of future interest. In addition to these criteria, the study team also considered if the pilot project idea had a project champion as well as if it was location specific to assess feasibility of implementation.

The following page illustrates how the study team used the criteria from the screening methodology to assess the pilot project ideas.

SCREENING METHODOLOGY

COST	$	Low: Requires **minimal** investment of time and/or money to implement
	$$	Medium: Requires **moderate** investment of time and/or money to implement
	$$$	High: Requires **significant** investment of time and/or money to implement
GOALS		**SAFETY** Applying technology and context-sensitive approaches to achieve zero fatalities
		EFFICIENT, SEAMLESS TRAVEL Coordinated systems across jurisdictions and modes; accessible, real-time travel information
		EQUITABLE ACCESS People of all ages, abilities, languages, backgrounds, and incomes have access to safe, reliable, efficient mobility options
		RELIABLE TRAVEL TIMES Managing planned and unplanned disruptions to reduce unexpected delays
COMPLEXITY		Low: Builds off of an existing initiative/infrastructure
		Medium: New initiative, but concept of operations is vetted and understood
		High: Significant integration, research, development, and/or multi-jurisdictional coordination required
REGIONAL IMPACT		High: Project expected to impact the region significantly
		Medium: Project expected to impact multiple jurisdictions
		Low: Project expected to impact local jurisdiction only
CONCEPTUALITY	1	Builds off of existing initiative and/or infrastructure
	2	Location defined; Goal defined
	3	Idea moderately refined, further development required
	4	Deployment requested; needs extensive research beforehand
	5	Study/research/non-deployment project

Figure 2: Call for Pilot Project Ideas

3 Project Vetting

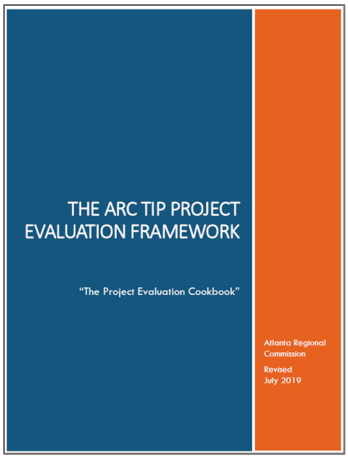
All 56 pilot project ideas were assessed using the screening methodology and the study team identified five pilot projects to serve as case studies to refine ARC's TIP project evaluation framework. The projects selected were representative of TSMO technologies and varied in their complexity, regional impact, and level of conceptuality.

Table 2 details these five pilot project ideas. The appendix of this document includes overviews of each of the pilot project case studies and the screening assessment matrix.

Table 2: Pilot Project Case Studies Selections

PILOT PROJECT IDEA	PROJECT DESCRIPTION	SUBMITTING ORGANIZATION
Virginia Avenue Smart Corridor DSRC v. Cellular V2X Pilot	Conduct a DSRC v. C-V2X (4G LTE and 5G) pilot study along the Virginia Avenue Smart Corridor as a follow-up of the Virginia Avenue Smart Corridor Study	Aerotropolis Atlanta Community Improvement Districts (CIDs)
Shared Autonomous Shuttle Demonstration	Test the use of a sensor-enabled Autonomous Driving System (ADS) over a 2-year performance period to refine and test routes and operations	City of Chamblee
Connected Data Platform Expansion	GDOT seeks to expand the utility of the Connected Data Platform (CDP) for additional users and applications by partnering with ARC to increase the user base and the number of data sets ingested by the CDP	Georgia Department of Transportation
Gwinnett County Connected Vehicle Applications	Building on the success of the first generation applications, the ARC pilot project concept will focus on additional applications that may include: Transit, conditional priority based on transit schedule adherence; Transit, conditional priority based on bus occupancy; Transit/pedestrian, driver alert for pedestrian presence; Pedestrian, driver alert for mid-block pedestrians; Pedestrian, applications that support the visually impaired	Gwinnett County Department of Transportation
Regional Trip Planner (with Multi Variable Capabilities)	Develop a mobile/web app that combines all existing public mobility functions/data in the region with the ultimate goal of supporting mobility as a service (MaaS)	MARTA

4 TIP Project Evaluation Framework Recommendations



The pilot project case studies enabled the study team to identify recommendations to refine ARC's TIP Project Evaluation Framework to better consider and evaluate TSMO strategies and technologies in future TIP solicitations.

The table on the following page illustrates how the project types identified through the pilot project screening assessment align with the RTP goals and performance criteria in the existing TIP Project Evaluation Framework.

To evaluate TSMO projects, the study team also identified potential measures or data sources specific to TSMO technologies and their benefits. These recommended metrics are described in detail on the pilot project case study sheets included in the appendix.

Table 3: TIP Project Evaluation Framework Incorporation of TSMO Projects

Atlanta Region's Plan Goals	Performance Criteria	Recommended TSMO Project Types			
		Roadway Transportation Systems Management & Operations (existing)	Connected Vehicle Transportation Systems Management & Operations	Autonomous Vehicle Transportation Systems Management & Operations/Transit Expansion	Data / App / Other Transportation Systems Management & Operations
World Class Infrastructure	Mobility & Congestion	X	X	X	X
	Reliability	X	X	X	X
	Network Connectivity	X	X	X	
	Multimodalism	X	X	X	X
	Asset Management & Resiliency			X	X
Healthy Livable Communities	Safety	X	X	X	X
	Air Quality & Climate Change	X	X	X	X
	Cultural & Environmental Resources	X		X	X
	Social Equity	X	X	X	X
	Land Use Compatibility			X	
Competitive Economy	Goods Movement	X	X		X
	Employment Accessibility	X	X	X	X

5 Appendix

PILOT ID	PILOT PROJECT TITLE	SUBMITTING ORGANIZATION	PILOT PROJECT DESCRIPTION	PROJECT TYPE	SPECIFIC LOCATION	CHAMPION	CONCEPTUALITY	COMPLEXITY	RELATIVE COST	GOALS	REGIONAL IMPACT
PP-01	Virginia Avenue Smart Corridor DSRC v. Cellular V2X Pilot	Aerotropolis Atlanta CIDs	Conduct a DSRC v. C-V2X (4G LTE and 5G) pilot study along the Virginia Avenue Smart Corridor as a follow-up of the Virginia Avenue Smart Corridor Study	Vehicular Mobility			1		$$		
PP-02	Emergency Vehicle Preemption Technology	Temple	Use connected vehicle preemption technology to provide green lights at traffic intersections to allow safe passage of the emergency vehicle while bringing all public vehicles safely to a halt. Specifically, this is a concern in rural areas were speeds at signalized intersections are high	Vehicular Mobility			1		$$		
PP-03	Wrong Way Detection	MH Corbin, LLC	Utilize existing rader and/or camera infrastructure (Connect:ITS) to detect, verify, and alert in real-time wrong-way driving vehicles and sends information to the TMC/other agencies	Vehicular Mobility			1		$		
PP-04	Smart Corridor Study	Sandy Springs	Conduct a smart corridor study on Mount Vernon Hwy corridor between Sandy Springs MARTA Station and Sandy Springs City Center	Vehicular Mobility			2		$		
PP-05	Intelligent Left Turn Signals	Temple	Install Intelligent Left Turn's where there are unprotected left turns with high-speed dual lane traffic	Vehicular Mobility			4		$$		
PP-06	Emergency Vehicle Response Time	City of Sandy Springs	Leverage the City of Sandy Springs' investment in emergency vehicle preemption at traffic signals by coordinating with existing CAD systems' routing algorithms (uses GPS and signal geofencing data to make real-time adjustments to predetermined dispatch routes)	Vehicular Mobility			4		$$		
PP-07	Principal Arterial Speed Limits	City of Atlanta	Implement variable speed limits on principal arterials during AM and PM peak hours to assist with progression	Vehicular Mobility			5		$$$		
PP-08	Shared Autonomous Shuttle Demonstration	City of Chamblee	Test the use of a sensor-enabled Autonomous Driving System (ADS) over a 2-year performance period to refine and test routes and operations	Vehicular Mobility			5		$		
PP-09	Autonomous Vehicles	City of Atlanta	Study the use of autonomous vehicles	Vehicular Mobility			5		$		
PP-10	Aerotropolis Signal Priority for Trucks	Aerotropolis Atlanta CIDs	Conduct a pilot study for signal priority or preemption for trucks on one or more corridors as a result of the Aerotropolis Freight Cluster Plan	Freight			1		$$		
PP-11	TravelSafely Pro App	Temple	Utilize the TravelSafely app to provide freight vehicles green lights at traffic intersections during off-peak periods	Freight			1		$		
PP-12	State Route 6/Thornton Road Freight Prioritization: Signal Priority	Douglas County Board of Commissioners	Freight truck preempption to recognize trucks and analyze speeds to avoid accidents	Freight			1		$		
PP-13	State Route 6/Thornton Road Freight Prioritization: Truck Parking	Douglas County Board of Commissioners	Technology-based truck staging for intermodal facility and facilities along SR-6	Freight			3		$$		
PP-14	State Route 6/Thornton Road Freight Prioritization: Truck Platooning	Douglas County Board of Commissioners	Provide SmartCorridor/connected technologies and infrastructure to support truck platooning on SR-6	Freight			5		$$$		
PP-15	SR 74 Freight ITS System	South Fulton Community Improvement District	Improve the existing freight corridor along SR 74 to McClarin Rd through a combination of technology and roadway improvements to combat freight-induced congestion and mobility challenges surrounding the growing CSX intermodal terminal in Fairburn, GA. The primary ITS elements of the project include using dynamic message signage to alert truck drivers on SR 74 when McLarin Road is blocked by a CSX train and then direct drivers to an alternate route on US 29/Roosevelt Highway."	Freight			2		$$		
PP-16	Multimodal Efficiency Corridor: Transit Signal Priority and SCOOT	Sandy Springs; MARTA	Incorporate transit signal priority capability into existing traffic signals along Roswell Road which are currently equipped with SCOOT	Transit			1		$$		
PP-17	Regional Transit Signal Prioritization	SRTA	Coordinate with Georgia DOT and regional transit operators to implement transit signal prioritization and/or preemption (TSP) in common transit corridors	Transit			1		$$		
PP-18	Transit Signal Priority	Temple	Use Transit Signal Priority (TSP) to improve bus systems throughout metro-Atlanta	Transit			1		$$		

PILOT ID	PILOT PROJECT TITLE	SUBMITTING ORGANIZATION	PILOT PROJECT DESCRIPTION	PROJECT TYPE	SPECIFIC LOCATION	CHAMPION	CONCEPTUALITY	COMPLEXITY	RELATIVE COST	GOALS	REGIONAL IMPACT
PP-19	North Point Autonomous Shuttle	City of Alpharetta	Implement an autonomous shuttle in North Point	Transit			3		$$$		
PP-20	Dynamic Bus Routes	MHP Americas	Offer bus routes that vary based on time of day and specific on-demand routes	Transit			4		$		
PP-21	On-Demand Multimodal Transit Systems for Atlanta	Georgia Institute of Technology	Conduct a pilot study to explore the concept of On-Demand Multimodal Transit Systems (ODMTS) as it exploits advances in data and decision sciences to transform public transit in Atlanta and addresses accessibility, congestion, and parking issues	Transit			5		$		
PP-22	Active Transport bundled Transit	MHP Americas	Include bikeshare into MARTA prices to incentivize transit and support first/last mile	Transit			5		$$		
PP-23	Real time Transit Trip Coordination - Bus	Gwinnett County Transit	Develop an algorithm that allows bus coordination to be completed in real-time; the algorithm would make decisions on whether to hold a bus to make bus connections while evaluating the down stream impacts	Transit			5		$$		
PP-24	Public Transit Equity Pricing	MHP Americas	Vary transit pricing based on household income, household size, and distance from nearest public transit	Transit			5		$$$		
PP-25	Dockless Mobility Corrals	MHP Americas	Create strategic corrals for scooters, bikes, and mo-peds on sidewalks and public right-of-way	Bike / Ped / Shared			1		$$$		
PP-26	TravelSafely App	Temple	Utilize the TravelSafely app which provides 20 connected vehicle applications to the user, with additional applications added with over-the-air software to avoid collisions, "get ready for green," red light turning and many more.	Bike / Ped / Shared			1		$		
PP-27	Next Generation of Pedestrian Crossing Equipment Installation	Temple	Install the next generation of pedestrian crossing equipment (intelligent solar powered/connected vehicle devices) that will communicate to drivers and pedestrians when it is safe or unsafe to cross the road	Bike / Ped / Shared			2		$$		
PP-28	Pedestrian Detection and TIM via DSRC and/or 5G	MH Corbin, LLC	Utilize cameras with analytics (Connect:ITS) to monitor pedestrians and alert oncoming motorists	Bike / Ped / Shared			2		$$		
PP-29	Pedestrian Detection	City of Atlanta	Implement pedestrian detection systems into infrastructure at high ped volume intersections or midblock crossings	Bike / Ped / Shared			2		$		
PP-30	Real-time On-Street Parking Vacancy Tracking	City of Atlanta	Utilize real-time on-street parking vacancy tracking to set the stage for dynamic parking pricing	Parking			2		$$$		
PP-31	Curb Space Data Collection and Monitoring Tool	AECOM	Allvision has developed a Lidar-based data collection method that maps and tracks curb space occupancy, and for the ARC pilot, the goal is to digitally capture data for a small urban area to collect data and provide metrics for the curb activity	Parking			3		$$$		
PP-32	Connected Data Platform Expansion	Georgia Department of Transportation	GDOT seeks to expand the utility of the Connected Data Platform (CDP) for additional users and applications by partnering with ARC to increase the user base and the number of data sets ingested by the CDP	Data			1		$$		
PP-33	Smart Pavement Technology	City of Atlanta	Implement in-roadway censors/smart pavement technologies to provide data about roadway variables	Data			2		$		
PP-34	Video-based Technology	City of Atlanta	Utilize video-based technology to quantify near misses	Data			2		$$		
PP-35	Dockless Mobility Data Aggregation	City of Atlanta Office of Mobility Planning	Create a method of aggregating and analyzing data from all dockless scooter/e-bike companies that protects data privacy, tracks compliance with regulations, and analyzes data for planning functions	Data			2		$$		
PP-36	Shareable Dockless Mobility Device Study	City of Atlanta	Share dockless mobility device data (e.g. scooters)	Data			2		$$		

PILOT ID	PILOT PROJECT TITLE	SUBMITTING ORGANIZATION	PILOT PROJECT DESCRIPTION	PROJECT TYPE	SPECIFIC LOCATION	CHAMPION	CONCEPTUALITY	COMPLEXITY	RELATIVE COST	GOALS	REGIONAL IMPACT
PP-37	Gwinnett County Connected Vehicle Applications	Gwinnett County Department of Transportation	Building on the success of the first generation applications, the ARC pilot project concept will focus on additional applications that may include some or all of the following: • Transit, conditional priority based on transit schedule adherence • Transit, conditional priority based on bus occupancy • Transit/pedestrian, driver alert for pedestrian presence when bus or transit door is opened • Pedestrian, driver alert for mid-block pedestrians • Pedestrian, applications that support the visually impaired	App			1		$$		
PP-38	Mobile Parking App	City of Atlanta	Implement a mobile parking app to assist motorists of vacant parking locations	App			2		$$		
PP-39	Regional Mobility App	MARTA	Develop a mobile/web app that combines all existing public mobility functions/data in the region with the ultimate goal of supporting mobility as a service (MaaS)	App			3		$		
PP-40	Mobility Planner App Function	MARTA	Develop a planning app/website that accepts multiple trips needed to be taken in a day/across days and outputs alternative multi-modal results for the best mobility plan to be taken	App			3		$$		
PP-41	Regional Trip Planner (with Multi Variable Capabilities)	MARTA	Develop a single-trip planner that includes options for all possible modes of transportation and takes multiple variables into account	App			3		$$		
PP-42	One App to Rule Them all	Gwinnett County Transit	Develop an app that allows users to plan and evaluate all transportation options in the metro-Atlanta area in one app	App			3		$$		
PP-43	Bicycle and Pedestrian Trip Planning Application	Sandy Springs	Add onto smartphone apps to show options for trip routes per mode, ultimately giving safer and more travel options to pedestrians and bicyclists	App			3		$$		
PP-44	GiveMeGreen	ARC - Transportation Access and Mobility Group	Utilize the GiveMeGreen app to improve bicycle and scooter safety while improving the travel experience for all modes of transportation. The app automatically detects bicyclists/scooter users and actuates traffic signals.	App			3		$		
PP-45	Atlanta Transit Wallet	MHP Americas	Develop a mobile app to pay for all transit and mobility options outside of parking and tolls	App			5		$$$		
PP-46	Multi-disciplinary Smart Cities Mobility Ecosystem	Aerotropolis Atlanta Community Improvement Districts; GDOT	Peds and two-wheel riders will use a smartphone app to receive audible warnings of pending collisions as well as alert drivers of peds in their path. AI Intelligent Mobility Traffic Device (IMTD) will be fit into all traffic cabinets in the district in preparation for CAV. Emergency vehicles, transit, and school busses will be fitted with AI on-board units. Intelligent school beacons will also be deployed.	Smart City			1		$$$		
PP-47	MARTA WiFi Beacons	MARTA	Deploy WiFi beacons at various rail/bus/transit centers and stops	Smart City			1		$		
PP-48	Black Ice and Surface and Sub Surface Temperature Alert System	MH Corbin, LLC	Utilize Connect:ITS and VX-21 (from MH Corbin) to alert motorists and traffic management centers in real time of black ice formation/any changes to the roadway surfaces	Smart City			2		$		
PP-49	Autonomous Shuttle Study	Sandy Springs	Create a multi-use path, including autonomous shuttle service, between the North Springs MARTA Station and companies on Glenlake Parkway	Smart City			4		$$$		
PP-50	Cherokee County Traffic Management Center	Cherokee County	Allow counties (Cherokee County) to remotely monitor and manage traffic signals	Vehicular Mobility			6				
PP-51	Traffic Light Phasing	GCA, Inc.	Introduce a new traffic phase: a red/yellow phase (after the red phase and before the green phase) that alerts drivers of an upcoming green phase. This would help in reducing start up loss time at the start of the green phase	Vehicular Mobility			6				
PP-52	Alternative Transport Benefits	MHP Americas	Provide tax benefits for lower car ownership/household size, bike ownership, and usage on Atlanta roads	Bike / Ped / Shared			6				
PP-53	Bicycle and Pedestrian Detection and Automated Counts at Signals	City of Atlanta	Deploy ped/bike detection and automated counts at signals.	Bike / Ped / Shared			6				

PILOT ID	PILOT PROJECT TITLE	SUBMITTING ORGANIZATION	PILOT PROJECT DESCRIPTION	PROJECT TYPE	SPECIFIC LOCATION	CHAMPION	CONCEPTUALITY	COMPLEXITY	RELATIVE COST	GOALS	REGIONAL IMPACT
PP-54	ATL Transits Technology Integration	State Road and Tollway Authority (SRTA)	SRTA intends to create an ITS network based on the ARC-sponsored Regional ITS Architecture Update Study and ultimately allow other state agencies', cities', and counties' transit operators access to the new ITS network	Data			6				
PP-55	Road Data Collection Technology	City of Atlanta	Create a technology that reports existing, future, and past constrained road information, especially useful for planning what roads are at or will be at LOS capacity	Data			6				
PP-56	North Point WiFi/Small Cell integrated Art Installations	City of Alpharetta	Install WiFi/Small Cell Infrastructure in North Point	Smart City			6				

Virginia Avenue Smart Corridor: DSRC v. Cellular V2X Pilot (CV)

Description

The Virginia Avenue Smart Corridor Study pilot project is a proposed continuation of an ongoing effort by Aerotropolis Atlanta CIDs (AACIDs) to ultimately improve safety and mobility along the 2-mile corridor near the airport. Utilizing an ARC LCI grant, AACIDs determined through preliminary assessment that connected vehicle technology integration has the potential to significantly improve the corridor's safety and mobility. Inadequate real-world understanding of emerging technologies like Dedicated Short-Range Communication (DSRC) or Cellular Vehicle-to-Everything (C-V2X) presents a barrier for practitioners and agencies when deciding how to best use technology within specific corridor contexts. The proposed project will test and compare the two primary methods of connected vehicle communication, DSRC and C-V2X (4G LTE or 5G), by distributing different systems across the ten existing traffic signals along the corridor. Metrics will be developed for each intersection based on the connectivity, latency, and intended function of the use case to determine the best telecommunications fit for each. AACIDs intends to develop operational, system, and safety metrics to determine the optimal communication method per use case. The intent is to share these results publicly to inform the Atlanta region and the larger industry.

Goals and Benefits

This project seeks to determine the preferred method of communication for optimal connected vehicle applications. The results of this study will provide enhanced:

Safety

CV safety applications have the potential to greatly reduce crashes and severity. Warnings and alerts to drivers can assist in crash avoidance.

Reliable Travel Times

CV mobility applications have the potential to improve operational efficiency through communication of SPaT data to drivers. Improvements in travel time and reliability result from a reduction in congestion due to improved operations and a decrease in unplanned events.

Virginia Avenue Project Corridor

High-level Cost Estimate

High-level cost estimates were based on the following equipment and labor-based assumptions:

- The DSRC and C-V2X unit will funded and deployed through the Connected Vehicle Program at all existing signals, totaling 10 units - $0
- GDOT will provide on-board vehicle units for a minimum of two vehicles - $0
- GDOT will provide access to the connected vehicle central system database for data access - $0
- GDOT will make intersection upgrades to traffic signals, software, and cabinets as is currently planned - $0
- Post processing of data will be included in the cost of the research and analysis
- Expenses will include any diagnostic applications and hardware required to assess performance metrics
- An engineering study will be performed which will include data collection, analysis and reporting or results

Cost Estimate: $100,000

Virginia Avenue Smart Corridor: DSRC v. Cellular V2X Pilot (CV)

Prioritization Metrics

The following prioritization metrics are provide for TIP solicitation inclusion. In addition, recommendations have been provided for prioritization methodology refinements specific to Connected Vehicle proposed projects.

World Class Infrastructure			
Criteria	**Metric**	**Source**	**Project Metric**
Mobility & Congestion	1) Current project limit peak period travel time index (TTI) 2) Absolute change in vehicle hours of delay (VHD) in the build vs no build scenario for the worst traffic time period - Recommend - Average daily bottleneck duration per mile (hour/mile/day)	1) ARC; RITIS 2) ARC; RITIS	1) 1.3 2) 0.98 hours per mile per day
Reliability	Worst hour travel time reliability; Aggregated 80% travel time / 50% travel time for all weekdays	ARC	1.13
Network Connectivity	Is the project located on, or does it connect to, a regional policy network? (Yes/No)	ARC	YES
Multimodalism	Additional person throughput by active modes - Recommend - Does the proposed project include multimodal applications or have a plan for inclusion? (Yes/No)	Sponsor	NO

Healthy Livable Communities			
Criteria	**Metric**	**Source**	**Project Metric**
Safety	1) Serious injury + fatality crash rate per 100 million VMT (crashes per 100 million VMT) 2) Bicycle/Pedestrian Crash Risk Score 3) Safety countermeasures proposed (Yes/N0)	1) ARC; GEARS database 2) ARC; Safe Streets Action Plan 3) Sponsor; Does the proposed project include safety applications such as Emergency Vehicle Preemption (EVP)?	1) 15.8 100M VMT 2) Crash Risk Score: Bike = 5; Ped = 5 3) NO
Air Quality and Climate Change	1a) Change in Nox, VOC, & PM2.5 emissions (kg/year) 1b) Change in greenhouse gas emissions CO2 (kg/year) 2) Is the project located in a PM2.5 hotspot (Yes/No)	ARC	Hold

Virginia Avenue Smart Corridor: DSRC v. Cellular V2X Pilot (CV)

Prioritization Metrics (continued)

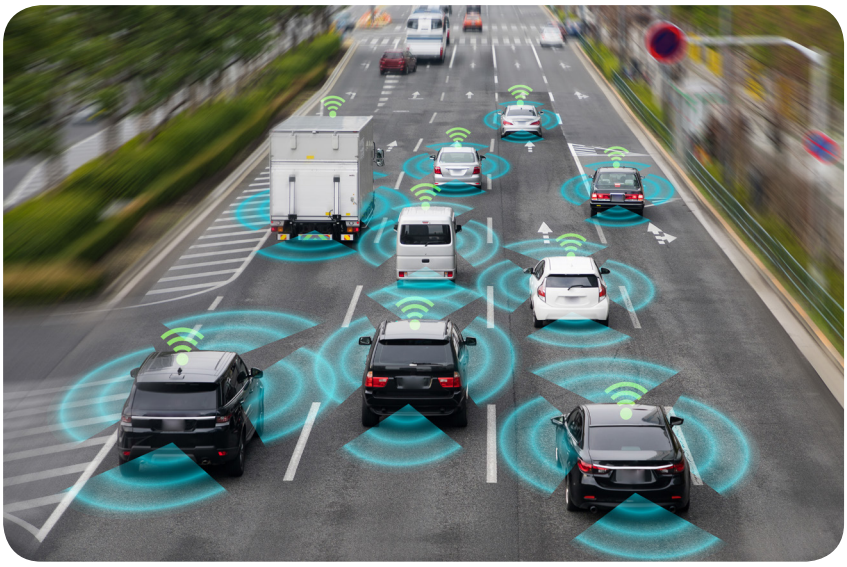
Healthy Livable Communities			
Criteria	**Metric**	**Source**	**Project Metric**
Social Equity	Does project serve a minority or low-income community? (Written Response)	Sponsor Written; sponsor provides an assessment of how developing the project will support these populations. ARC Scored; this information is used to screen projects to receive a score.	Within the proposed project area, the minority and low-income population are significantly higher than both the Atlanta 20-county region and the state average. The percent of lower-educated population is also slightly higher than both the Atlanta region and the state average. There are slightly higher percentages of child population along the corridor than the Atlanta region and the state, meanwhile the elderly population is lower. 5) High - 100

Competitive Economy			
Criteria	**Metric**	**Source**	**Project Metric**
Goods Movement	Does the project improve the movement of freight and is it located on ARC's regional freight system (ASTRoMaP), GDOT's Statewide Designated Freight Corridors or the FHWA National Highway Freight Network (NHFN)? (Yes/No)	ARC	NO
Employment Accessibility	Does the project connect to (or is it within) a Regional Employment Center or a Freight Cluster Area or a Regional Place? (Yes/No)	Sponsor	YES

City of Chamblee: Shared Autonomous Shuttle Demonstration

Description

The City of Chamblee Shared Autonomous Vehicle (SAV) Shuttle Demonstration pilot project is seeking to demonstrate the use of a sensor-enabled Autonomous Driving System (ADS) over a 2-year performance period to address its mobility, economic, and environmental goals outlined in previous plans as well as the ARC TSMO goals. The City expects to use the performance period to refine and test the route and operations, with an expectation to extend operations beyond the pilot period.



Using current technology, shuttles at L4 autonomy are planned for deployment on a mixed traffic, fixed route system, providing first/last-mile connectivity to the City's MARTA rail station as well as to connect to Chamblee's downtown core.

The initial 1.1 mile-long Peachtree Road corridor has been identified to pilot this self-driving shuttle system, with plans from the City to extend route the route to a total of 2.2 miles, connecting to the Assembly employment center in Doraville. An extended network of routes is envisioned to connect multiple job centers and housing stock to support service uses around and beyond the City limits. Through this initiative, Chamblee also aims to aid other communities in formulating strategies and policies for the safe and successful implementation of SAVs nationwide.

Goals and Benefits

Safety

This project is focused on providing enhanced safety through the use of an autonomous shuttle. The National Highway Traffic Safety Administration (NHTSA) estimates that 94% of serious crashes are due to human error. Automated vehicles have the potential to eliminate the influence of human error, which will help protect drivers and passengers, as well as bicyclists and pedestrians.

Reliable Travel Times

Shared autonomous vehicles have the potential to provide efficient platooning and smoother progression as well as reducing incidents; these enhancements will support reliable travel times.

High-level Cost Estimate

High-level cost estimates were based on the City of Chamblee's estimate for the project. In addition, the following equipment and labor-based assumptions:

- Autonomous shuttle for a minimum of two years
- Data collection and management of autonomous shuttle
- Refining of test routes and operations

Cost Estimate: $5,000,000 - $9,000,000

City of Chamblee: Shared Autonomous Shuttle Demonstration

Prioritization Metrics

The following prioritization metrics are recommended for use for the Autonomous Vehicle Transportation Systems Management & Operations/Transit Expansion.

World Class Infrastructure			
Criteria	**Metric**	**Source**	**Project Metric**
Mobility & Congestion	1) Change in project level transit boardings (unlinked trips) 2) Change in regional transit trips (linked trips)	1) ARC; Modeling 2) ARC; Modeling	1) Hold 2) Hold
Reliability	1) Percent of proposed route with dedicated right-of-way 2) Service headway in minutes 3) Will the project implement transit signal priority or AV/CV technology?	1) Sponsor 2) Sponsor 3) Sponsor Written, Sponsor provides information about proposed technology being implemented.	1) 0 % 2) Hold 3) Autonomous technology will be implemented on the corridor which should also provide the potential for additional equipment allowing TSP
Network Connectivity	The number of peak period high frequency (<= 15 mins) connections and rail lines served by the project. Recommend - Does the proposed project include peak period high frequency connections and rail lines served by the project? (Yes/No)	ARC	YES
Multimodalism	Additional person throughput by active modes - Recommend - Does the proposed project include multimodal applications or have a plan for inclusion? (Yes/No)	Sponsor	YES
Facility Vulnerability	1) Is the proposed project on a critical and vulnerable facility? 2) Resilience countermeasures proposed	1) No 2) Sponsor Written, sponsor provides information on how they will address resilience issues for the transit expansion project.	1) NO 2) Hold

City of Chamblee: Shared Autonomous Shuttle Demonstration

Prioritization Metrics (continued)

Healthy Livable Communities			
Criteria	**Metric**	**Source**	**Project Metric**
Safety	Safety measures proposed	Sponsor Written; Crash Modification Factors derived from sponsor selected proven USDOT supported safety countermeasures. Sponsors will also be able to provide information on other safety measures	Per NHTSA, 94% of serious crashes are due to human error. Automated vehicles have the potential to remove human error from the crash equation, which will help protect drivers and passengers, as well as bicyclists and pedestrians.
Air Quality and Climate Change	1) Change in NOx, VOC, & PM2.5 emissions 2) Change in greenhouse gas emissions CO2(e)	ARC	Hold
Cultural & Environmental Resources	1) Cultural & Environmental GIS Overlay Score 2) Does the project have an environmental improvement component?	1) ARC 2) Sponsor Written; sponsor provides a list of green infrastructure assets required in the project scope such as: storm water management, permeable pavement, LED lighting, etc. Projects are scored based on the combination of elements and how they advance environmental goals.	1) Hold 2) Per NHTSA, roads filled with automated vehicles could smooth traffic flow and reduce traffic congestion. This reduction in congestion and driving time can decrease fuel usage and vehicle emissions
Social Equity	Does project serve a minority or low-income community? (Written Response)	Sponsor Written; sponsor provides an assessment of how developing the project will support these populations. ARC Scored; this information is used to screen projects to receive a score.	Hold for Chamblee Data Set

City of Chamblee: Shared Autonomous Shuttle Demonstration

Prioritization Metrics (continued)

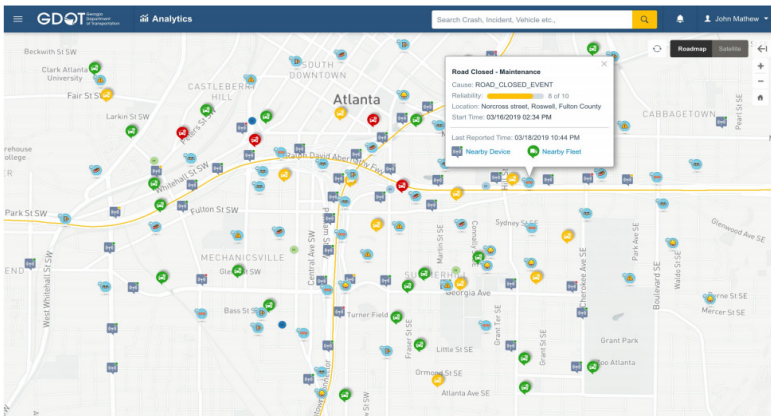
Healthy Livable Communities			
Criteria	**Metric**	**Source**	**Project Metric**
Land Use Compatibility	1) Do the communities the transit line passes through have transit supportive land use zoning in place? 2) Does the existing density support the development of transit?	1) Sponsor Written; sponsor provides the average number of dwelling units/acre zoning provisions within ½ mile of new transit stations and/or stops. 2) Sponsor should provide information on the population per square mile within ½ mile of new transit stations and/or stops.	1) Hold for Chamblee Data Set 2) Hold for Chamblee Data Set

Competitive Economy			
Criteria	**Metric**	**Source**	**Project Metric**
Employment Accessibility	1) Does the project connect to (or is it within) a Regional Employment Center or a Freight Cluster Area or a Regional Place? (Yes/No) 2) Accessibility Index: The index is a measure of the change in jobs accessible due to the new transit project or service expansion	1) Sponsor 2) ARC	1) Yes 2) Hold

Connected Data Platform Expansion (DATA)

Description

The Georgia Department of Transportation (GDOT) seeks to expand the utility of the Connected Data Platform (CDP) for additional users and applications. Building on the success of the first phase of CDP development, GDOT, in partnership with ARC, intends to increase the user base and the number of data sets ingested by the CDP. Reflecting the region's collaboration at the FHWA Data Business Plan workshop held in May 2019, there is a strong desire to share data with multiple agencies and the public. The pilot project will apply concepts identified within the GDOT Data Aggregation Master Plan, possibly including a public-facing data analytics website, publicly accessible safety data sets, and the obtainment and importation of transit vehicle data, railroad activity data, oversized vehicle activity data, truck freight, shipping container, port, and aviation activity data, first responder and law enforcement vehicle data, and asset management data. The project will aim to expand the utility and availability of the data, leading to an improvement of performance metrics and overall understanding of the transportation system.



Goals and Benefits

This project aims to expand the utility of data collected by multiple agencies, and to make the data available to the appropriate data users with an easy-to-use interface. Expanding the data ingested by the CDP will enrich the performance measures, dashboards, and standard reports already available.

Safety and Reliable Travel Times

The CDP provides a launching point for improving the collective knowledge of the transportation system, enabling transportation agencies and the public to better understand how the transportation system is influenced with respect to efficiency and safety by many different variables; providing a way to better optimize network performance.

Equitable Access

The CDP will provide an equitable source of transportation data and analytics to all ARC stakeholders.

Efficient, Seamless Travel

The CDP will provide a holistic view of the transportation system which will support approaches to managing the transportation system in a manner that leads to greater utility and sustainability.

High-level Cost Estimate

High-level cost estimates were based on the following equipment and labor-based assumptions:

- GDOT will provide monthly hosting fees that will be incurred through the usage of the CDP - $0
- Education and training costs will be outside of the scope of this project
- Continual software development and integration will be required for additional datasets, improvements, and refinements

Cost Estimate: $800,000 to $1,000,000

Connected Data Platform Expansion (DATA)

Prioritization Metrics

The following prioritization metrics are provide for TIP solicitation inclusion. The following criteria and metrics are recommended to assess Data proposed projects.

World Class Infrastructure			
Criteria	**Metric**	**Source**	**Project Metric**
Mobility & Congestion	Percent Regional Network for which the proposed data set will incorporate TTI data (%)	ARC	100%
Reliability	Percent Regional Network for which the proposed data set will incorporate LOTTR data (%)	ARC	100%
Multimodalism	Number of different modal data sets included. A) 0=0; B) 1=25; C) 2=50; D) 3=75; E) 4+=100	Sponsor	Vehicular; Freight; Transit; Aviation; Bicycle; Pedestrian; Nautical = 100
Asset Management and Resiliency	Does the proposed data set incorporate asset management and maintenance information? (Yes/No)	Sponsor	YES

Healthy Livable Communities			
Criteria	**Metric**	**Source**	**Project Metric**
Safety	Percent Regional Network for which the proposed data set will incorporate safety data (%)	ARC	100%
Air Quality and Climate Change	Does the proposed data set incorporate Air Quality and Climate Change data? (Yes/No) How does the proposed data set support emissions reduction?	Sponsor	NO; The proposed project allows users to understand and address safety and congestion issues within their jurisdictions. Users will be able to address issues and optimize performance which will have a positive impact on air quality and climate change; reducing the current emissions.
Social Equity	Does project include minority or low-income community data? (Yes/No)	Sponsor	NO

Connected Data Platform Expansion (DATA)

Prioritization Metrics (continued)

Competitive Economy			
Criteria	**Metric**	**Source**	**Project Metric**
Goods Movement	Does the project include a data set for ARC's regional freight system (ASTRoMaP), GDOT's Statewide Designated Freight Corridors or the FHWA National Highway Freight Network (NHFN)? (Yes/No)	Sponsor	YES
Employment Accessibility	Does the project include an employment data set? (Yes/No)	Sponsor	NO

Gwinnett County DOT: Connected Vehicle Applications

Description

The Gwinnett County DOT Connected Vehicle (CV) Applications pilot project seeks to implement CV applications that build upon previous efforts and align with the current Connected Vehicle Technology Master Plan to improve safety, reliability, accessibility, and efficiency of the transportation system. Gwinnett County intends to demonstrate the benefits of CV across a variety of users that allow for scalability across the County and transferability to other jurisdictions. The tiered CV application approach will first focus on leveraging proven technologies, and building off of existing GDOT work to provide a mature "sandbox" in which to consider additional CV applications.

Building on the success of the first generation applications, the ARC pilot project concept will focus on additional applications that may include some or all of the following:

- Transit, conditional priority based on transit schedule adherence
- Transit, conditional priority based on bus occupancy
- Transit/pedestrian, driver alert for pedestrian presence when bus or transit door is opened
- Pedestrian, driver alert for mid-block pedestrians
- Pedestrian, applications that support the visually impaired

It is anticipated that this project will help to inform a consistent regional approach to the integration of CV infrastructure that adheres to regional goals and contributes to a sustainable transportation future.

Goals and Benefits

Safety
This project is focused on providing enhanced safety for pedestrians through CV application deployments.

Reliable Travel Times
This project focused on improving travel reliability by demonstrating the mobility impacts of consistent deployment of CV applications.

Efficient, Seamless Travel
This project aims to improve efficiency and connectivity within the transportation system by leveraging technology to enhance communication and streamline operations.

Equitable Access
This project addresses equitable access goals by representing under-served roadway system users in the proposed CV applications.

High-level Cost Estimate

High-level cost estimates were based on the following assumptions:

- DSRC or C-V2X units will be funded and deployed through the Connected Vehicle Program at existing signals - $0
- GDOT will provide access to the connected vehicle central system database for data access - $0
- Intelight is making necessary modifications to MaxView software to accommodate Transit Signal Priority - $0
- Automated Passenger Count equipment is installed on Gwinnett County buses - $0
- Automatic Vehicle Location equipment is installed on Gwinnett County buses with real time data feed - $0
- Development of the CV application and integration of the data feeds for operation - $100,000
- Passive pedestrian detection near transit stops and downtown with data integration - $150,000

Cost Estimate: $250,000

Gwinnett County DOT: Connected Vehicle Applications

Prioritization Metrics

The following prioritization metrics are provide for TIP soliciatation inclusion. In addition, recommendations have been provided for prioritization methodology refinements specific to Connected Vehicle proposed projects.

World Class Infrastructure			
Criteria	**Metric**	**Source**	**Project Metric**
Mobility & Congestion	1) Current project limit peak period travel time index (TTI) 2) Absolute change in vehicle hours of delay (VHD) in the build vs no build scenario for the worst traffic time period - Recommend - Average daily bottleneck duration per mile (hour/mile/day)	1) ARC; RITIS 2) ARC; RITIS	1) 1.3 2) 1.6 hours per mile per day
Reliability	Worst hour travel time reliability; Aggregated 80% travel time / 50% travel time for all weekdays	ARC	1.13
Network Connectivity	Is the project located on, or does it connect to, a regional policy network? (Yes/No)	ARC	YES
Multimodalism	Additional person throughput by active modes - Recommend - Does the proposed project include multimodal applications or have a plan for inclusion? (Yes/No)	Sponsor	YES

Healthy Livable Communities			
Criteria	**Metric**	**Source**	**Project Metric**
Safety	1) Serious injury + fatality crash rate per 100 million VMT (crashes per 100 million VMT) 2) Bicycle/Pedestrian Crash Risk Score 3) Safety countermeasures proposed (Yes/No)	1) ARC; GEARS database 2) ARC; Safe Streets Action Plan 3) Sponsor; Does the proposed project include safety applications such as Emergency Vehicle Preemption (EVP)?	1) 15.6 2) Crash Risk Score: Bike = 3; Ped = 3 3) YES
Air Quality and Climate Change	1a) Change in Nox, VOC, & PM2.5 emissions (kg/year) 1b) Change in greenhouse gas emissions CO2 (kg/year) 2) Is the project located in a PM2.5 hotspot (Yes/No)	ARC	Hold

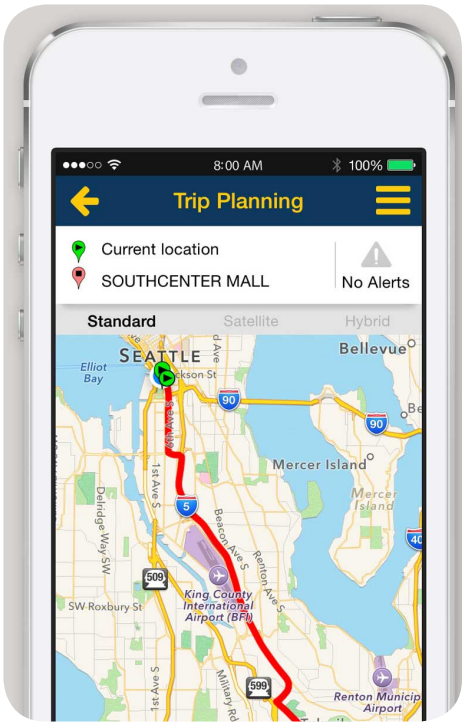
Gwinnett County DOT: Connected Vehicle Applications

Prioritization Metrics (continued)

Healthy Livable Communities			
Criteria	**Metric**	**Source**	**Project Metric**
Social Equity	Does project serve a minority or low-income community? (Written Response)	Sponsor Written; sponsor provides an assessment of how developing the project will support these populations. ARC Scored; this information is used to screen projects to receive a score.	The CV applications under consideration are focused on enhancing safety and mobility for transit, bike, and pedestrian modes and specifically, the visually impaired. The project is focused on the under-served users of the roadway system, providing greater equity of users for the transportation system. 5) High - 100

Competitive Economy			
Criteria	**Metric**	**Source**	**Project Metric**
Goods Movement	Does the project improve the movement of freight and is it located on ARC's regional freight system (ASTRoMaP), GDOT's Statewide Designated Freight Corridors or the FHWA National Highway Freight Network (NHFN)? (Yes/No)	ARC	NO
Employment Accessibility	Does the project connect to (or is it within) a Regional Employment Center or a Freight Cluster Area or a Regional Place? (Yes/No)	Sponsor	YES

MARTA: Regional Trip Planner



Example of a trip planner app

Description

The MARTA: Regional Trip Planner pilot project seeks to develop and deploy a singular mobile and web-based responsive application that combines all existing public mobility functions and data that are currently found across a multitude of applications. The proposed project will encompass functionality for a universal view of mobility in the region and include information about trip behaviors, preferences, modes, and planning, resulting in a singular application with multiple, variable capabilities. The ultimate goal of the Regional Trip Planner App is to support mobility as a service (MaaS).

Goals and Benefits

Reliable Travel Times

This project will provide user specific, real-time travel information which will allow users to choose the most reliable mode choice for their destination.

Efficient, Seamless Travel

This project will support efficient, seamless travel by integrating real-time traveler information from multiple sources and modes to allow a user to make the most informed and efficient travel choices based on their individual preferences. By integrating this information, there will be further opportunity to integrate fare systems and beyond.

Equitable Access

This project supports equitable access by providing real-time travel times, mode choice options and routes, etc. to all users via mobile app and web-based application.

High-level Cost Estimate

High-level cost estimates were based on the following equipment and labor-based assumptions:

- Acquisition and integration of data sets - $100,000
- Continual software development and maintenance will be required for improvements and refinements - $250,000

Cost Estimate: $350,000

MARTA: Regional Trip Planner

Prioritization Metrics

The following prioritization metrics are recommended for the Data / App / Other Transportation Systems Management & Operations project type.

World Class Infrastructure			
Criteria	**Metric**	**Source**	**Project Metric**
Mobility & Congestion	Percent Regional Network for which the proposed data set will incorporate TTI data (%)	ARC	100%
Reliability	Percent Regional Network for which the proposed data set will incorporate LOTTR data (%)	ARC	100%
Multimodalism	Number of different modal data sets included. A) 0=0; B) 1=25; C) 2=50; D) 3=75; E) 4+=100	Sponsor	Vehicular; Freight; Transit; Aviation; Bicycle; Pedestrian; Nautical = 100
Asset Management and Resiliency	Does the proposed data set incorporate asset management and maintenance information? (Yes/No)	Sponsor	YES

Healthy Livable Communities			
Criteria	**Metric**	**Source**	**Project Metric**
Safety	Percent Regional Network for which the proposed data set will incorporate safety data (%)	ARC	100%
Air Quality and Climate Change	Does the proposed data set incorporate Air Quality and Climate Change data? (Yes/No) How does the proposed data set support emissions reduction?	Sponsor	NO; The proposed project allows users to understand and address safety and congestion issues within their jurisdictions. Users will be able to address issues and optimize performance which will have a positive impact on air quality and climate change; reducing the current emissions.
Social Equity	Does project serve a minority or low-income community? (Yes/No)	Sponsor	NO

Prioritization Metrics (continued)

Competitive Economy			
Criteria	**Metric**	**Source**	**Project Metric**
Goods Movement	Does the project include a data set for ARC's regional freight system (ASTRoMaP), GDOT's Statewide Designated Freight Corridors or the FHWA National Highway Freight Network (NHFN)? (Yes/No)	Sponsor	NO
Employment Accessibility	Does the project include an employment data set? (Yes/No)	Sponsor	NO