

CAT Coalition

Strategic Initiatives Technical Working Group

July 25, 2019 Webinar

Notes and Summary of Discussions

Summary of Action Items

1. Members wishing to present a summary of the CAT deployments and the operational applications and benefits achieved on a future webinar should email their suggested topic to Blaine Leonard or Dean Deeter.
2. Dean to update the webinar invite to reflect the date change for October. This group will meet again on October 31, 2019 at 2:00 PM ET.

Welcome

The Strategic Initiatives Working Group meet on July 25, 2019. Approximately 48 members and guests joined the webinar. A list of those in attendance is provided at the end of these notes.

Brief Overview of the Policy, Legislative & Regulatory (PLR) WG Products

The CAT Coalition organizational chart illustrates how six of the working groups of the CAT Coalition are organized into three Focus Areas, with the Peer Exchange and Outreach working group supporting all areas. As illustrated below, the Strategic Initiatives Working Group is in the “Programmatic & Strategic Activities” Focus Area and the other working group in this focus area is the Policy, Legislative, and Regulatory (PLR) Working Group (chaired by Jennifer Toth and Paul Ajegba).

To help members better understand this focus area, Dean Deeter provided a brief summary of the CAT Coalition PLR Working Group’s activities and products that are currently (or soon to be) posted on the CAT Coalition website. The PLR Working Group products include:

- The CAT Policy Framework Clearinghouse – a summary table with links to various CAT policy related framework documents developed by transportation agencies in the US and other countries.
- An informational 2-page summary of policy related challenges regarding truck platooning.
- The results of a survey of how DOTs are funding CAT activities and staffing CAT projects – note this survey summary is being compiled and will be on the website soon.

These documents, along with other information about the PLR Working Group, are available at the CAT Coalition website at: <http://transportationops.org/catcoalition>.

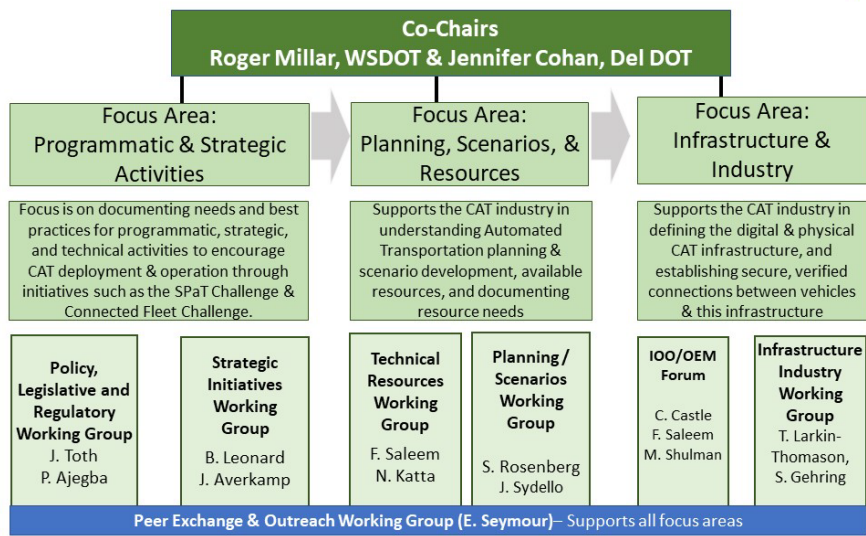


Figure 1: Illustration of the CAT Coalition Organizational Structure

Update on Topics Discussed During the April Webinar

Connected Fleet Challenge

Blaine Leonard reported that three SPaT Challenge/Connected Fleet Challenge webinars are being planned for this summer/fall season and that the Connected Fleet Challenge website is in development and nearing completion. The goal is to have the Connected Fleet Challenge website operational before proceeding with the webinars. When posted live, the website will provide a mechanism for agencies to self-report their planned or completed activities towards meeting the Connected Fleet Challenge.

The website is more than just a mechanism to report what activities are planned, it will be a mechanism to share lessons learned about equipping on-board units (OBUs) on the specific fleet vehicles equipped. The group would like everyone to describe their deployments on the web site to share the benefits and lessons learned in order to add to the growing set of resources compiled to support the Connected Fleet Challenge.

A question was asked about including resources describing Cellular V2X deployments. Blaine indicated that since the SPaT Challenge was focused specifically on DSRC deployments, and the Fleet Challenge is meant to encourage those who had deployed to install OBUs in vehicles, the emphasis would continue to be on DSRC. However, since some agencies and organizations will now be deploying C-V2X systems, we need to also include insights on that technology. He encouraged members to send resources related to Cellular V2X for their inclusion in the overall resources table. The goal is to have as many resources on the Connected Fleet Challenge website that might support agencies deploying on-board equipment on their fleet vehicles.

Broadening Working Group Membership

Blaine also summarized the plans for broadening membership in this working group. During the April webinar of this group, two task forces were identified as good candidates to form a more formal relationship:

- The SAE On-Road Automated Driving (ORAD) Task Force; and
- The NCUTCD CAV Task Force.

Paul Carlson chairs both task forces and has agreed to attend one or more Strategic Initiatives Working Group webinars to discuss interactions among the groups. Paul was not able to attend the July webinar. Blaine will continue dialog with Paul to formalize interactions.

Introducing MaaS/MOD to Members

Blaine updated on another action this working group took in April to increase exposure to MaaS/MOD concepts. Blaine reminded members that Jeff Lindley presented the ITE MaaS Initiative in April, and Amy Ford would be presenting the ITS America MOD Alliance today. The goal is to have conversations about suggestions for any initiatives this working group might pursue related to MaaS/MOD.

Sharing Benefits of CAT Deployments

Blaine updated members on the recurring webinar agenda topic that this group has been pursuing to include presentations of active CAT deployments and the benefits of the applications supported by these deployments. In April, Blaine presented the transit signal priority and snowplow preemption applications that Utah DOT is operating. Georgia DOT will present on their applications today. ***Members are encouraged to submit ideas they would like to present on future webinars to highlight benefits of CAT deployments.***

ITS America Mobility on Demand (MOD) Alliance Overview

Blaine introduced Amy Ford to speak about ITS America's Mobility on Demand (MOD) Alliance. Amy provided background on shared mobility options and the relationship with the ITS America MOD Alliance.

Amy discussed the series of MOD Sandbox projects funded in 2016, each of which has results and publications coming soon. Amy discussed opportunities for mobility services working with DOTs to think more broadly about mobility, focusing on MOD as a concept and using peer exchange and collaboration to integrate with a connected strategy. Data sharing seems to be the hot topic right now.

Discussions following Amy's presentation identified that the data sharing agreements being pursued by public sector agencies with mobility service providers are likely very similar to the data sharing agreements that public agencies will seek with CAT service providers and/or automotive manufacturers. It was recognized that this may be a potential synergy between CAT and MaaS/MOD to pursue further within the Strategic Initiatives Working Group.

Amy's slides with additional details are attached.

V2I Applications – Georgia DOT Operational System Overview

Andrew Heath, GDOT, presented how V2I communications are supporting applications in the Atlanta metro area. GDOT started with the SPaT Challenge and DSRC infrastructure in June 2018 by implementing a pilot with the primary goal of building back-end infrastructure to support V2I on a broad level. This was Phase 1 and focused on safety and operational improvement. GDOT has created an open access system using standardized architecture. Challenges they encountered include device interoperability, MAP message creation, security credentialing, and technology risk and spectrum uncertainty.

Phase 2 is not a pilot program; it is a deliberate interagency deployment. In Phase 2, GDOT adopted a scalable deployment strategy and will implement 1,600 traffic locations and 185 ramp meters. Phase 2.1 is scheduled for fall 2019 and will implement an additional 600 locations with the goal of providing connectivity in every major arterial in Atlanta. Associated costs for these deployments include an estimated \$2.5 million for 600 locations in FY2019 and approximately \$4.2 million for 1,000 locations in FY2020.

When asked about how GDOT is considering the risks of communications technologies and use of the 5.9 GHz spectrum, Andrew noted that GDOT understands that DSRC may not be the end solution for communications protocols. If a different communications technology/protocol is used, GDOT understands that some equipment will require replacement, but that the backend supporting systems will remain intact.

Andrew's slides include additional details and are attached to this summary.

Close

The next webinar is scheduled for **Thursday, October 31, 2019**, at 2pm Eastern. This is a change from the traditional quarterly meeting date due to a conflict with ITS World Congress Meeting.

TWG 1 July 25, 2019 Webinar Participants

- Blaine Leonard (Chair)
- Ahmad Jawad
- Amy Ford
- Andrew Heath
- Animesh Balse (Leidos)
- Ann Nichols
- Bob Murphy
- Carole Delion (MDOT SHA)
- Curtis Thompson
- Dean Deeter
- Dhiraj Verma
- Doug Hohulin
- Eduard Fidler
- Galen McGill
- Gary Duncan
- Ginny Crowson
- Gummada Murthy
- Hideki Hada
- James Chang
- Jeff Stewart
- Jeremy Schroeder
- Jesus Ruiz
- Jianming Ma
- Jim Frazer
- Jim Misener
- Joe Averkamp (Co-Chair)
- John Lower
- Jon Obenberger
- Jon Riehl
- Justin Chan
- Ken Yang (AECOM)
- Kent Kacir
- Kyle Garrett
- Liana Mortazavi (Panasonic)

- Mauricio Guerra
- Mia Silver
- Mike Schagrin
- Mohammed Hadi
- Patrick Son

- Paul Avery
- Robert Dingess
- Roxane (MDTA)
- Shah Imran
- Shane McKenzie

- Stan Caldwell
- Susan Catlett
- Suzanne Murtha
- Tom Timcho

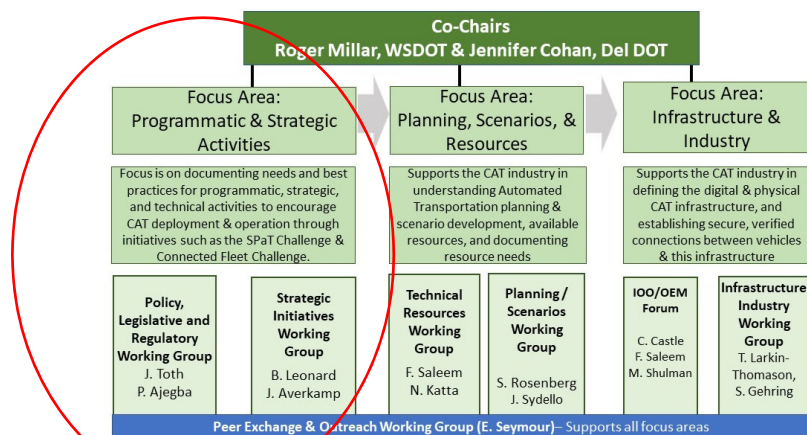
CAT Coalition Strategic Initiatives TWG – July 25, 2019 Webinar Agenda

1. Welcome
2. Overview of CAT Coalition Policy, Legislative & Regulatory (PLR) WG Products
3. Updated on Topics from the April Webinar
4. ITS America Mobility on Demand (MOD) Alliance Overview
5. V2I Applications – Lessons Learned & Benefits
 - Georgia DOT Operational System Overview



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CAT Coalition Policy, Legislative & Regulatory (PLR) WG Products

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2

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CAT Policy Framework Clearinghouse

CAT Coalition Home

CAT Resources

CAT Coalition Groups

- Policy, Legislative & Regulatory Working Group
- Clearinghouse of CAT Policy Frameworks and Policy Statements
- Planning Working Group
- Infrastructure/Industry Working Group
- Strategic Initiatives Working Group
- Technical Resources Working Group
- Peer Exchange and Outreach Working Group
- IOQDEM Forum

SPaT Challenge

Contact Us


Clearinghouse of CAT Policy Frameworks and Policy Statements

The intent of this page is to share cooperative automated transportation (CAT) policy frameworks and statements identified by the Policy, Legislative, and Regulatory (PLR) Working Group.

The frameworks included in the table below are not intended to be an all-inclusive list. Rather, the intent is to share the examples that this working group has identified. If you would like to add CAT policy statements to the list below, please email Pat Zelinski information about the statements at pzelinski@ashto.org. A more comprehensive list of CAT legislation is available from HCSL.

Agency / Organization	Content	Summary of Content
Arizona	Law Enforcement Protocols for Fully Autonomous Vehicles	<ul style="list-style-type: none"> • Includes the policy statement on testing or operation of autonomous vehicles; • Includes key definitions of terms • Includes requirements for fully autonomous vehicle companies • Describes the enforcement protocols

- 22 CAT Policy Frameworks Initially Identified
- Very brief summaries of each Framework completed
- CAT Framework On-line Clearinghouse Created.
<https://transportationops.org/CATCoalition/clearinghouse-cat-policy-frameworks>
- **“Emerging Practices”** resource document summarizing the Policy Frameworks in development



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Summary of Truck Platooning Policy Issues

**Cooperative Automated Transportation (CAT) Coalition
Policy Legislative & Regulatory (PLR) Working Group**

**Summary of Truck Platooning Policy Issues
Presented at the CAT PLR Working Group Webinar on February 1, 2019**

What is truck platooning?

Platooning links two or more trucks electronically so that they can follow more closely, reducing fuel consumption and increasing highway capacity. With platooning, the acceleration and braking of the platooning trucks are linked using vehicle-to-vehicle communications technology so that a change in speed in the lead truck is immediately matched by the following trucks. In driver-assistive truck platooning, the drivers maintain control of the steering function for lane-keeping and lane-changing and have the ability to leave the platoon at any time. The systems are designed to adjust when another vehicle cuts into the space between the trucks, and the platooning trucks are equipped with active safety and collision avoidance systems to help prevent collisions. Platooning can reduce fuel consumption by 7.25% combined for both trucks in a two-truck platoon at a 40-foot gap at 65 mph.


What policy issues do States need to consider?

States should review their following distance laws and enforcement procedures as described below:

States are responsible for establishing and enforcing laws related to safe vehicle following distances. For trucks, there are basically two types of following distance laws in place in states:

- Numerical Minimum Following Distance
 - A defined numeric minimum following distance, e.g., “at least 500 feet” (in 24 states as of October 2018). These may prevent platooning.
- “Reasonable and Prudent”
 - A flexible, discretionary standard (in 26 states as of October 2018). Platooning can be legal under these laws.

- 2-page summary of challenges related to regulations related to truck platooning
- Informative document, not a recommendation



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Survey of How DOTs are Funding CAT Activities

- Goal is to understand how state and local DOTs are funding their CAT activities (e.g. research funds, grants, operations funds) and the general scale of funding they are investing.
- Questions related to staffing and organizational structure of CAT/CAV activities
- Survey results being compiled and will be posted to the CAT Coalition website soon



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<https://transportationops.org/catcoalition>

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CAT Coalition Home

CAT Resources

CAT Coalition Groups

- Policy, Legislative & Regulatory Working Group
 - Clearinghouse of CAT Policy Frameworks and Policy Statements
- Planning Working Group
- Infrastructure/Industry Working Group
- Strategic Initiatives Working Group
- Technical Resources

Cooperative Automated Transportation (CAT) Coalition

AASHTO | **ITS AMERICA** | **ite**

The Cooperative Automated Transportation Coalition (CAT) serves as a collaborative focal point for federal, state and local government officials, academia, industry and their related associations to address critical program and technical issues associated with the nationwide deployment of connected and automated vehicles on streets and highways. Coalition membership includes representation from infrastructure owners and operators (IOOs), original equipment manufacturers (OEMs), technology and service providers, and internet of things (IOT) suppliers.

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Update on Topics from the April Webinar

Connected Fleet Challenge Website & Resources



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Connected Fleet Challenge Website (note: In-progress website – not yet live)

Connected Fleet Challenge

[Home](#)

[Add Your Fleet to the Map](#)

[Benefits](#)

[Resources](#)

[Connected Vehicle Applications](#)

[SPaT Challenge Home](#)

Connected Fleet Challenge



The Connected Fleet Challenge

As a logical next step to a large scale connected vehicle deployment and operation, the Connected Fleet Challenge encourages IOOs that have responded to the SPaT Challenge to equip at least one light-duty vehicle and at least one heavy-duty vehicle with a 5.9 GHz DSRC On-Board Unit (OBU) by 2021. These OBUs should be capable of broadcasting the Basic Safety Message (BSM) to Roadside Units (RSUs) and of receiving SPaT, MAP, and other data messages that are being broadcast by the infrastructure.

The objective of the Connected Fleet Challenge is not necessarily to equip large numbers of vehicles, but to gain experience with equipping a diverse group in terms of types, such as snow plows, transit buses, commercial trucks, and fire trucks, as well as different combinations of vehicle make/model/year. The

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Connected Fleet Challenge Website

Connected Fleet Challenge

- Home
- Add Your Fleet to the Map
- Benefits
- Resources
- Connected Vehicle Applications
- SPaT Challenge Home

Name *

Agency *

Email Contact *

Phone Number *

Fleet Location *

Associated SPaT Location(s) *

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Connected Fleet Challenge Website

Connected Fleet Challenge

- Home
- Add Your Fleet to the Map
- Benefits
- Resources
- Connected Vehicle Applications
- SPaT Challenge Home

Connected Fleet Challenge Resources

Resource Area #1: Existing On-Board Unit (OBU) Procurement Documents

Resource / Link	Brief Description
Connected Vehicle Procurement State of the Practice Assessment: Summary Findings Report (Final) (2018)	Researched and assessed the current state of the practice on the procurement of connected vehicle technologies by transportation agencies, determined initial lessons learned from early deployers, and identified next steps and recommended activities toward improving the likelihood that agencies will successfully procure connected vehicle projects.

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Update on Topics from the April Webinar

Working Group Year 2 Activities:

- Sharing Benefits of CAV
- Broadening membership
- Exploring MaaS/MOD

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Strategic Initiatives WG identified a priority to share examples of benefits of V2I deployments

Strategic Initiatives WG April Webinar Discussion On this topic:

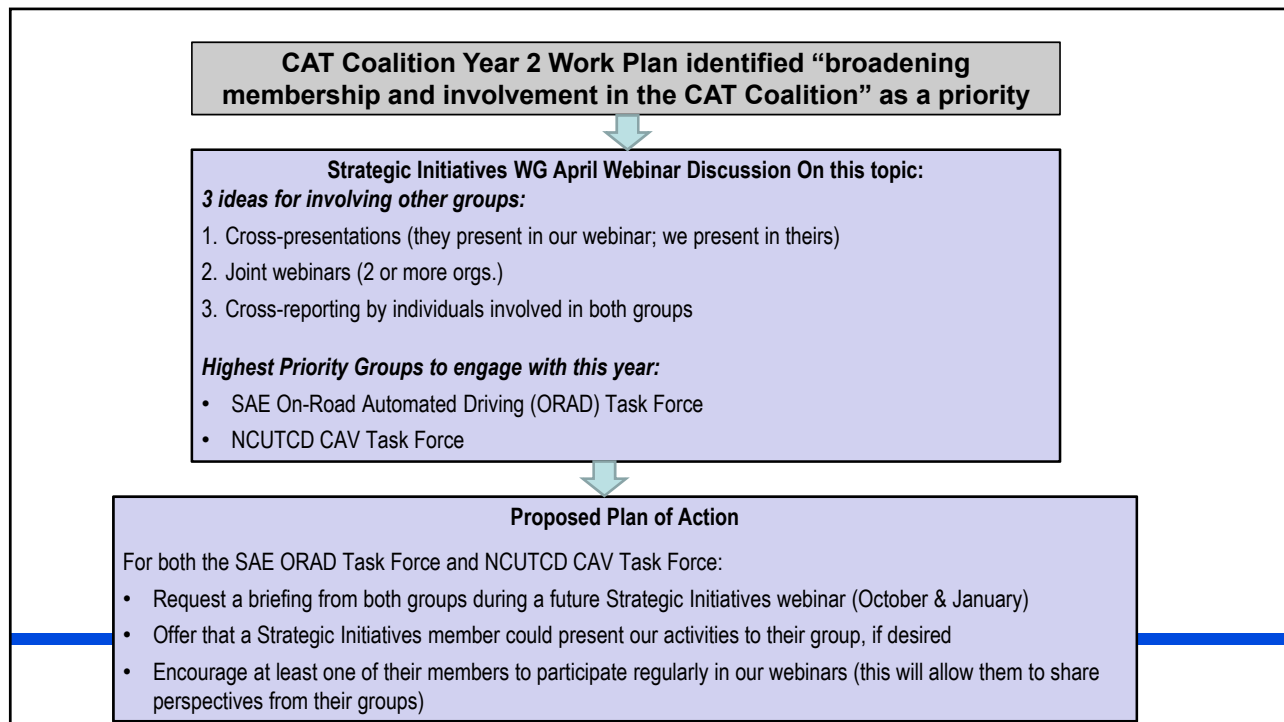
- *Utah's use of SPaT/MAP broadcasts to support Transit Signal Priority and Snow Plow Preemption*

Strategic Initiatives WG July Webinar Discussion On this topic:

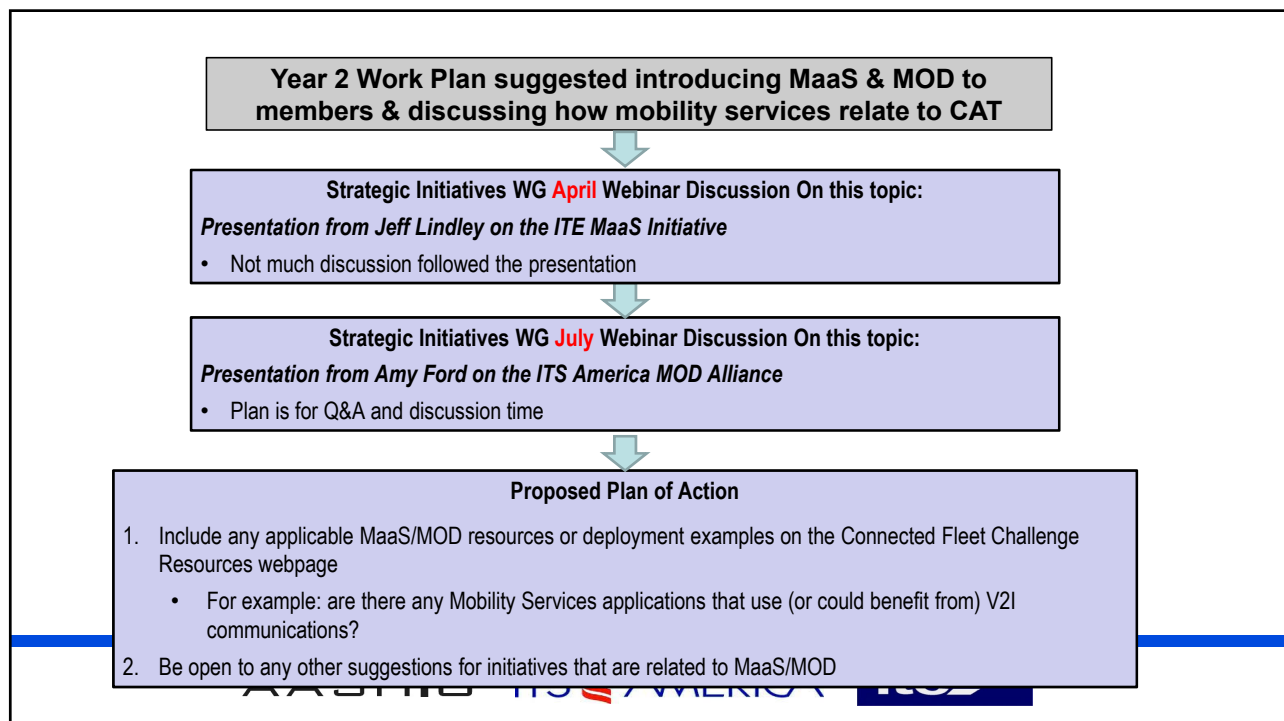
- *Georgia DOT's applications supported by SPaT/MAP broadcasts*
- *Open request for other state and local DOTs to share their deployments*

Plan is for a brief summary document of examples benefits of V2I deployments and the applications they support

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Outreach Webinar Plan

- Plan is to conduct a minimum of 3 SPaT Challenge / Fleet Challenge Webinars
 - 10 Webinars have been conducted to date. These will be #11, #12, #13.
- These webinars will:
 - Introduce the Connected Fleet Challenge and Resources Available
 - Enable Updated Presentations on the SPaT Challenge
- We want the Connected Fleet Challenge website to be functioning and have a 'critical mass' of resources and IOOs participating in the challenge before the initial webinar
- We'd like volunteers who identify resources to introduce these on the upcoming webinars (if you are available and interested)



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ITS America MOD Alliance

Amy Ford, ITS America



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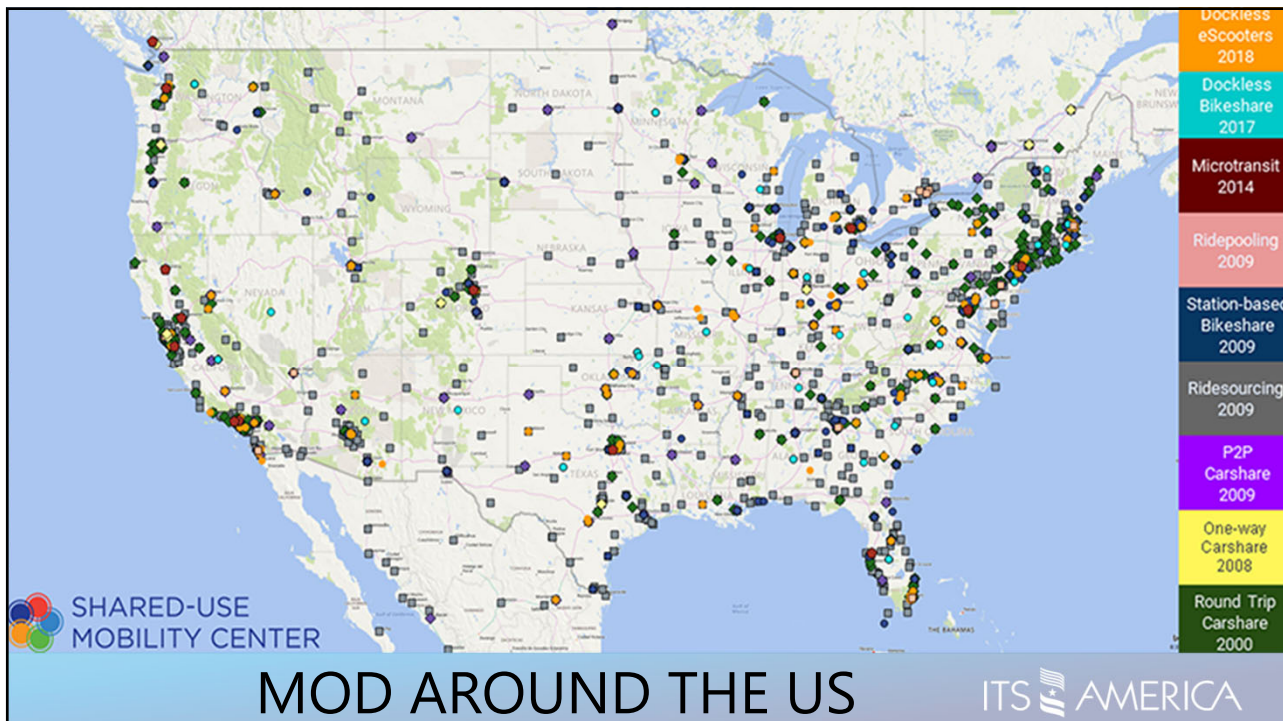
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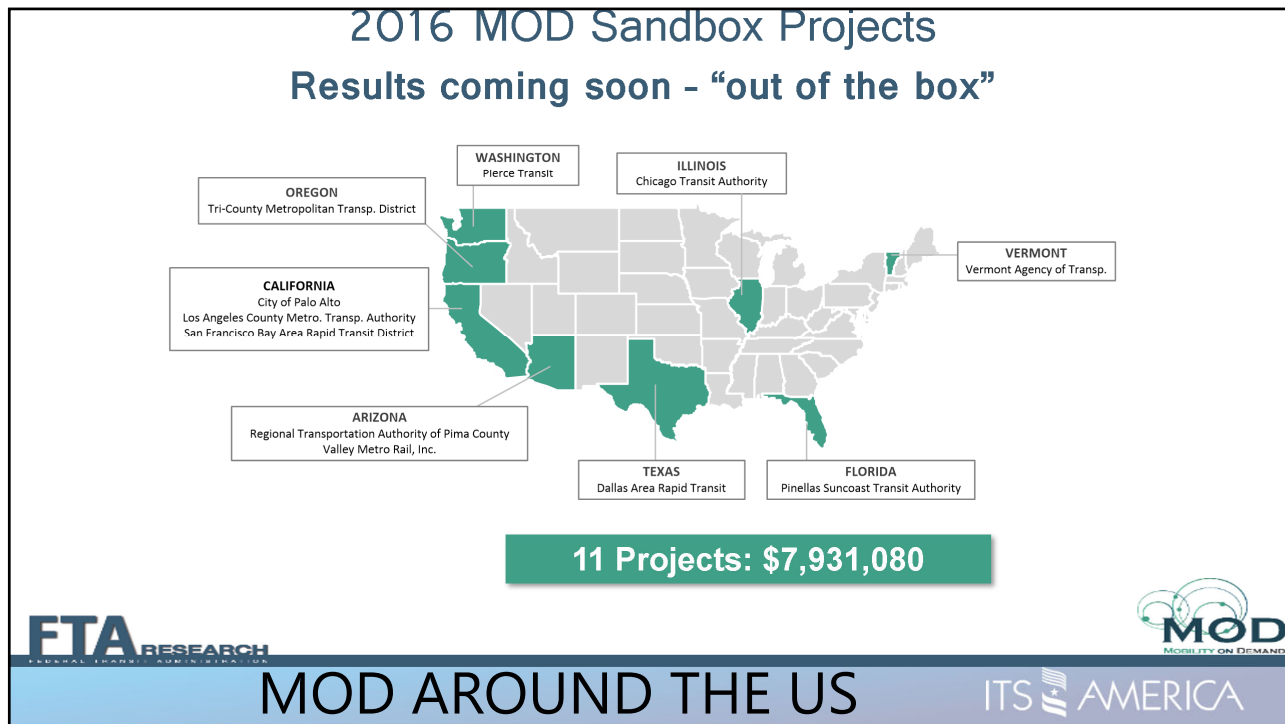
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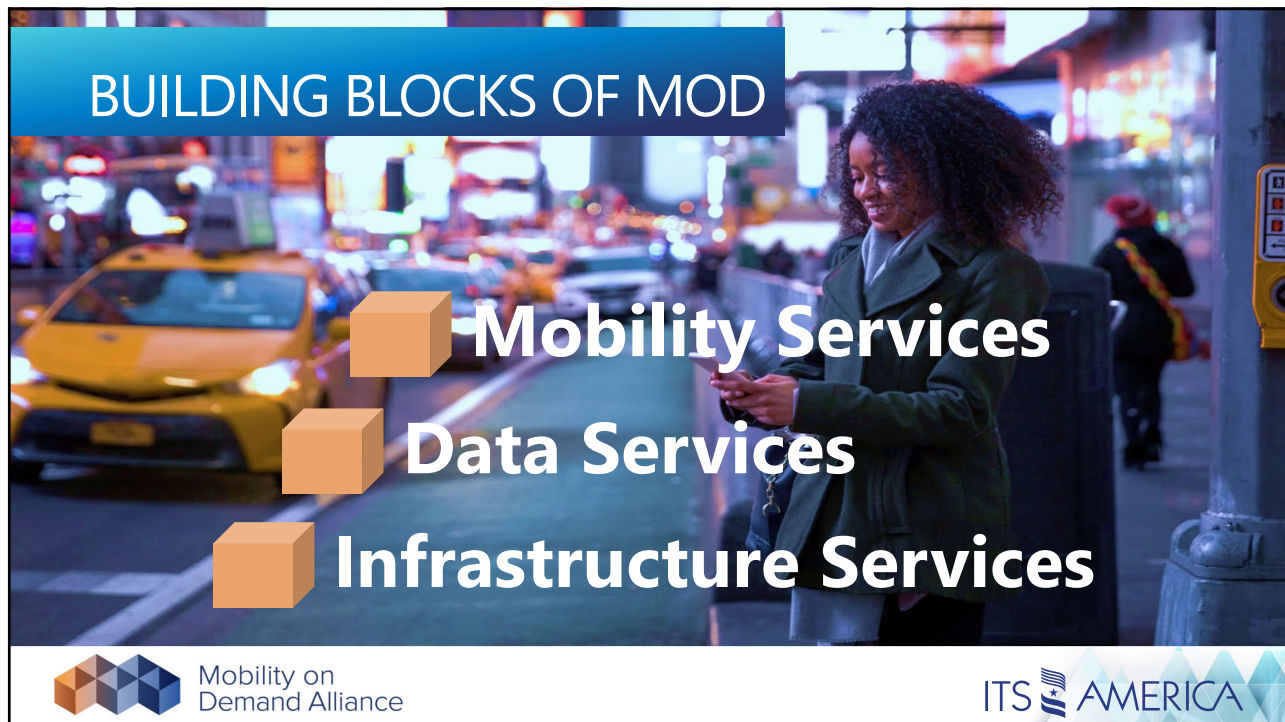
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BUILDING BLOCKS OF MOD

- Mobility Services
- Data Services
- Infrastructure Services

Mobility on Demand Alliance

ITS AMERICA

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BUILDING BLOCKS OF MOD

- Customer Services
- Operator Services
- Payment Services

Mobility on Demand Alliance

ITS AMERICA

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Focus Areas



Mobility on
Demand Alliance

- ✓

Policy Setting and Advocacy
- ✓

Plenary Events

 - ✓ April 3 | MOD Alliance Launch, Seattle
 - ✓ June 3 | MOD Forum, Washington DC
 - ✓ September 25 | MaaS Alliance MOD Alliance Insurance Workshop, Paris
 - ✓ Oct 23 | MOD Alliance MaaS Alliance Singapore LTA Event
 - ✓ Dec 9 | MOD Forum, Los Angeles
 - ✓ Feb 2020 | MOD Alliance MaaS Alliance Insurance Workshop, East Coast, US
- ✓

Work Groups and MOD Matters

 - ✓ Policy | Business Models | Technology/Standards
 - ✓ Data Sharing | Insurance | Congestion Pricing
 - Secure Payments | Automation
- ✓

Programs and Partnerships

 - ✓ Analysis | Networks | Outreach & Engagement
 - ✓ MaaS Alliance



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Mobility on Demand Alliance

www.modalliance.org



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V2I Applications – Georgia DOT



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Georgia Connected Vehicles

Progress and Plans



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AASHTO SPaT Challenge

To challenge state and local public sector transportation Infrastructure Owners and Operators (IOOs) to deploy DSRC infrastructure with SPaT (and MAP) broadcasts in at least one corridor or network (approximately 20 signalized intersections) in each state by January 2020

20 intersections in 50 states by 2020!



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States Committed

450+
Signals Operating

3,800+
Signals Planned



Pilot Deployment Objectives

Primary goal: Develop back-end infrastructure, network components, and business processes to support broad vehicle to infrastructure applications that is broadcast-medium agnostic, scalable, and sustainable.

Secondary goal: Begin broad installation of available roadside units and on-board units to facilitate applications that improve safety and mobility.

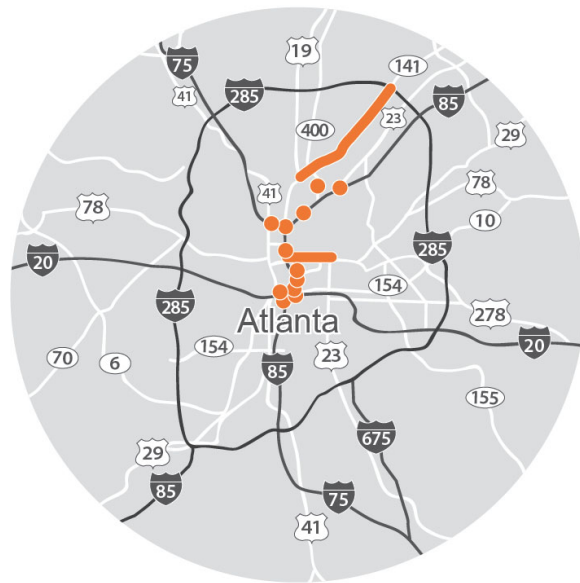
Primary Application Spaces:



Initial Deployment

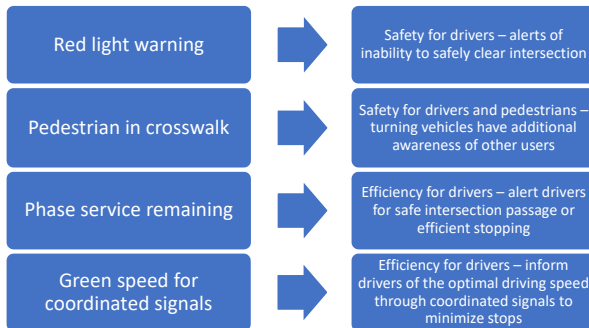
Phase 1: Pilot – Active June 2018

- SR 141 (Peachtree) from SR 9 to I-285
- SR 8 (Ponce de Leon) from Peachtree to SR 42
- 54 traffic signals
- 12 ramp meters
- Signal Phasing and Timing (SPaT)
 - Red light warning
 - Pedestrian in signalized crosswalk (in development)
 - Phase termination/next signal phase
 - Green-band speed (Green light optimal speed)



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Phase 1 SPaT/MAP Applications

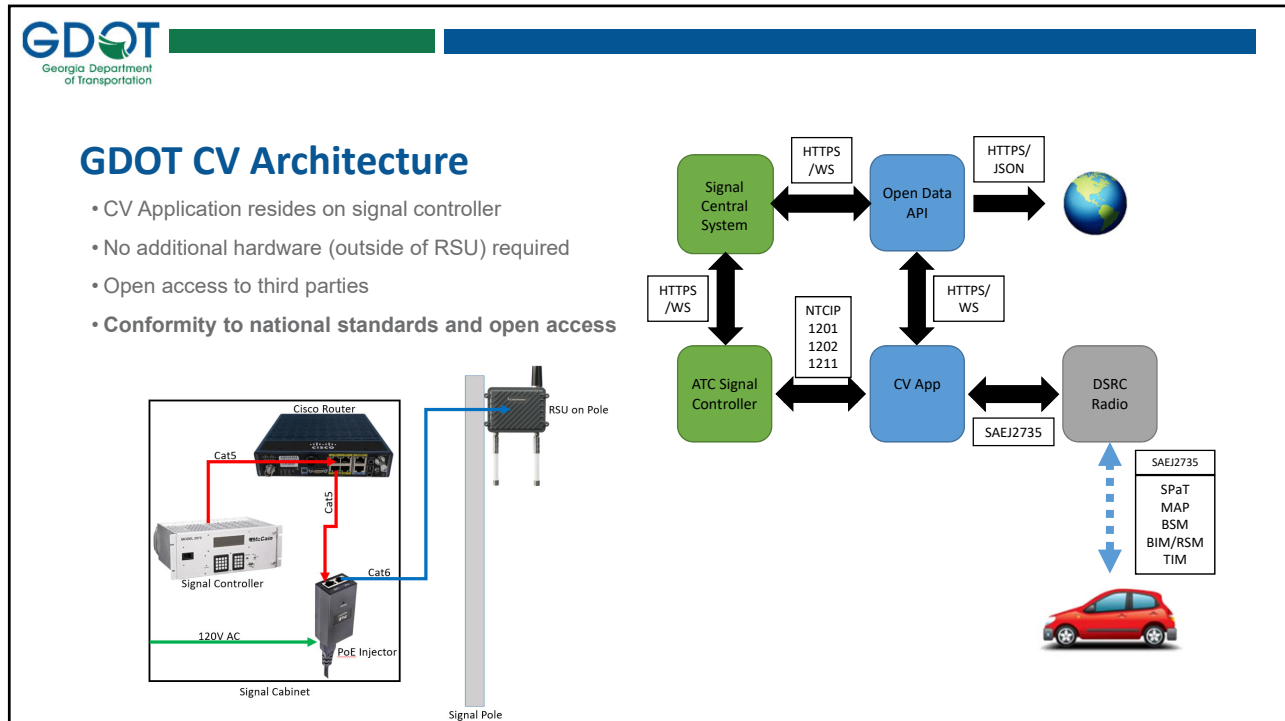


ACTIVE RSUs IN METRO ATLANTA

- SR 141 (Peachtree) – 39 intersections
- SR 8 (Ponce de Leon) – 15 intersections
- North Ave – 22 intersections (Renew)



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GDOT Georgia Department of Transportation

Deployment

MAXTIME CV

CVGUI
SPaT AND MAP
SR141_Shadowlawn
Target Speed: 10 MPH
33 MPH

Connected Devices Status
Show All Devices

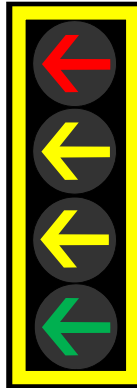
Device	Device Type	Peer ID	Connection Status
1	MaxTime	1	Connected
2	RSU 4.1 SPaT UDP	2	Connected
3	RSU 4.1 MAP UDP	3	Connected
4	RSU 4.1 TIM UDP	4	Connected
5	Generic RSU UDP	5	Connected

SwRI
SOUTHWEST RESEARCH INSTITUTE

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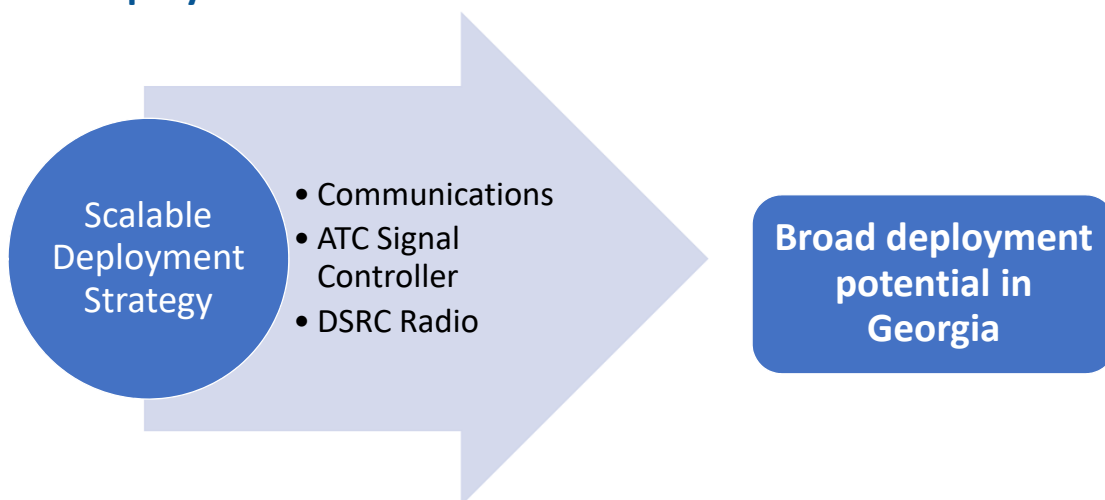
Project Challenges

- Device interoperability
 - Controller to RSU
 - RSU to OBU
 - OBU to OBU
- MAP message creation and validation
- Protected/permissive left turns
- Application deployments
- Security credentialing
- Data
- Limited fleet
- Regional communications network
- **Technology risk and Spectrum Uncertainty**




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Phase 2 Deployment



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Phase 2 Deployment


Phase 2: RTOP – June 2020

GDOT Investment + USDOT ATCMTD Grant

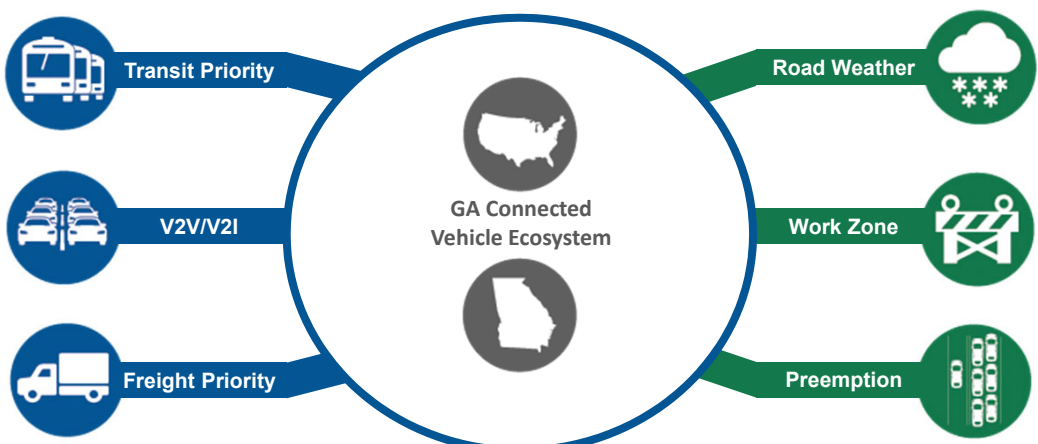
- 1,600 traffic signals in metro Atlanta
- 185 ramp meter locations
- **Regional deployment**
 - Not a pilot program: a deliberate inter-agency deployment across the entire metro Atlanta region



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Interoperable Ecosystem



GA Connected Vehicle Ecosystem

Transit Priority

V2V/V2I

Freight Priority

Road Weather

Work Zone

Preemption

Regional interoperability through standards-based, non-proprietary technology deployments

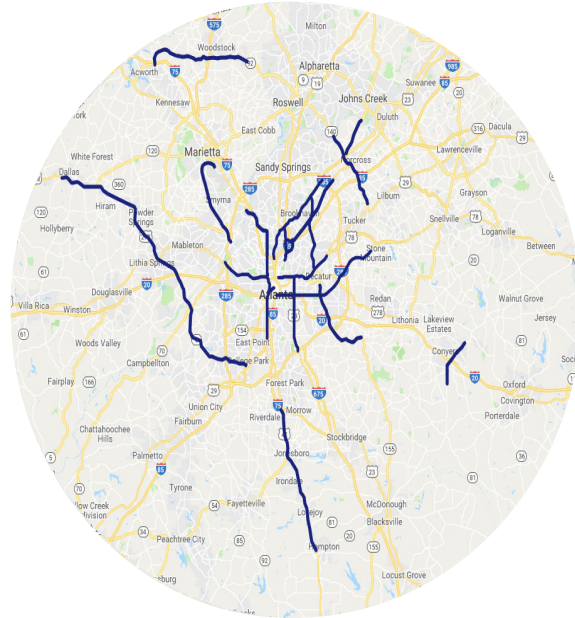
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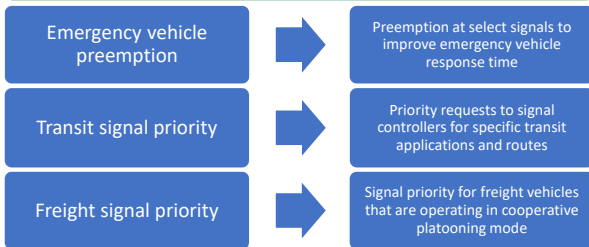
Phase 2 Deployment

Phase 2.1: RTOP – Fall 2019

- Additional 600 of FY 2019 to be installed by Fall 2019
- 305 RSUs operational as of July 2019
- Connectivity on every major arterial in metro Atlanta
- Open data stream to third parties also available



ADDITIONAL APPLICATIONS



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Phase 2 Deployment



ATCMTD 2018

Phase 2 Deployment Est.	FY 2019 (600)	FY 2020 (1000)
RSU Equipment	\$780,000	\$1,300,000
RSU Deployment	\$510,000	\$850,000
RSU Configuration & Support	\$1,200,000	\$2,000,000
ATCMTD OBUs (1000)	-	\$1,000,000
TOTAL	\$2,490,000	\$4,150,000
<ul style="list-style-type: none"> • 1,600 Roadside units at \$1,300 per device. • RSU deployment at \$850 per location. • RSU configuration at \$2,000 per device. • OBU costs at \$1,000 per device (optional). 	Total:	\$6,640,000
	654 RSUs to be operational by Fall 2019	

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Next Strategic Initiatives TWG Webinars

- Webinars:
 - ~~October 24th, 2019 2:00 PM Eastern~~— Conflict with World Congress
 - October 31st, 2019 2:00 PM Eastern – Suggested alternate

 - January 23rd, 2020 2:00 PM Eastern