CONNECTED AND AUTONOMOUS VEHICLES – MOVING FORWARD ALONG THE EAST COAST

May 15, 2018

I-95 CORRIDOR COALITION

Webcast and Audio Information

- The call-in phone number is:

  xxx-xxx-xxxx & enter xxxxxx# at the prompt

- Please call xxx.xxx.xxxx for difficulties with the web or audio application
- This is a **virtual meeting** experience
  - **Please mute your line** until you are making a comment or asking a question (press *6 to mute/unmute individual phone lines)
  - Please do not place call “on hold” as your hold music will be heard by the group
- **This web meeting is being recorded**
- **All materials will be available to participants after the web meeting**

Make Comments & Ask Questions

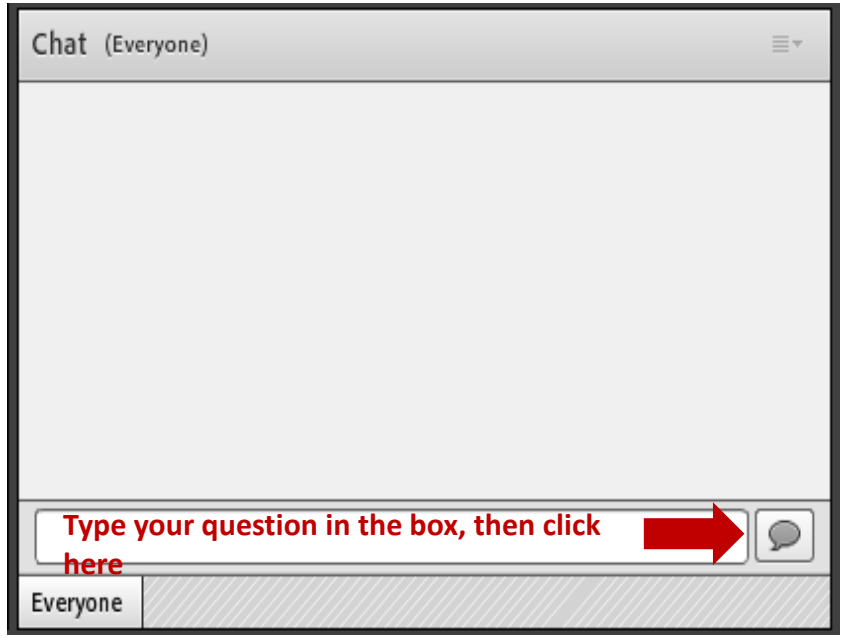
We encourage EVERYONE to participate……

VERBALLY

- Please give your name and agency before asking your question (at least the first time)
- Keep your line muted when not asking a question

IN THE CHAT BOX

- You may pose your questions using the chat box



While you are not speaking….
Please confirm you are
MUTED

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Mute your computer

Thank
You!

Welcome & Introductions

Patricia Hendren, I-95 Corridor Coalition

Speakers

Trish Hendren, PhD

I-95 Corridor Coalition

Executive Director

Robert C. Passmore, CPCU

Property Casualty Insurers Association of America

Assistant Vice President, Personal Lines Policy

Fred Payne

Greenville County Council

Councilman

Participants

Agency	Representative	Agency	Representative
Baltimore Metropolitan Council	Eileen Singleton	New York State DOT	Lynn Weiskopf
Commonwealth of Virginia	Ronique Day	North Carolina DOT	Chuck Church, Dominic Ciaramitaro, Hope Mozingo
Connecticut DOT	Kevin Danh, Tom Maziarz, Peter Calcaterra	North Carolina Turnpike Authority	Beau Memory
District DOT	Stefanie Brodie, Kelli Raboy, Amanda Stout	Port Authority NY & NJ	Daniel Jacobs
Federal Highway Administration	Gene McHale	PCI – Property Casualty Insurers Association of America	Robert Passmore
Florida DOT	Ed Hutchinson	Pennsylvania DOT	Leo Bagley, Roger Cohen, Mark Kopko
Greenville County (SC)	Fred Payne	Pennsylvania Turnpike	Kevin Geiger
Maine DOT	Kara Aguilar, Luke Lorrimer	Rhode Island DOT	Pamela Cotter, Julia Gold, Christos Xenophontos
Maryland DOT	Mark Crampton, Joseph Sagal, Nanette Schieke (MVA)	South Carolina DOT	Rob Perry
Maryland Transportation Authority	Roan Bennett, Kelly Harper, Sushmita Mitra, Roxane Mukai, Jason R. Pulliam (Police), Kevin Reigrut	University of Connecticut	Eric Jackson
Massachusetts DOT	Daniel Sullivan	Vermont AOT	Mike Obuchowski, Emily Parkany, Robert White
New Hampshire DOT	Susan Klasen	Virginia DOT	Cathy McGhee
New Jersey DOT	Susan Catlett, Tom Houck, Charles Kingsland	I-95 Corridor Coalition	Patricia Hendren, Denise Markow, Marygrace Parker, Patty Reich

Agenda

1:30pm – 1:35pm	Introductions and Welcome
1:35pm – 1:40pm	Connected and Autonomous Vehicles Workshop Summary (December 2017)
1:40pm – 2:00pm	Automated Vehicles and Auto Insurance • Robert Passmore, PCI- Property Casualty Insurers Association of America
2:00pm – 2:20pm	Planning for a Better ACES Future • Fred Payne, Greenville County
2:20pm – 3:00pm	Member Roundtable & responding to questions in chat box • 3 to 5 minutes updates from participating agencies
3:00pm	Wrap Up

Connected and Autonomous Vehicles Workshop Summary (December 2017)

Patricia Hendren, I-95 Corridor Coalition

Connected and Autonomous Vehicles Workshop Summary

"What Agencies Need to Do for the Connected and Autonomous Vehicles of Tomorrow"

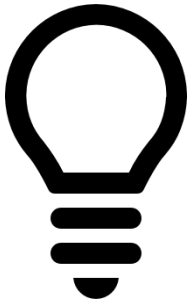
December 11-12, 2017

I-95 Corridor Coalition

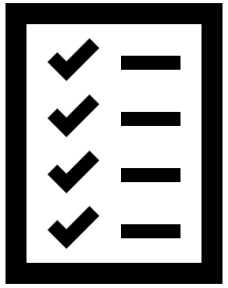
A partnership of public transportation agencies, accelerating transportation system improvements

Workshop Goals

(1) Share CAV-related activities



(2) Identify challenges and potential solutions

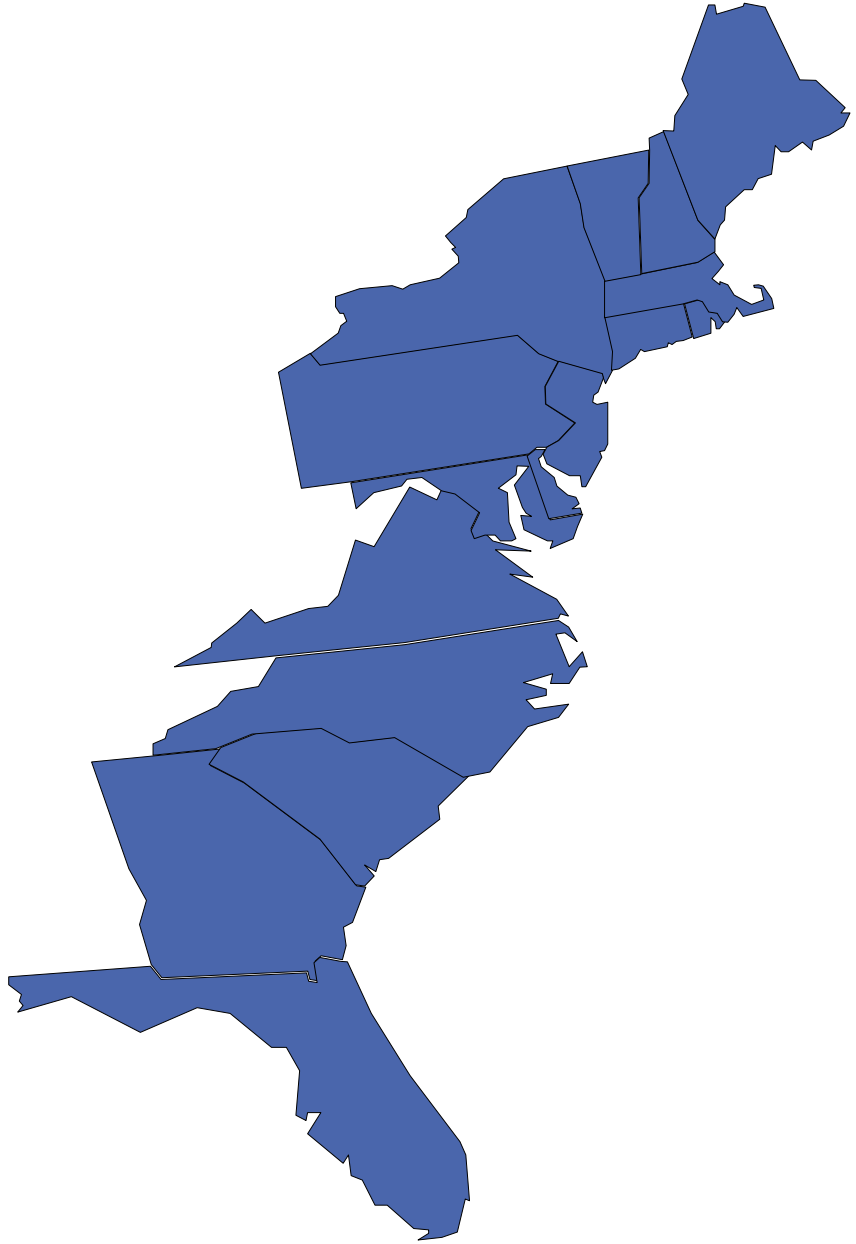


(3) Define implementation steps for member agencies and the Coalition

Who participated?

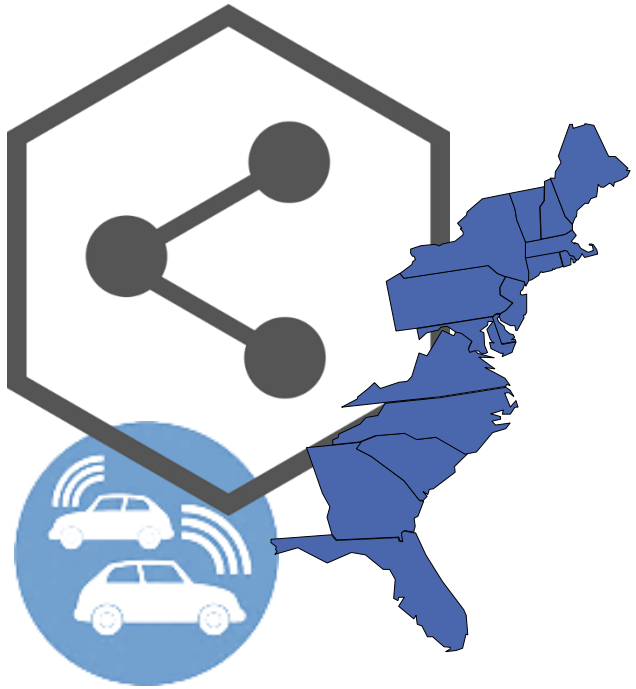
Over 40 practitioners from:

- 15 State DOTs
- Maryland Transportation Authority
- Baltimore Metropolitan Council
- Pennsylvania Turnpike Commission
- Port Authority of New York and New Jersey

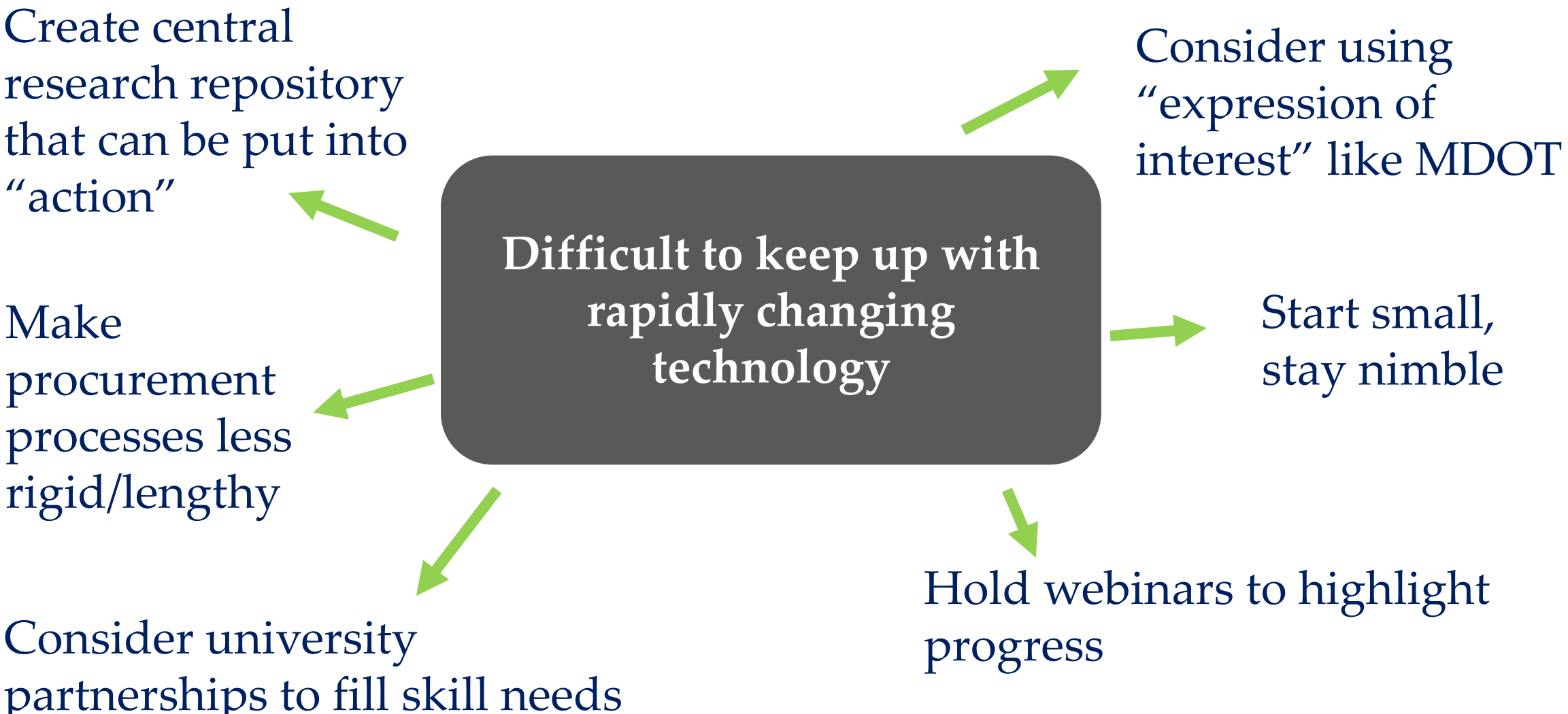


(1) What can we learn from each other?

- Data
- Legislation and regulation
- Collaboration
- Planning



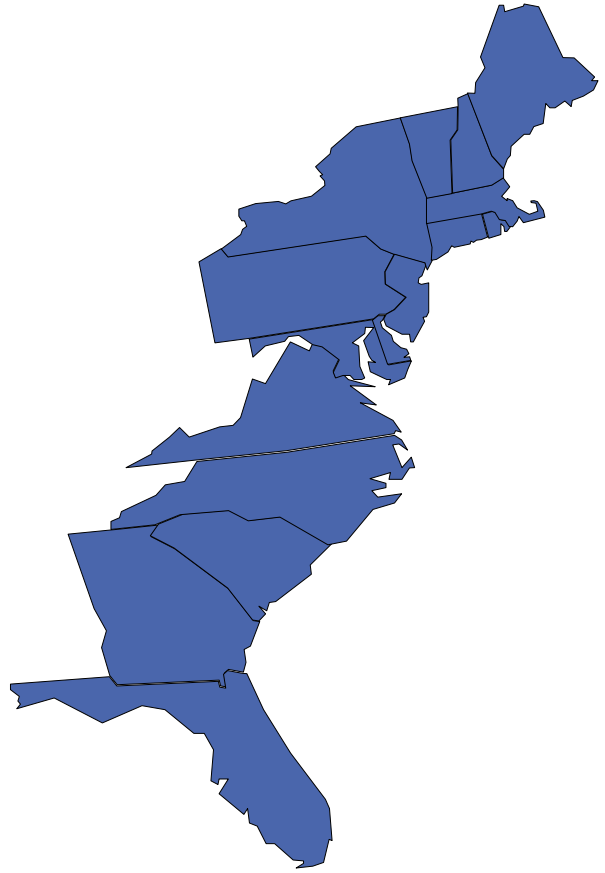
(2) Identify barriers and potential solutions (example)



(3) Define Implementation Steps

For member agencies

- Identify a leader
- Create a strategic vision focused on the "why": safety, congestion relief, emergency response, economic development
- Start a multi-disciplinary stakeholder group with members from inside and outside agency
- Engage in testing and pilot projects (SPaT)



Final CAV Workshop Report

- Emailed to CAV Working Group
- Posted on the I-95 CC Website
- Feel free to distribute!

Automated Vehicles and Auto Insurance

Robert Passmore, Property Casualty Insurers Association of America

Automated Vehicles and Auto Insurance

Connected and Autonomous Vehicles Workgroup

I-95 Corridor Coalition

May 15, 2018

Automated Vehicle Impact on Auto Insurers

- Will more AV's mean fewer claims?
  - What happens in the transition period?
- Who is responsible ?
  - Manufacturer , driver or both?
  - Products liability / More complexity
  - What did the car do and when?
  - Repair costs and complexity?
- Opportunity to develop new products
  - Who owns the vehicles?
  - Subscription based?
- Challenge to figure out how to rate for them
  - Shift from driver based regimes to technology based?
  - Does this fit in to current regulatory systems?
  - Does adequate data exist, accessible?

AV Policy Questions

- What guidelines, standards or requirements should be put in place to ensure safety without constraining the developing technology?
- Does our current system of determining liability for accidents and compensating victims need to change?
- Who should have ownership of or access to AV data?
- How can the privacy of users and the intellectual property rights of developers be protected?
- Do financial responsibility laws that need to be changed to reflect the increasing role of technology in the driving function?

PCI's Essential Elements for AV's

- **Safety**
  - Requirements that promote public confidence, provide direction for compliance
  - FMVSS exceptions should be rare, no exceptions to crash protection standards
  - Do not lose focus on todays auto safety challenges
- **Liability Determination**
  - Current state based system will be able to adapt with reasonable access to vehicle data

PCI's Essential Elements for AV's

- **Insurance Innovation**
  - Insurers need ability to identify AV equipped vehicles and differentiate between AV systems to develop products and pricing.
- **Insurance Requirements for Automated Vehicles**
  - Severity exposure doesn't change for AV, current requirements do not need to change.
  - Reasonable to establish new and direct insurance requirements for manufacturers due to more frequent manufacturer involvement

PCI Data Access and Sharing Principles

- **Identification of ADS equipped vehicles**
  - Attaches at manufacture or retrofitting
  - Sufficient Information to differentiate
  - Reflected in motor vehicle and crash records
- **Data Recording Capability Mandate**
- **Vehicle Owner Authorization of Data Access**
  - Vehicle owner ability to authorize access to vehicle data
  - No consent needed from vehicle/system manufacturer
- **Common Data Recording Requirements**
  - Tracking information that could be obtained by human driver
  - In a usable format for insurers/investigator to establish liability

Questions?

Robert Passmore
Assistant Vice President – Personal Lines Policy
robert.passmore@pciaa.net
847-553-3612

Planning for a Better *Automated Connected Electric Shared (***ACES**) Mobility Future

Fred Payne, Greenville County Council

State DOT & I-95 Corridor Coalition: Planning for a Better ACES Future

- I-95 Corridor Coalition Webinar
- May 15, 2018
- Fred Payne
  - Greenville County Council
  - CA4 Innovation Board
  - Ordinary Guy working to be a Civil Servant

Smart Infrastructure

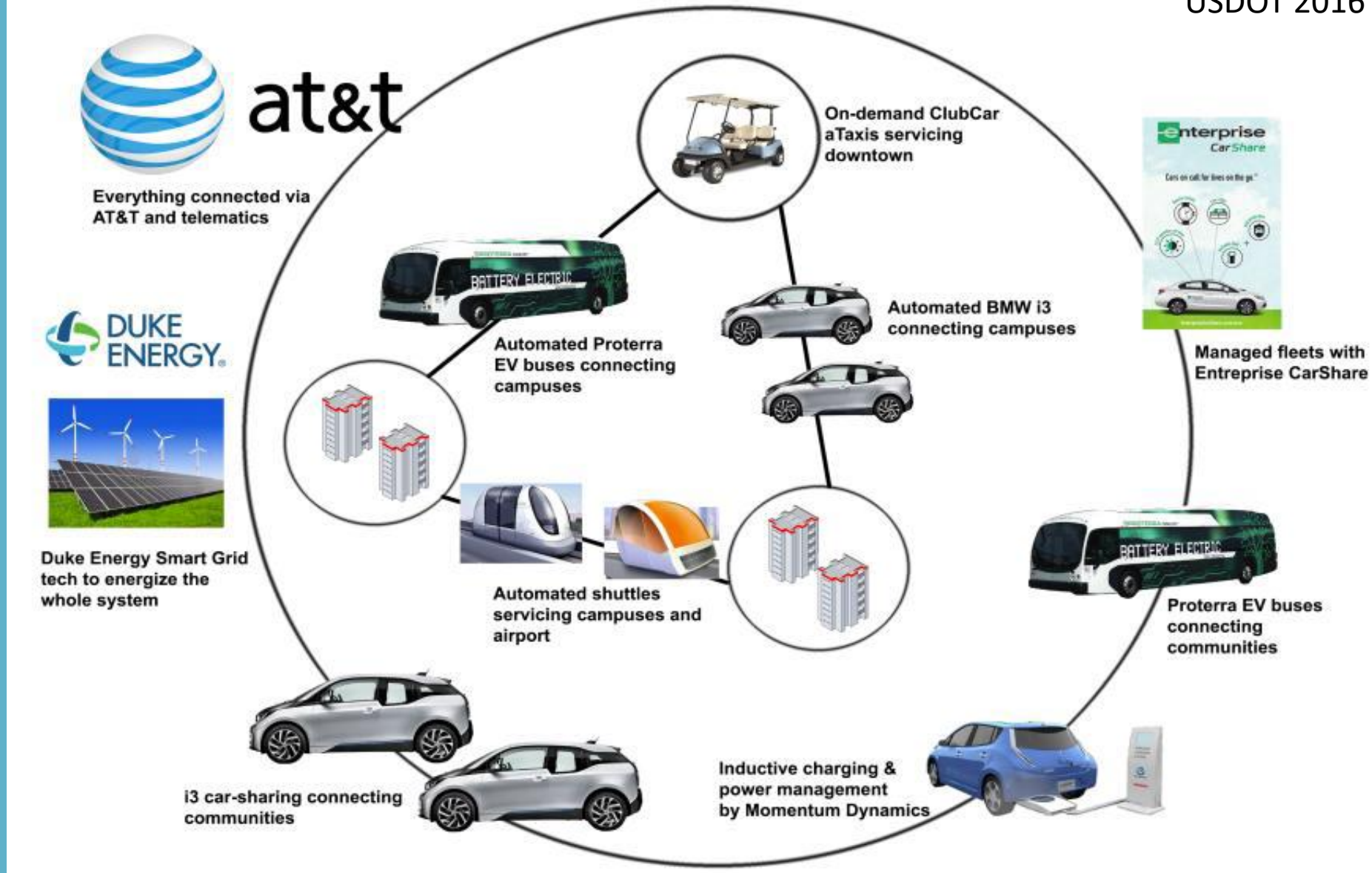
Answers: Why Are State DOTs Interested in ACES?

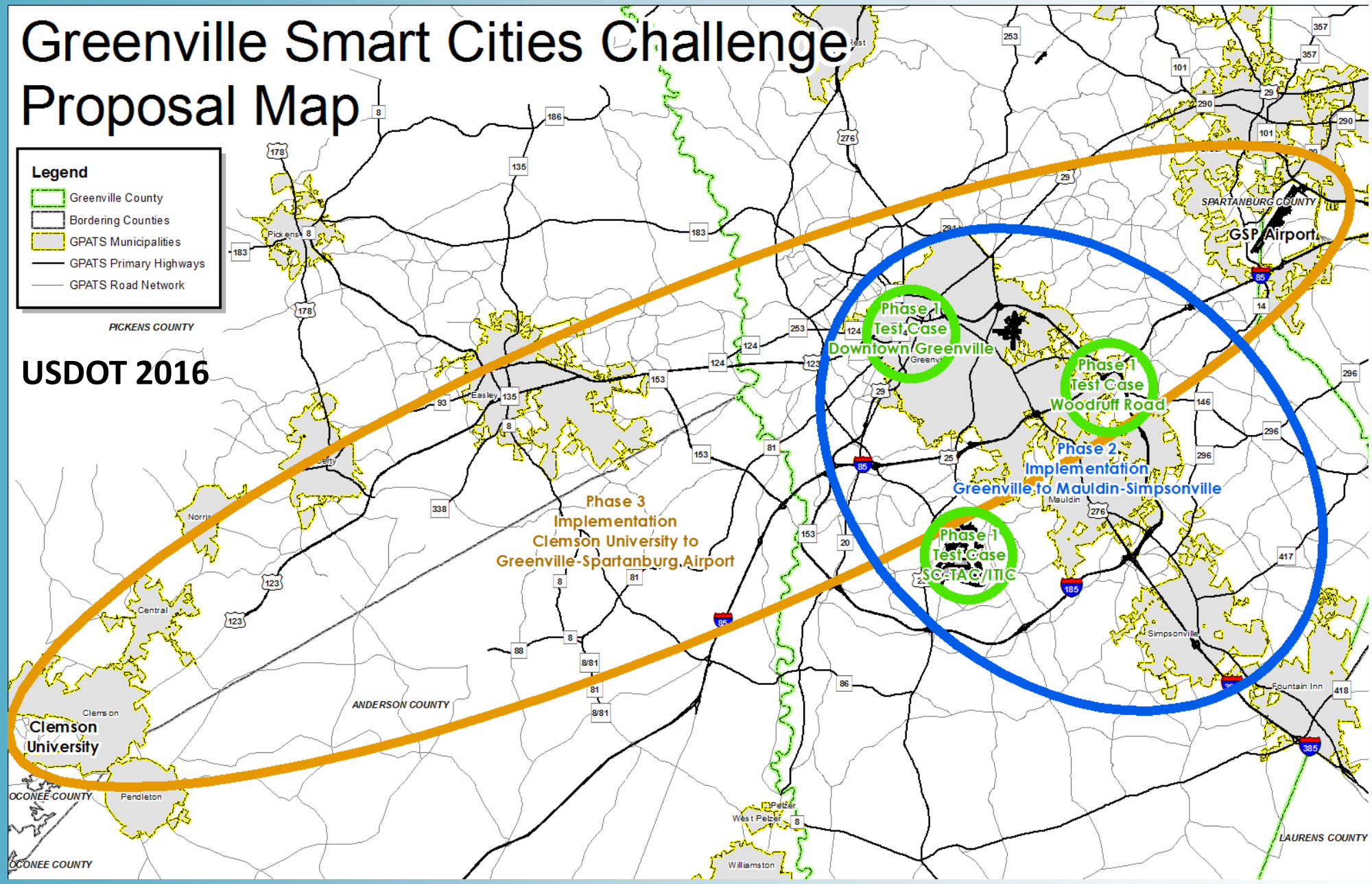
- **SAFETY**: Why State DOTs want CAV?
- **Welcome Mats**: What State DOTs give for successful CAV projects?
- **Supportive policies/ legislation**: How can you help implement economic development projects?
- **Lead, Follow, or Get Out of the way**: How can State DOT planning support CAV projects like A-taxi?
- **Private Money**: Is the Answer. What is the Public Question?
- **Monetize Access and Data**: How can State DOTs collect funding through ACES Mobility projects?

- **USDOT/NHTSA policy**: Who can coordinate answers for one OEM to work with regulations and laws in 50 States and 500 Cities?
- **Greenville Example:** How does a company satisfy law enforcement to address potential operating challenges?
  - Motor Vehicles?
    - Cushman: Cart, Driver, Insurance
    - OLLI Shuttle: No Wheel, No Driver
  - Routes?
    - DOT roadways (A-Taxis)
    - FTA railways (GreenPods)
    - FAA airways (drones)
  - Operators?
    - Drivers, Safety Operators, Control Booth?

Greenville Smart City Vision

USDOT 2016



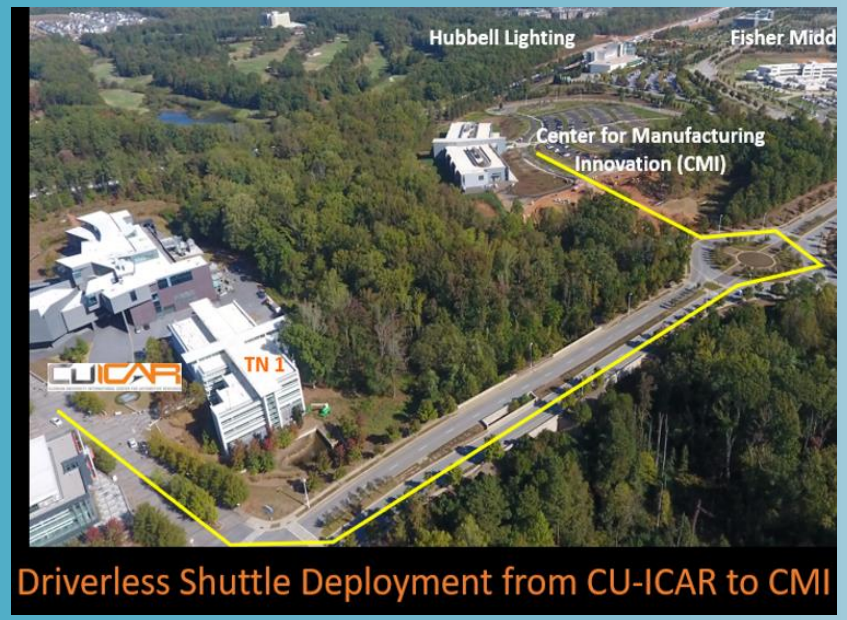

Greenville Smart Cities Challenge
Proposal Map
Legend
Greenville County
Bordering Counties
GPATS Municipalities
GPATS Primary Highways
GPATS Road Network
USDOT 2016
Phase 1
Test Case
Downtown Greenville
Phase 1
Test Case
Woodruff Road
Phase 2
Implementation
Greenville to Mauldin-Simpsonville
Phase 1
Test Case
SC-TAC/ITIC
Phase 3
Implementation
Clemson University to
Greenville-Spartanburg Airport
Clemson
University
GSP Airport
SPARTANBURG COUNTY
PICKENS COUNTY
ANDERSON COUNTY
OCONEE COUNTY
LAURENS COUNTY
Pendleton
Simpsonville
Mauldin
Fountain Inn
Williamston
Easley

Carolinas Alliance 4 Innovation:

A Greenville Consortium of Public and Private Partners

A Necessary Element for Mass Mobility Solutions

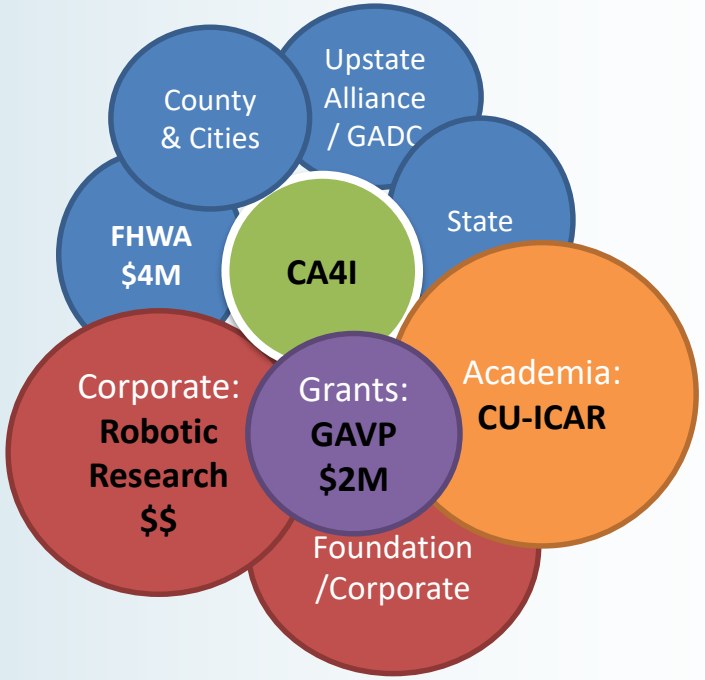
Real Needs
1st/Last Mile Access-Health



Real Roads
with Different Vehicles

EV Partners: Local Motors OLLI and Green4U Technologies

Real Proactive Partnerships



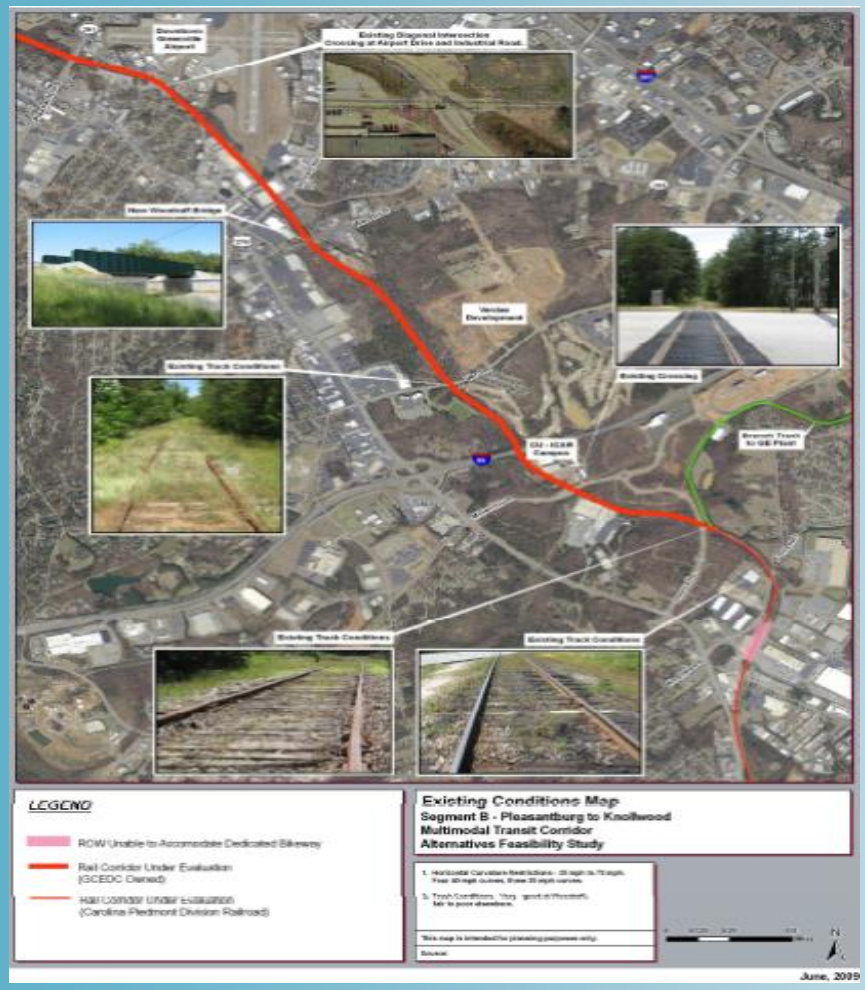
CA4I Goal: Sustainable Mobility

Partners

Smart City 2020

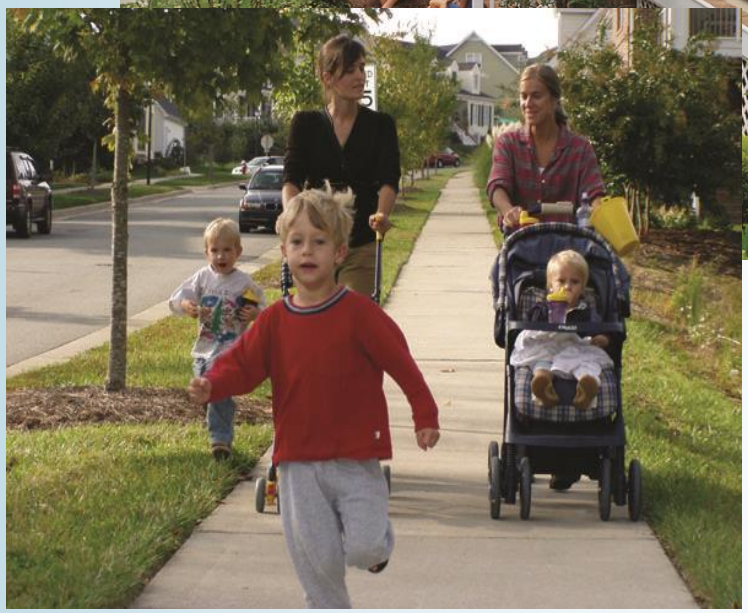
Carolinas Alliance 4 Innovation "Helping Communities Move Forward"

DOT Reality & Planning: “Imagining Our Future” Centers, Corridors, Communities

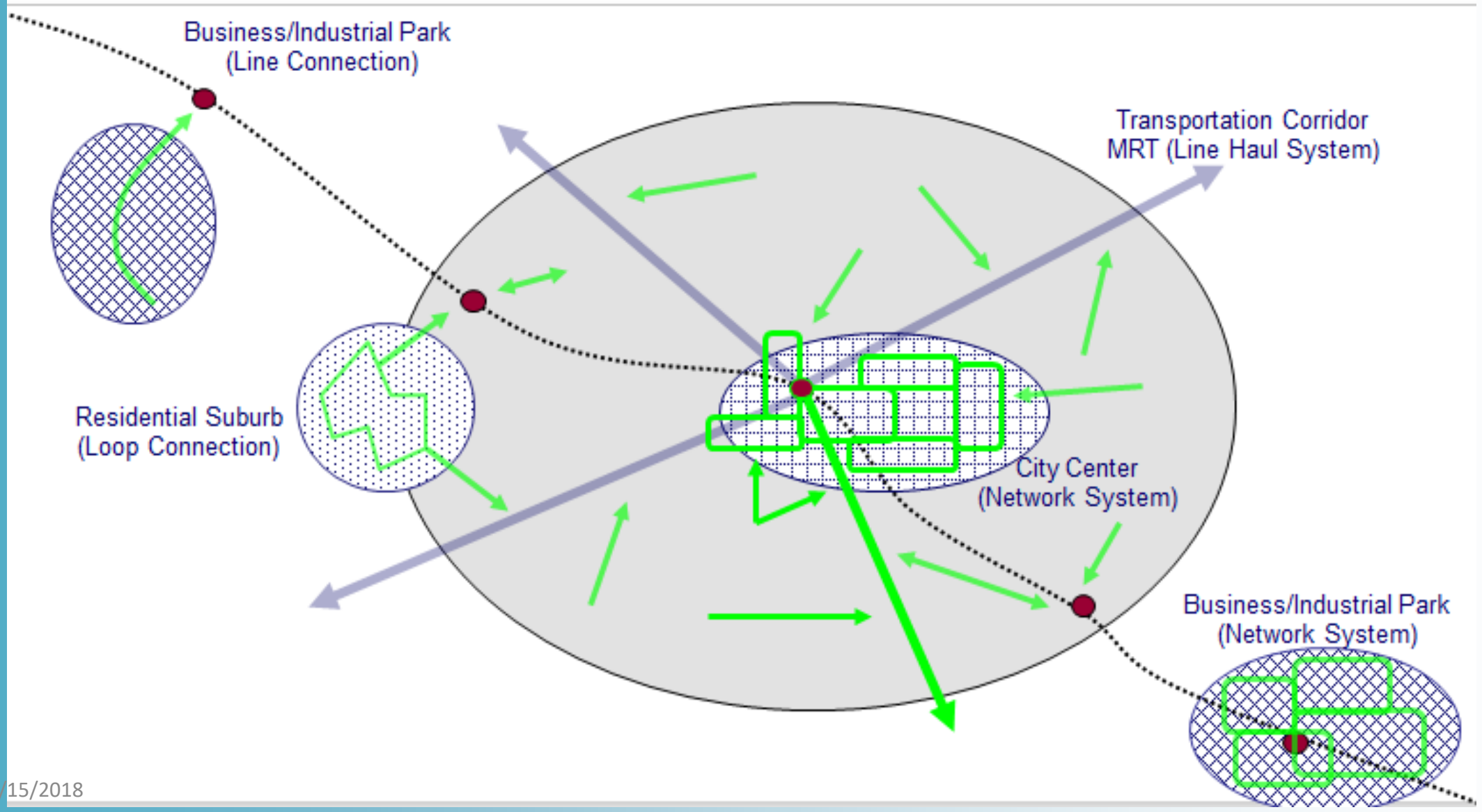


Smart **GreenVillages** Development:
Better Quality of Life with Sustainable Mobility

- Attractive, green, livable, sustainable, walkable – and connected centers
- Mixed-use communities where people love to live, work, learn, dine, shop, heal & play
- **A-Taxis** provide internal mobility and **GreenPods** enable connectivity among GreenVillages



A-Taxis (First-Last Mile) in **GreenVillages** & **GreenPods** Connecting Regional Centers



Why Autonomous Vehicles?

Autonomous Vehicles Bring Staggering Advantages,

Cities like Greenville Can Accelerate Their Adoption

- **Advantages** Include:
  - Increased safety
  - Increased access for underserved communities
  - Increased infrastructure capacity
  - Reduced commuter times and costs
  - Leaps in productivity & efficiency
  - Improvements in healthcare access, deployment of law enforcement and court system resources
  - Transformation of transportation economics
  - Dramatically alter the environment for the better

Why Greenville? Or A City in Your Region?
Right Place, Right Time

- Right Place (Mid-size Metro) for pilot programs
  - Middle of 'CharLantaVille' Megalopolis on I-85 Corridor
  - Microcosm of Challenges/Problems
- Engaged communities – Active CA4I Consortium
  - Political / Academic / Business
- Proactively Seeking Innovative Transportation Solutions
  - Deployed A-Taxi Shuttles and actively exploring GreenPods
  - Solutions Sought are Viable, Scalable, Replicable
- Clemson University International Center for Automotive Research (CU-ICAR) and Int'l Transportation Innovation Center (iTiC)
- 25,000+ citizens work in transport-related industries

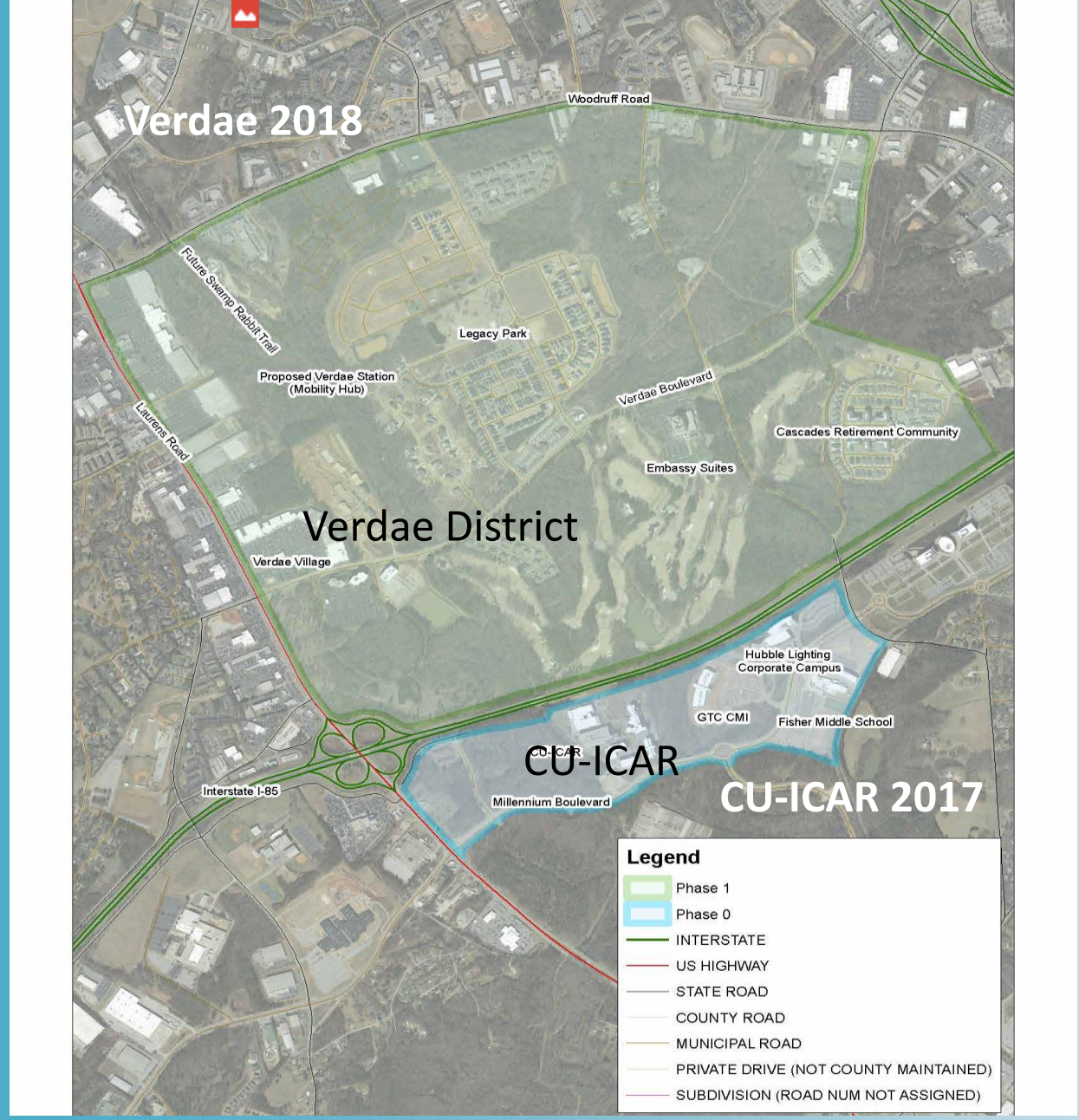
Greenville A-Taxis = ACES Mobility

- Unique Greenville Approach
  - Real Needs (1st Mile/NEMT)
  - Real Roads w/ Multiple Vehicle Types Vehicles
  - Real Pro-Active Partnerships
- Strong Automation Partner
  - Robotic Research, LLC (**RR**)
  - Re-deploy from Fort Bragg to **CU-ICAR** (2017-18)
  - More NEV Partners and Other "AMD" Districts in 2018-20
    - **Verdae** (High Income)
    - **Parker** (Low Income)

Olli

Actual Olli currently at Robotic Research having AV capabilities installed

Future NEV Partners: Local Motors Olli and Green4U Technologies Surge Vehicles



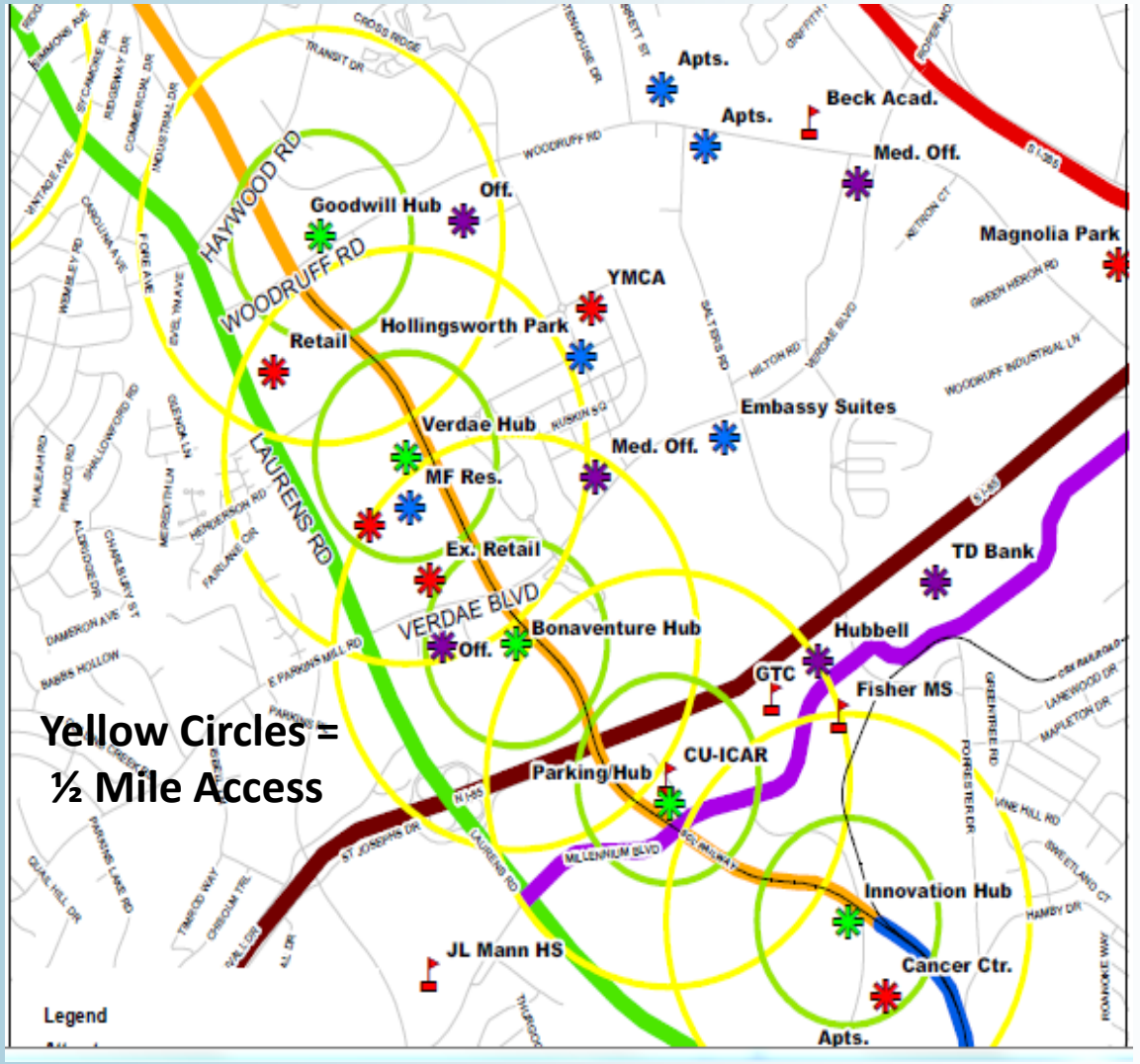
Deployment Phases

- CU ICAR
  - August 2017 – Ongoing
- Verdae District
  - May 2018- Ongoing

Mobility Hubs on Swamp Rabbit Trail: Improved Access for Verdae and CU-ICAR

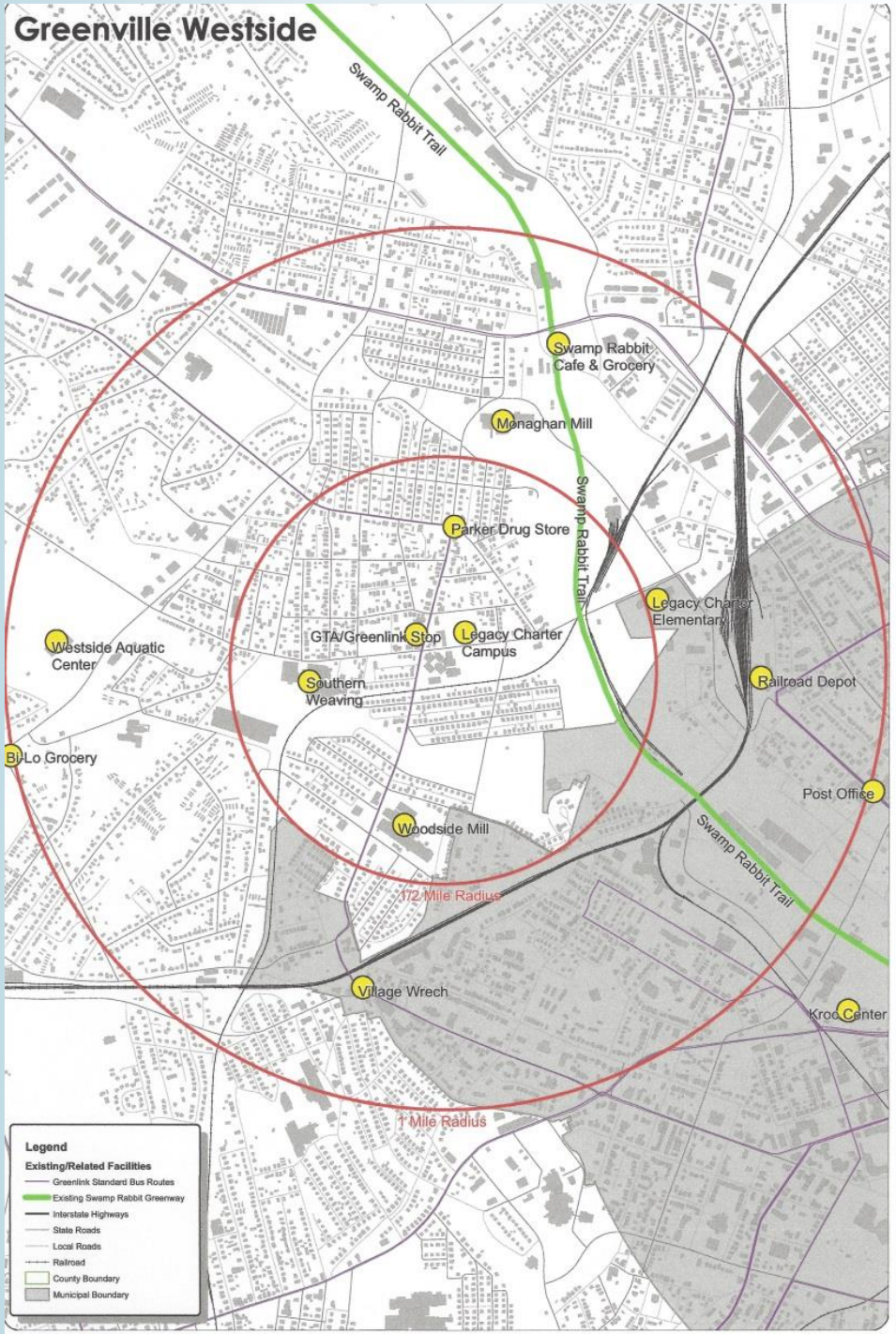
- Mobility Hubs (Swamp Rabbit Trail):
  - Improve 1st mile access
  - Multi-modal Mobility
    - Bike, Walk, A-Taxi, Bus, Park & Ride
    - Increases ACES Mobility Ridership
  - Amenity adds site value
  - GreenVillages focal areas

- Real estate potential affected by:
  - Transport Modes
  - Level of service
  - Regional access



Parker As a Model

- Multi-jurisdictional (City and former unincorporated Mill Villages in County)
- Poor Communities (Bottom 10% in America – US Opportunity Zones)
- 41% of residents without cars (poor, elderly, youth, disabled)
- ACES A-Taxi Shuttles could improve access and mobility at lower cost



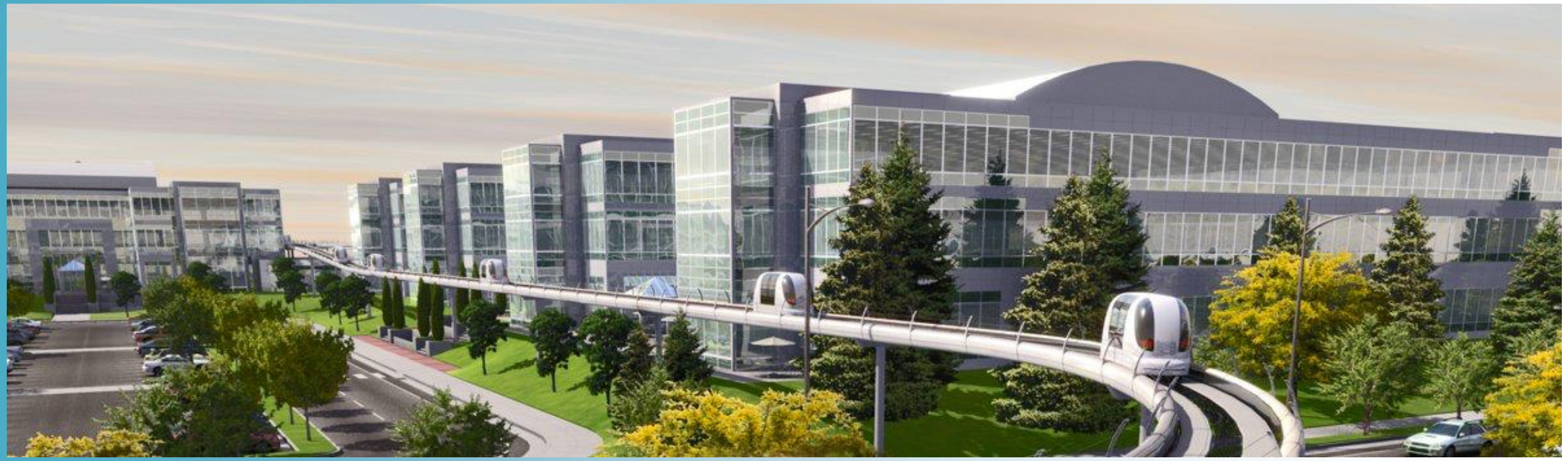
Podcars for Personal Rapid Transit

Increase Safety – Over 2 Million VMT – Zero Deaths

Reduce Roadway Congestion

Operating Now: WVU/Morgantown, Heathrow, Korea, Mexico

… 2020? GreenPods in Greenville Urbanized Area



Transit X

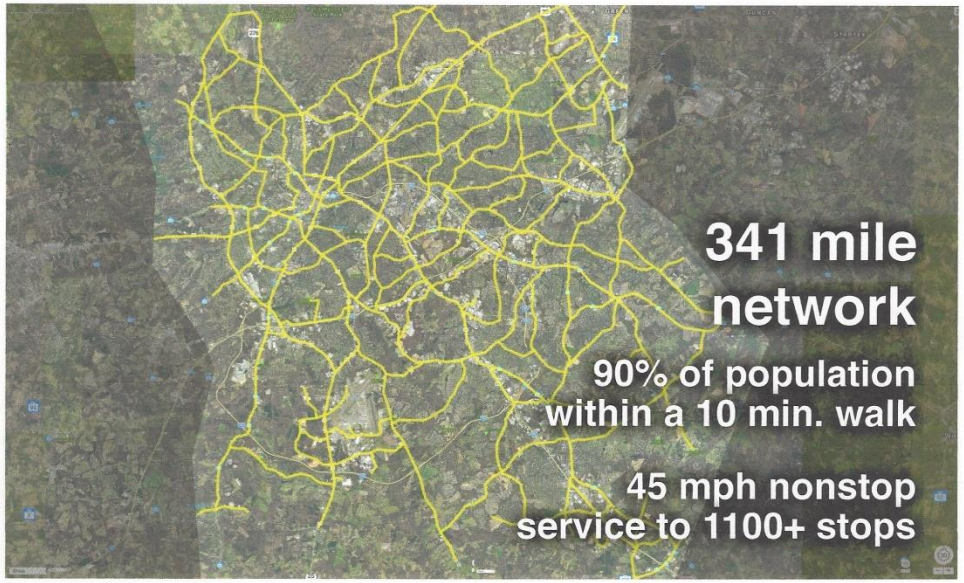
Transit X, LLC offers a preliminary proposal for

Greenville County, SC

For a privately-funded shared mobility service that is

High capacity • Automated • Wait-free
Solar powered • Last mile • Resilient

26-page companion Transit X Handbook is available at transitx.com/transitxhandbook.pdf



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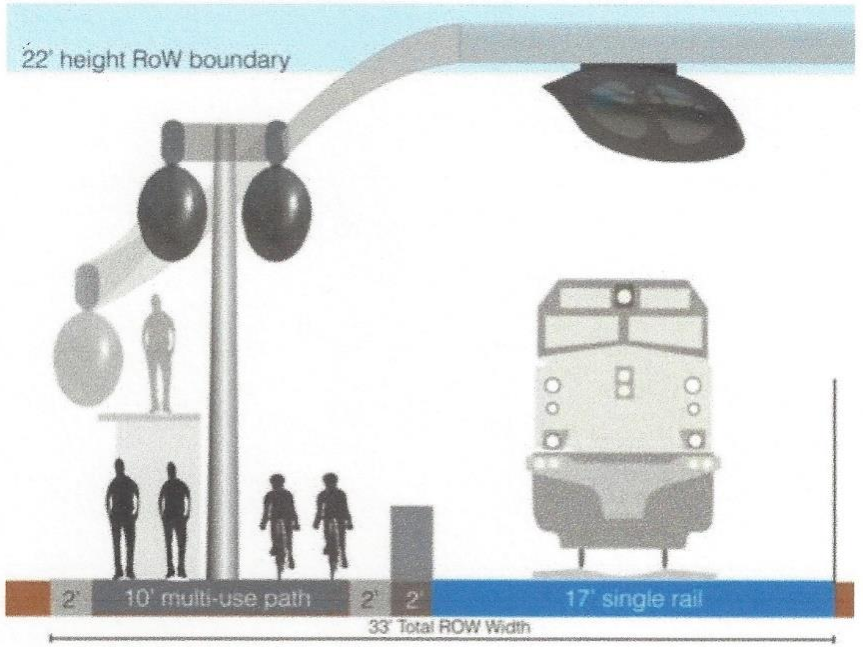
Un-Solicited Proposals?
1. Private Technology Vendor
2. Engineering, Procurement, & Construction (EPC) and
3. Global Financing Partners



Rights-of-way near railway or community path

Innovative Financing

- Public Private Partnerships (CapEx & OpEx)
  - **Public** Right of Way (ROW) Access and Permitting
  - **Private** Investors to Design, Finance, Build, Operate
    - Private ATN with Major EPC plus Finance Partners
      - Infrastructure Funds or Banks w/ TIFIA, NMTC funds
    - Local Private Equity: Sponsorships, Pre-paid Tickets
  - **Public** MCIP (TIF-type) funds repay infrastructure
    - Property tax increases in corridor (dedicate 95- 25% for infrastructure)
  - **Private** O&M: Farebox, Access fees, Advertising, Sponsors
- Partners: Motivated by Local Community & Self Interest
  - Property owners, Hospitals, Hotels, Airport, Large companies, Developers
    - Save $$ on Parking Deck costs, Get Employees to Work 24/7, Maximize Return on Assets

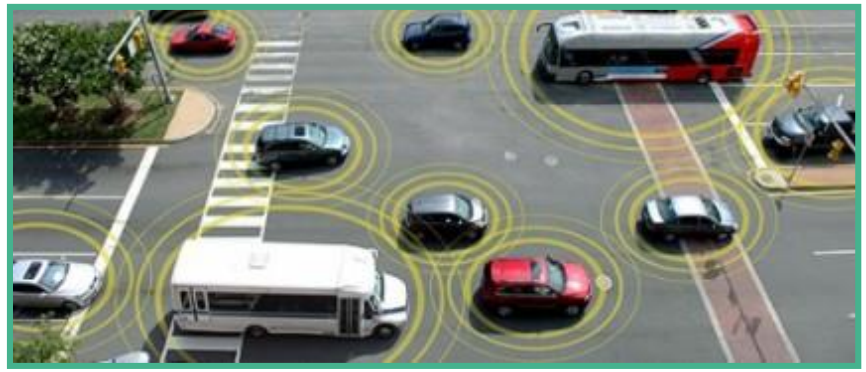
Final Thoughts

- Be Pro-Active
- Begin with the End in Mind
- Put First Things First
- Think Win-Win
- Seek First to Understand, Then to be Understood
- Synergize (1+1=3)
- Sharpen the Saw

Agency Roundtable discussion – *Recent Agency Activities on Connected and Autonomous Vehicles*

Participating Agency Members

Facilitated by Trish Hendren, I-95 Corridor Coalition



Participating Agencies

Agency	Speaker	Agency	Speaker
Massachusetts DOT	Daniel Sullivan	PennDOT	Roger Cohen
Connecticut DOT	Tom Maziarz and/or Eric Jackson (UConn)	Maryland	Kevin Reigrut (MdTA)
New Hampshire DOT	Susan Klasen	Virginia DOT	Cathy McGhee
Rhode Island DOT	Julia Gold	AMPO CAV Working Group	Eileen Singleton (BMC)
Vermont DOT	Emily Parkany		


Commonwealth of Massachusetts Autonomous Vehicles Testing Program

May 15, 2018

massDOT
Massachusetts Department of Transportation

Executive Order 572: To Promote the Testing and Deployment of Highly Automated Driving Technologies

- Signed October 20, 2017, EO 572 articulated the Commonwealth's support for innovation in general and driver-assistive technologies in particular, and expressed the belief that autonomous vehicles have the potential to transform personal mobility and road safety
- Established an approval process for the testing of autonomous vehicles (Levels 3-5) on Massachusetts roads:
  - Requires a licensed driver to be in the vehicle to take immediate control
  - Requires an MOU between MassDOT and any municipality in which testing will take place
  - Requires an application to MassDOT for approval, including documentation of previous testing experience; testing and safety plans; insurance coverage; vehicle registration; and operator licensure
- Created an Autonomous Vehicles Working Group to provide input on potential policies, regulations, and legislation

Current Testing in Massachusetts

- nuTonomy (recently acquired by Aptiv) began testing in January 2017 and has logged +1,000 miles. Conducted a passenger pilot with Lyft in late 2017. The company has 5 vehicles in Massachusetts.

- Optimus Ride began testing Polaris vehicle in Boston's Seaport District in June 2017. The company has entered into a partnership with Union Point in South Weymouth to test autonomous shuttle services within the development. Optimus Ride has 15 vehicles and has logged +1,000 miles on public ways in Boston.

- Traditional auto manufacturers, tech companies, academic institutions, and other startups have expressed interest in testing AVs on Massachusetts roads.

- To review the quarterly reports and additional information submitted to Boston: www.boston.gov/departments/new-urban-mechanics/autonomous-vehicles-bostons-approach

AV Working Group

- Convened 8 AV Working Group meetings since December 2016
- About 75+ attendees on average, including companies, lobbyists, academic institutions, regional planning agencies, and news media
- Discuss topics including a general overview of AVs, the current Massachusetts testing program, a review of existing statutes and regulations impacting AVs, cybersecurity considerations, and draft testing guidance and regulations
- Included a legislative session in July 2017 and a stakeholder session in September 2017 (materials available on the Working Group webpage)
- Goal of the Working Group is to issue a report this fall including an introduction to connected and autonomous vehicles in MA, policy considerations, and information about companies and entities involved in the C/AV industry in Massachusetts.
- Next Meeting: June 27 @ 10 am – 12 pm

Lessons Learned and Next Steps

- Working in close collaboration with the City of Boston and other stakeholders to facilitate AV testing on municipal ways
- Engaging with testing entities and municipal or state stakeholders as frequently as possible and necessary to:
  - Improve policymakers understanding of the state of the technology
  - Discuss use-cases and potential testing routes and services
  - Understand road design and operational considerations for AVs (eg. LED traffic lights)
  - Develop and iterate on an safe and effective testing program/process

- Next Steps
  - Facilitate the development of a regional testing process, and continue to iterate on this process
  - Continue public awareness and education about the technology and current testing activities and processes

CONNECTICUT CAV ACTIVITIES

THOMAS MAZIARZ, CONNECTICUT DOT

ERIC JACKSON, UNIVERSITY OF CONNECTICUT

May 15, 2018

I-95 CORRIDOR COALITION

CT's Autonomous Vehicle Law

1. Defines terms related to autonomous vehicles and legislation

2. Establishes State pilot program to test fully autonomous vehicles within municipalities

3. Creates a State legislative task force to study autonomous vehicles

CT's AV Pilot Program

Main Components of Pilot Program

1. **Application Process**
2. **Testing**
3. **Test Vehicles**
4. **Operators**
5. **Reporting**

CT DOT's Interest in AV and CV Pilots

- **Participate in Pilots to Build Internal Knowledge Base and Share Lessons Learned**
  - Support Portfolio of Pilots with Diverse Learning Opportunities
  - Encourage Pilots with Multiple Partners, Especially Institutional Partnerships

- **Offer Resources and Technical Support**
  - May Apply for Federal ITS Grant for AV/CV Funding
  - Working with UConn to Support Pilots

- **Collaboration with Other States**
  - Connected Vehicle Pooled Fund Study
  - New England CAV Cross Border Research Project

UConn's Interest in AV and CV Pilots

- **Build Internal Knowledge Base and Share Lessons Learned**
- **Provide Research Support**
- **UConn Campus Pilot(s)**
- **UConn AV Driving Simulator**
- **Partner with CT DOT and Other Industry Partners**


2018 NORTHEAST AUTONOMOUS AND CONNECTED VEHICLE SUMMIT
Policy, Infrastructure, and Technology
June 12: Autonomous Vehicles
June 13: Connected Vehicles
Windsor/Hartford Marriott
WINDSOR, CT
For More Info Go To: http://s.uconn.edu/NACV2018
UCONN
UNIVERSITY OF CONNECTICUT
CTI
Connecticut Transportation Institute
CTSRC
Connecticut Transportation Safety Research Center
U.S. Department of Transportation
Federal Highway Administration

For More Information

Thomas Maziarz

Thomas.Maziarz@ct.gov

Eric Jackson

Eric.D.Jackson@uconn.edu

NE Transportation Consortium

- The New England Transportation Consortium (NETC), a cooperative effort of the Departments of Transportation and the Land Grant Universities of the six New England States (CT, NH, ME, MA, RI and VT) has recently begun an initiative to identifying issues related to the testing and deployment of connected and automated vehicles extending beyond state lines.
- As a first step, an initial research task is being started to identify multi-state issues. New Hampshire DOT will be participating in this project and can provide lessons learned from the evolving NHDOT ITS Program.

New Hampshire DOT

CAV Focus Area

Policy and Planning

Federal Guidance

- Identify a lead agency to coordinate CAV activity.
- Create a CAV committee that is launched by the designated lead agency.
- Develop an internal process for entities to test CAVs within the state.
- Coordinate training with public safety officials on vehicle technology and operations.
- Consider multi-state coordination of applicable activities.

NH Focus

- Within New Hampshire, the DOT serves as the lead agency of CAV activities.
- With much of the current V2I focus on communications, traffic signals, and various sensor technologies, the TSMO Bureau is representing NHDOT.

Performance Measures

Federal Guidance

- Transportation agencies may want to consider how the effects of AV and CV technologies can contribute to broad agency goals.

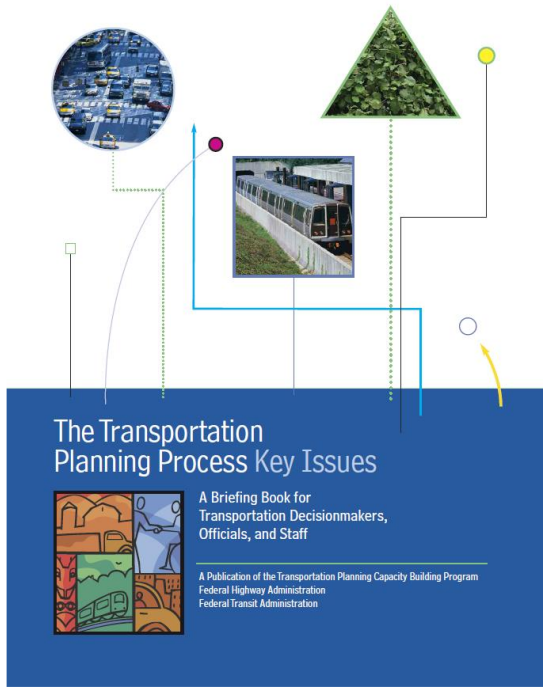
NH Focus

- To facilitate the alignment of transportation agency goals with AV and CV technologies, NHDOT is evaluating additional performance measures that support specific safety, congestion, mobility, and environmental goals that may be supported by CAV.

Long Range Transportation Plans

Federal Guidance

- With freeway, arterial, and urban environments all affected by potential future CAV scenarios, transportation planners should consider developing long range transportation planning tools that take automated vehicle systems into consideration.



NH Focus

- Both increases in capacity and changes to traveler behavior due to automated vehicles are being assessed for NHDOT long range transportation plans.
- If levels of automation continue at the current pace, infrastructure investments will be assessed considering the likely impacts of CAV systems as an additional variable within the model.

Infrastructure

Federal Guidance

- Standards related to infrastructure design considering CAV requirements are continuing to evolve.

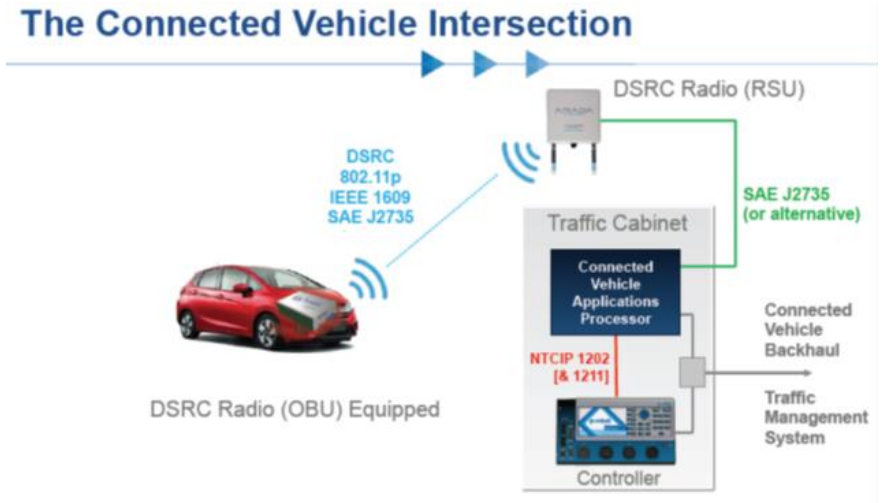
NH Focus

- NHDOT is monitoring the guidance being issued by FHWA, NHTSA and others related to CAV deployment and evaluating any recommended changes.
- Early adoption will likely ease any transition before widespread deployment.

Traffic Control Strategies

Federal Guidance

- The Signal Phase and Timing (SPaT) Challenge is a first step for states to consider the deployment of V2I technology at signalized intersections.



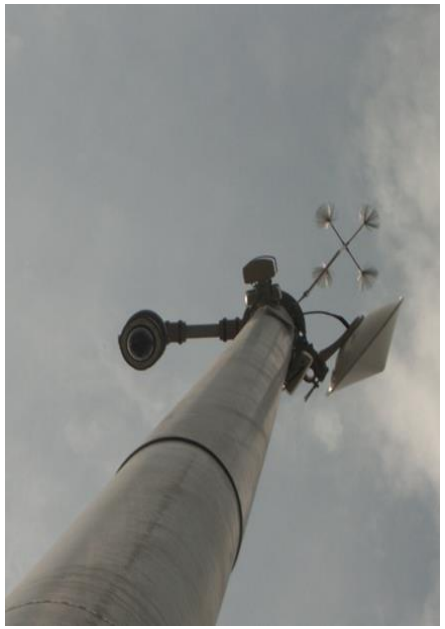
NH Focus

- NHDOT is supporting the efforts in Dover, NH to implement various signal controller platforms to test V2I strategies.
- NH is also participating with neighboring states in a regional approach to CAV planning and deployment through the NE Compass software platform.

Data Management and Cybersecurity

Federal Guidance

- While V2V data will come primarily from the vehicle manufacturers, V2I data will primarily be mined from traffic operation centers.
- Data collection, processing and dissemination of transportation system data will need to be processed outside of the vehicle architecture.



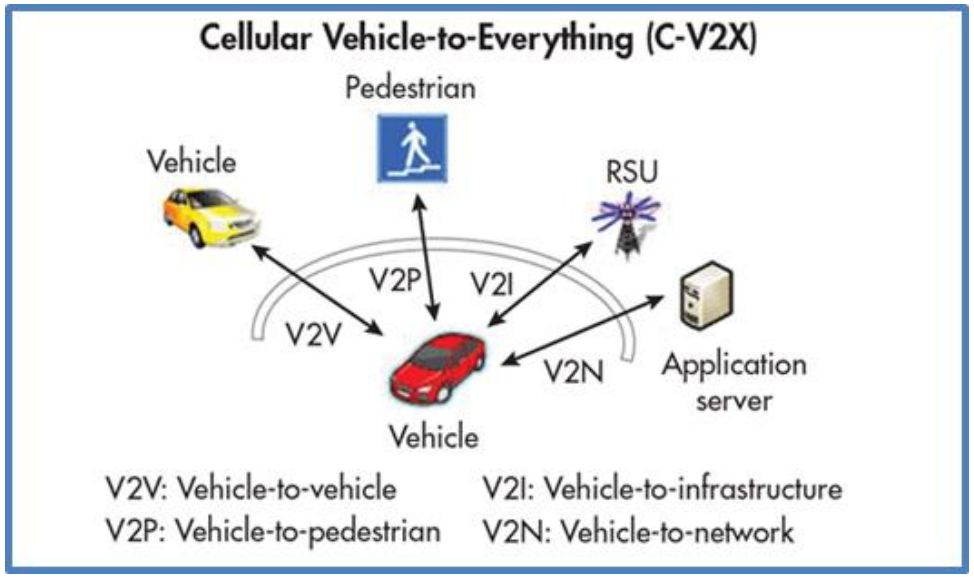
NH Focus

- The NHDOT ITS Program has considered these issues in all ATMS applications to date.
- We are continually evaluating the implications of these issues on the design of our communications networks, networking equipment configuration, field device security, and operations best practices.

V2X – vehicle to everything

Federal Guidance

- Currently, two approaches to V2X communication exist, DSRC and C-V2X.

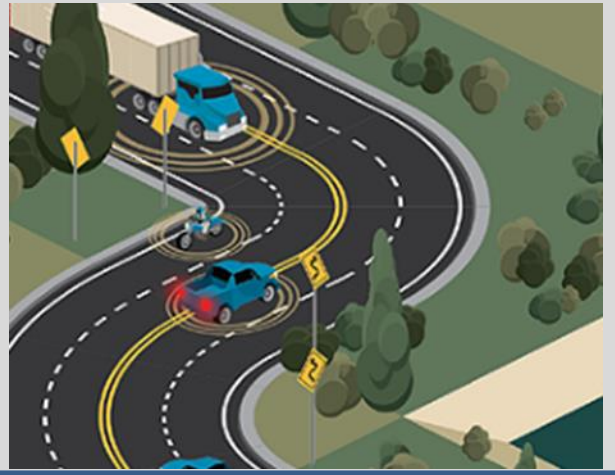


NH Focus

- NHDOT continues to monitor the progress of V2X and the two scenarios.
- Potential permitting of expanding 5G systems are being evaluated within the state.

RI dot
Driven to get you there

TRIP
Transportation Innovation Partnership



Rhode Island Transportation Innovation Partnership

AUTONOMOUS VEHICLE MOBILITY CHALLENGE

RIDOT's POLICY & INNOVATION TEAM

Julia Gold, Chief of Sustainability and Innovation

Division of Planning

RIDOT's Policy and Innovation Team

Pamela Cotter
Policy Director
Rhode Island Department of Transportation (RIDOT)

Julia Gold – Project Manager
Chief of Sustainability and Innovation
Rhode Island Department of Transportation (RIDOT)

Russell Holt, P.E.
Senior Civil Engineer
Rhode Island Department of Transportation (RIDOT)

Shoshana Lew
Chief Operating Officer
Rhode Island Department of Transportation (RIDOT)

Ken White
Programming Services Officer
Rhode Island Department of Transportation (RIDOT)

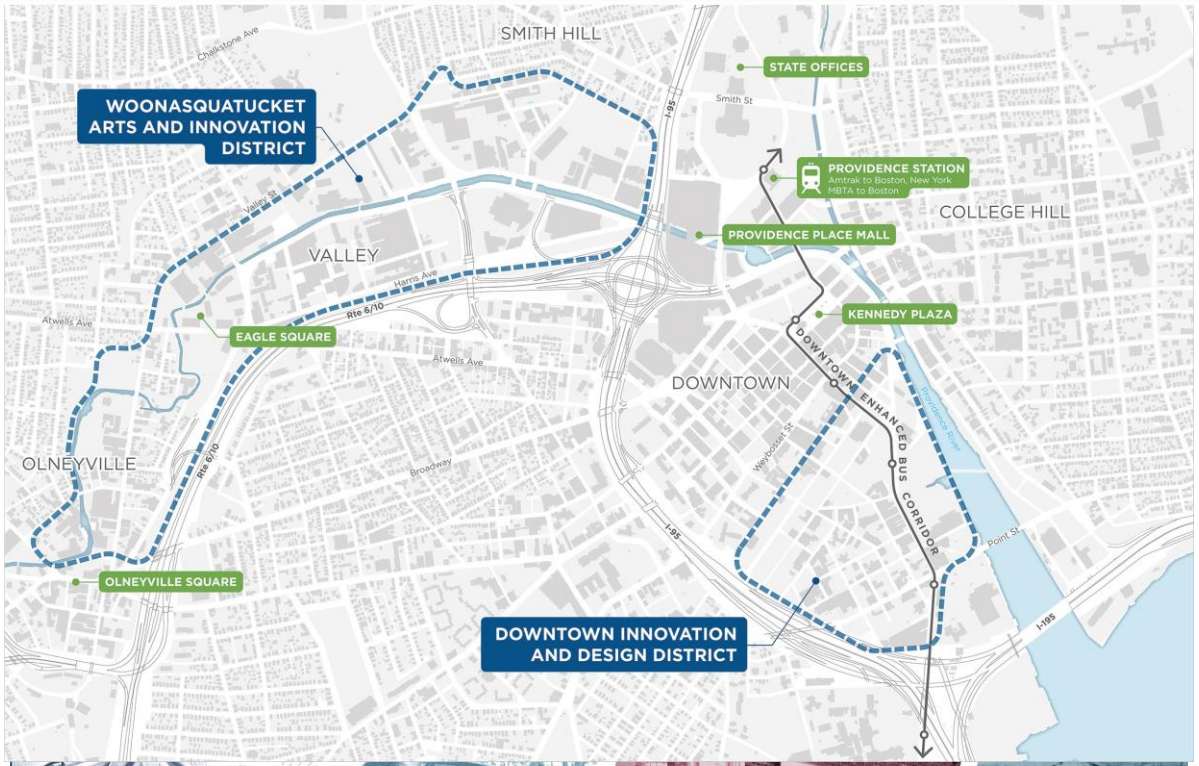
Christos Xenophontos
Assistant Director
Rhode Island Department of Transportation (RIDOT)

RIDOT's Efforts to Date

- **April 2017:** RIDOT hosts International Mini-Summit on CAVs
- **June 2017:** RIDOT issues Request for Information (RFI) on CAVs and innovative transit systems
- **July 2017:** The Rhode Island Transportation Innovation Partnership (TRIP) is established
- **September 2017:** TRIP hosts CAV Expo at The New England Institute of Technology
- **October 2017:** RFI Closed & Reviewed
- **November 2017:** Joint research forum with URI on "*Transportation Innovation Partnership (TRIP): Leading the Way for Research*"

TRIP Autonomous Vehicle Mobility Challenge

- A pilot program aimed to safely test multi-passenger autonomous vehicles (SAE Level 3+) on Providence's streets
- Presenting a unique opportunity to explore the integration of new technologies into public transit
- Providing the public exposure to autonomous vehicles and the opportunity to engage in the Challenge and learn with us



PARTNERS


RIPTA
RHODE ISLAND PUBLIC TRANSIT AUTHORITY


QUONSET
DEVELOPMENT CORPORATION


TRIP
Transportation Innovation Partnership


PROVIDENCE
THE CREATIVE CAPITAL

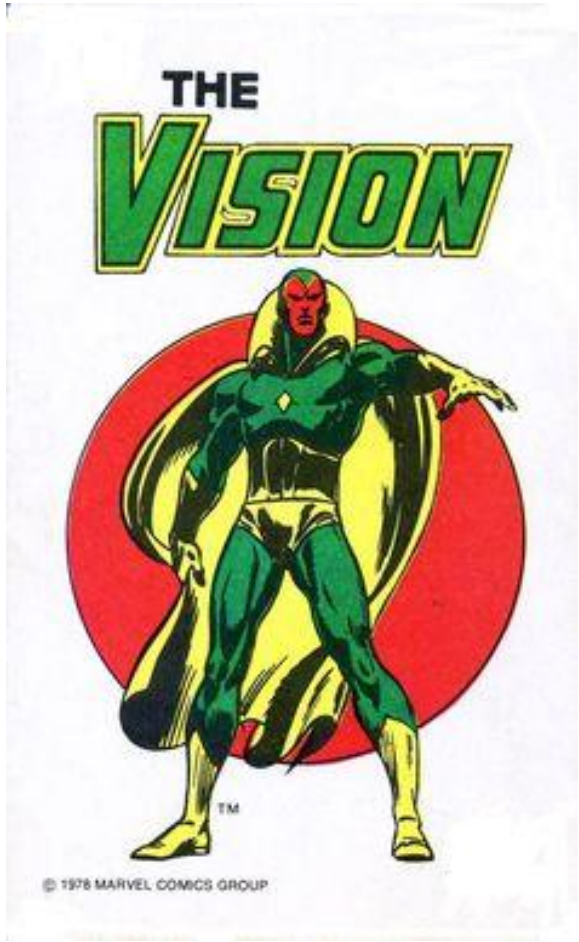

RI dot
Driven to get you there

STRATEGIES

- Create a safe and accessible environment for testing autonomous vehicles in RI
- Reduce emissions and congestion
- Improve mobility with a focus on equity
- Create a framework for economic growth and a stronger workforce
- Integrate Smart City applications and explore data management and privacy concerns
- Leverage academic partners to research social, behavioral, environmental, and systemic opportunities and challenges related to AVs

LESSONS LEARNED

- Have a **VISION** that serves your constituents
- Seek full support from your leadership
- Don’t take on everything at once
- Engage partners and stakeholders early and often
- Talk to other cities and states working on similar initiatives
- Embrace the unknown
- Allow for flexibility
- Don’t be afraid to challenge procurement status quo



NEXT STEPS

RFP Issued:
April 27, 2018

Pre-Proposal Conference
May 21, 2018 @ 1:00 PM

Submissions Due
June 8, 2018 @ 11:30 AM

For more information, contact:

Julia Gold

Chief of Sustainability and Innovation

Rhode Island Department of Transportation

Julia.Gold@dot.ri.gov

401-222-6940 x4665

www.dot.ri.gov/TRIP

Vermont Agency of Transportation

CAV ACTIVITIES

- Submitted report to VT General Assembly on "Preparing for Automated Vehicles in Vermont" January 15, 2018 that recommends legislation to allow for the testing and deployment of AVs in VT.
  - Testified on report findings, results of stakeholder engagement and recommendations to VT House and Senate Transportation Committees
  - Legislators appreciative that AVs will happen and we need to be prepared for them
  - After current session ends, we will work with DMV and other stakeholders on draft legislation for testing and deployment for consideration in 2019 session
- Chairing TAC for six-state six-month New England Transportation Consortium CAV Cross-Border Issues project (AECOM)
  - Working towards six-state workshop on June 11 (before CT CAV Summit)
- Learning about CAV through national participation in TRB/NCHRP, I-95CC, ITS America, AASHTO, IEEE, SAE, AMVA, etc.

Vermont Agency of Transportation

For more information, contact:
Emily Parkany
802-272-6862
emily.parkany@vermont.gov

VERMONT
AGENCY OF TRANSPORTATION

PennDOT

OVERVIEW

- Highly Automated Vehicle (HAV) Action Plan
- Pennsylvania Automated Vehicle (PAAV) Summit 2017 & 2018
- PennSTART Testing & Training Facility

  Safety Transportation and Research Track (START)

PennDOT

HAV Action Plan - GOALS

- Properly balance innovation and safety (safety being paramount)
- Existing PA Vehicle Code requires a human driver
- Build upon the AV Policy Task Force work
- Vision of shared responsibility to ensure public safety

PennDOT

HAV Action Plan – KEY POINTS

- Updating Task Force policies to strengthen testing safety
- Requesting (expecting) voluntary tester compliance pending legislation
- Calling on General Assembly to enact testing legislation to authorize PennDOT to oversee safe HAV testing

PennDOT

HAV Action Plan – NEXT STEPS

- Meet with testers and reconvene Task Force for feedback
- Explore establishing independent safety validation mechanism
- Enlist sister DOTs and other agencies to call on US DOT and NHTSA to enhance Guidance '2.0 – A Vision For Safety'

PennDOT

Pennsylvania Automated Vehicle Summit

Pittsburgh, April 9-10 www.paav.org

AUTOMATED VEHICLE SUMMIT 2018

PennDOT

PA Automated Vehicle Summit

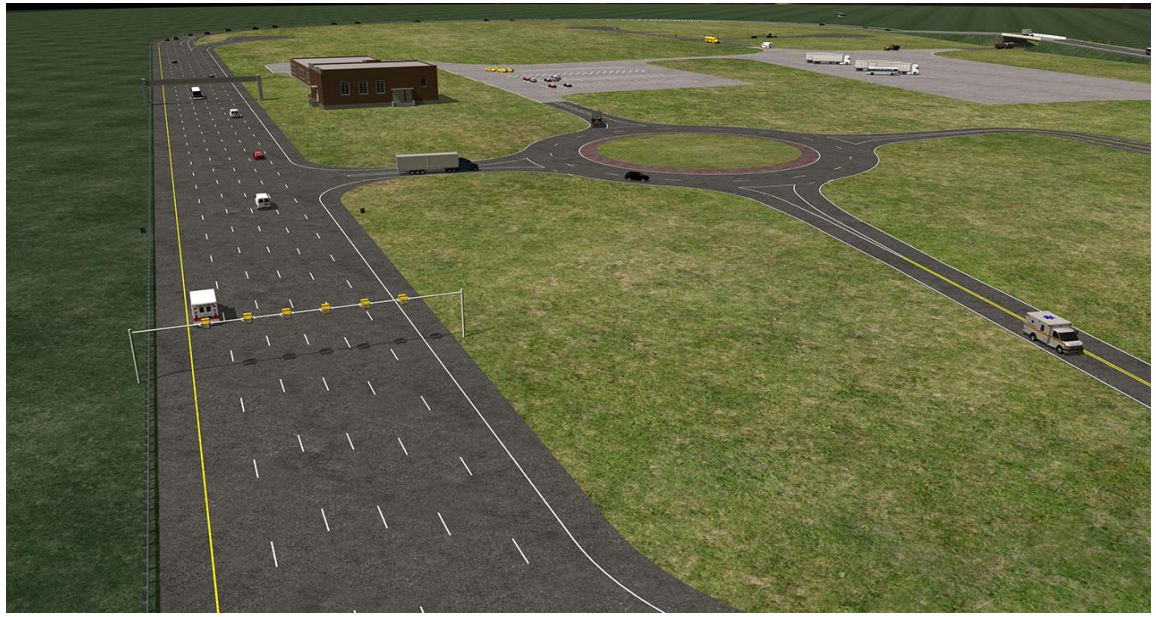
Pittsburgh, April 9-10 www.paav.org

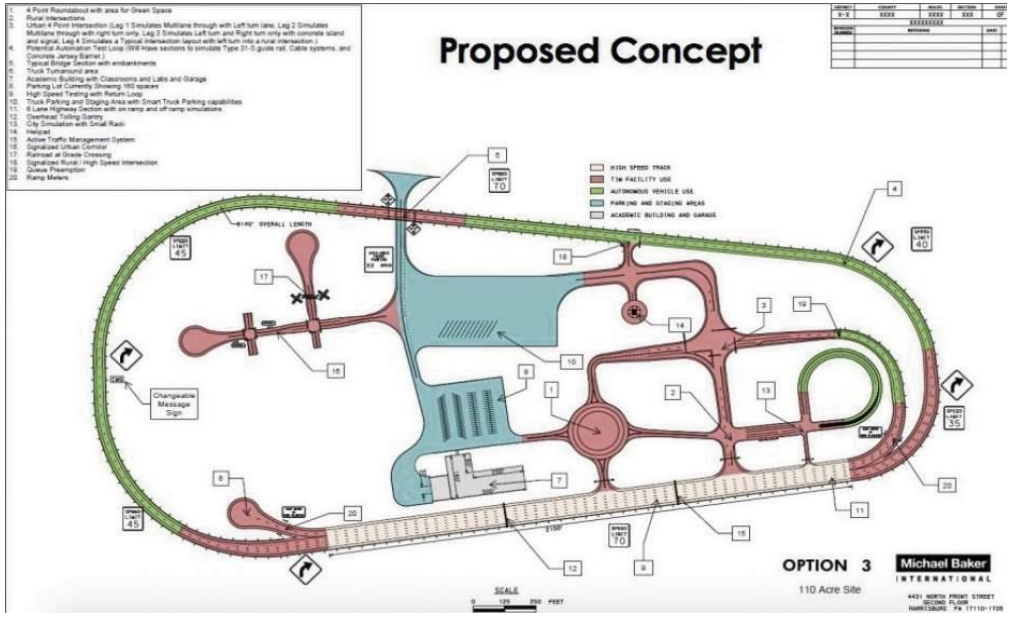
- PAAV Summit 2017 (275 attendees)
- PAAV Summit 2018 (400+ attendees)
  - Safety, Infrastructure Planning, Workforce & Economic Development
  - Interchange and collaboration among stakeholders
  - Public long-term acceptance of vehicle automation

PennDOT

PennSTART Testing & Training Facility

- Joint effort between PennDOT, PA Turnpike, PSU Larson Institute
- Advanced technology testing: CAV, ITS, Transit & Commercial Vehicles, Work Zone, Tolling, Incident Management
- Resources with video of testing facility: https://www.pennstart.org/





PennDOT

For more information, contact:

Roger Cohen
717-787-0786
rogecohen@pa.gov

pennsylvania
DEPARTMENT OF TRANSPORTATION

Maryland Department of Transportation

OVERVIEW

- Actively engaged and growing *Maryland Connected and Automated Vehicles Working Group* with diverse cross-section of members (private, public, insurance, etc.) – average 60+ attendees at each quarterly meeting.
- Forming CAV Sub-groups to focus on specialty areas such as Education and Research, Enforcement and Freight.
- Continuing operation of MDOT one-stop shop point of entry for those interested in collaborating on CAV technology; we continue to receive Expressions of Interest and reissue permits for HAV operations.
- Launched *Maryland Locations to Enable Testing Sites (LETs) for CAV :* interactive map for available CAV technology testing sites.

Maryland Department of Transportation

LESSONS LEARNED

- Collaboration and opening the door for discussion is essential; no one agency, organization or entity has all the answers.
- The **networking and communications implications** of testing CV technologies are complex; Maryland is undertaking various pilots to evaluate technology solutions.
- Education on CAV is critical; Maryland has started outreach through two separate flyers; posted on the MDOT CAV landing page at MDOT.Maryland.gov/MarylandCAV
  - Fast Facts on CAV Technology
  - Maryland Open for Business – CAV Technology

Maryland Department of Transportation

NEXT STEPS

- Collaborating with the Maryland Transportation Institute on CAV opportunities and workforce development activities.
- Continually assessing research and best practices on the use of CAV in Maryland.
- Continuing development of an MDOT Statewide CAV Strategic Vision Plan to align CAV planning and implementation efforts - MDOT State Highway Administration finalized and released a Strategic Action Plan with integration of CAV; other MDOT TBUs and the MDTA continuing development of agency specific CAV Strategic Plans.

Maryland Department of Transportation

NEXT STEPS (continued)

- Developing CAV video clips to share via the web, social media and at conferences; exploring additional ideas for distribution – economic development network, traffic safety and vehicle dealerships networks.
- Exploring CAV opportunities such as freight platooning.
- Participating in national, state and local CAV research projects developing challenges, definitions and standards of practice.

Maryland Department of Transportation

For more information, contact:
Kevin C. Reigrut
410-537-1001
kreigrut@mdta.state.md.us

For more information, contact:
Christine Nizer
410-787-7830
cnizer@mdot.state.md.us

MARYLAND DEPARTMENT OF TRANSPORTATION

VTRC
Virginia Transportation
Research Council

We Bring Innovation to Transportation

CAV Activities in Virginia
May 2018 Update

Enhancements to Virginia Connected Corridor

- All DSRC units have been upgraded from Savari to Cohda with 2016 standard (arterial and freeway)
- SPaT/MAP currently broadcast from all 30 intersections
- Work underway to install RTK base station to improve GPS accuracy
- Working with 2 private entities to use the SPaT/MAP messages for a vehicle based application and a pedestrian application

Data Sharing Activities

- Continuing to refine SmarterRoads data portal
  - Signal timing information shared for all VDOT signals in Northern Virginia (~1,400 signals)
  - Working to improve meta data
  - Developing a more robust framework

Expansion of Smart Roads w/VTTI

- Live Roadway Connector
  - Allows access from Rt. 460 to test track directly
- Surface Street Expansion
  - Reconfigurable lanes, moveable “structures”
- Rural Roadway Expansion
  - Expose challenges of horizontal/vertical curvature, surface types, weather

Other Activities

- Developing a Work Zone Builder app
  - Fill in data “gaps”
  - Enhance safety for both workers and motorists
- Continue to lead the CV pooled fund study
  - Added several new members from I-95 CC

Lessons Learned

- Focus on agency goals
  - Use the technology to address real transportation challenges
- Don’t be afraid to expose data
  - Feedback results in stronger data resources for both the agency and private partners

VTRC
Virginia Transportation Research Council

We Bring Innovation to Transportation

Catherine C. McGhee, PE
Director of Research
Cathy.McGhee@vdot.Virginia.gov

Virginia Lingham
VDOT Connected and Automated Vehicle Program Manager
Virginia.Lingham@vdot.Virginia.gov

Virginia Automated 20XX

Ronique Day
Deputy Director
Office of Intermodal Planning and Investment

Virginia Automated 20XX

Office of INTERMODAL Planning and Investment

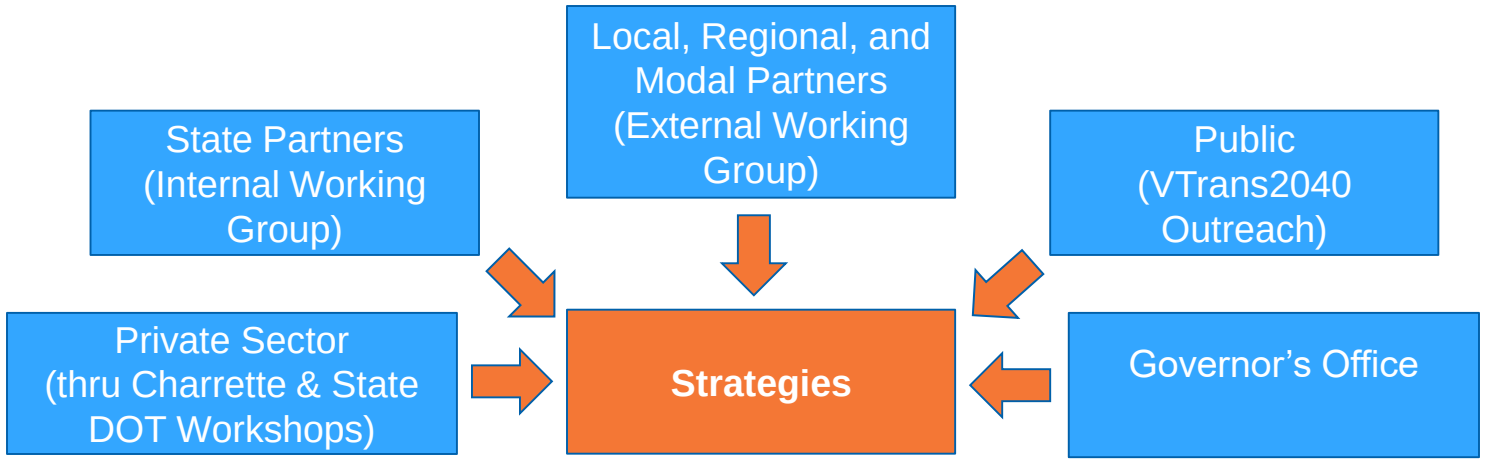
- Virginia began strategic planning for deployment of Automated during the McAuliffe administration
- The purpose of the plan is for the transportation Secretariat to have a coordinated and strategic approach to addressing the transition to AV
- A multi-agency workgroup was created to develop the plan – Virginia Automated 20XX
- A strategic framework has been created and will be finalized in upcoming months
- The final plan is expected to be published this year
- Next steps for the Commonwealth is implementation

The plan is a strategic policy framework for transitioning autonomous vehicles into the Virginia transportation network, and associated Autonomous and Connected Vehicle programs, by which the Office of the Secretary of Transportation can position Virginia to be a recognized leader in the rapidly advancing field of self-driving technology and connected mobility.

Virginia Automated 20XX

Office of INTERMODAL Planning and Investment

- **Primary focus is set of robust strategies for implementation**
- **Each strategy has an identified timeline for implementation in near-term (now), mid-term (within three years) and longer term (between five and seven years)**
- **There are 11 total strategies**
- **Each with owner, a list of agencies supporting the owner, a specific measure of success, timeline and estimated associated funding cost**
- **Designed to guide continued and focused effort in managing the advancement of AV**



Virginia Automated 20XX

Office of INTERMODAL Planning and Investment

For more details on this plan:

Ronique Day

Ronique.Day@oipi.Virginia.gov

(804)366-9225

Association of MPOs CAV Working Group

OVERVIEW

- Four meetings held between April 2017 – March 2018
- Summit to be held Fall 2018
- Products: meeting summary white papers and framework for MPOs

ASSOCIATION OF METROPOLITAN PLANNING ORGANIZATIONS

Association of MPOs CAV Working Group

CHALLENGES AND NEEDS AND RISKS

- Challenges and Needs
  - Unknowns and uncertainty
  - Data
  - Managing perceptions and expectations
  - Building technical, institutional, and policy capacity
  - Staying informed
  - Regulations and guidance
  - Building partnerships
  - Full range of impacts of emerging technologies
- Risks
  - Safety
  - Environmental Justice and Equity
  - Stakeholder expectations, acceptance, and unpredictability
  - Data Sharing
  - Incorporation into Current Planning Process and Decision Making

Association of MPOs CAV Working Group

STRATEGIES FOR INCORPORATION INTO PLANNING PROCESS

- Identify potential drivers, levers, triggers, and tipping points
- Develop visions at national, state, and regional levels
- Facilitate forums for regular dialogue
- Develop an integrated place for resources and ongoing activities from partners
- Continue maintaining infrastructure in good condition to provide venues to test successful CAV technology
- Continue the MPO role of providing public, partner, and stakeholder education, involvement, and engagement
- Encourage good data-sharing practices between the public and private sector
- Make investment decisions that support today's needs and the potential for future technology
- Continue MPO role of accounting for equity in transportation planning and investments
- Continue to build relationships with public and private stakeholders

Association of MPOs CAV Working Group

For more information, contact:

Eileen Singleton, Baltimore Metropolitan Council
410-732-0500 x 1033
esingleton@baltometro.org

Association of Metropolitan Planning Organizations

Rachel Roper, AMPO
202-624-3682
rroper@ampo.org

http://www.ampo.org/resources-publications/ampo-work-groups/connected-and-autonomous-vehicles-working-group/

I-95 CORRIDOR COALITION

Other Agencies who would like to give an update?

Your recent CAV efforts (Jan 2018 – present)

- Overview/what you did
- Lessons Learned
- Nest Steps

Wrap Up

Patricia Hendren, I-95 Corridor Coalition

Questions?

In Closing….

Thank you for joining today

For Additional Information, please contact:

Patricia Hendren, PhD
Executive Director
I-95 Corridor Coalition
202-441-6621
phendren@i95coalition.org

Speaker Contact Information

- Patricia Hendren, I-95 Corridor Coalition

  202-441-6621, phendren@i95coalition.org

- Robert C. Passmore, PCI- Property Casualty Insurers Association of America

  847-553-3612, robert.passmore@pciaa.net

- Fred Payne, Greenville County Council

  864-884-8899, FPayne@greenvillecounty.org