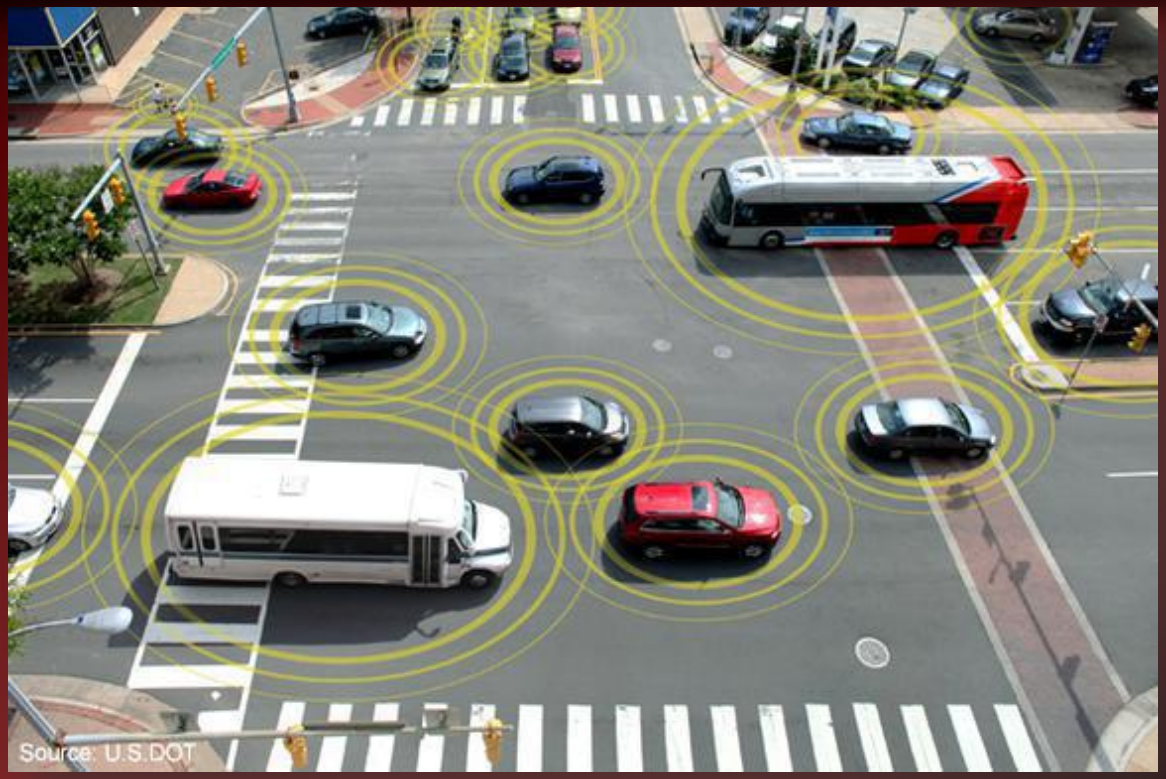
Maryland Department of Transportation

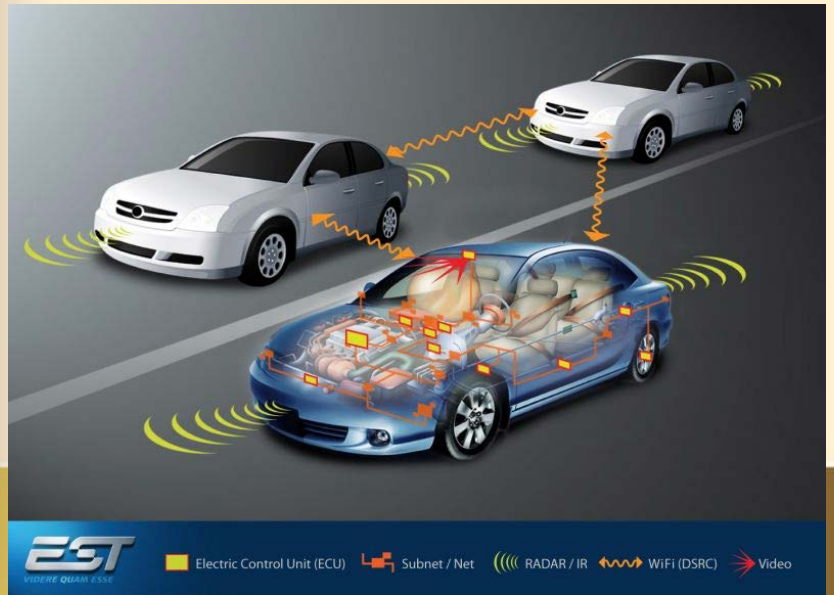


Autonomous Vehicles and the Future of Transportation

MACo Conference, August 2016

MVA Motor Vehicle Administration

Connected and Automated Vehicles….
No longer a question of "if"
But rather of "when"



Connected Vehicles

Vehicle to Vehicle (V2V)
Vehicle to Infrastructure (V2I)
Vehicle to Pedestrian (V2P)

Driver Assist Technology

Adaptive Cruise Control
Lane Keeping Assist
Automatic Parking
Automatic Emergency Braking

Driver Alerts & Warnings

Forward Collision Warning
Emergency Electronic Brake Light
Blind Spot Warning
Lane Change Warning
Do Not Pass Warning
Curve Speed Warning

NHTSA Levels of Automation

Level	Example Systems	Driver Roles
0	No automation	In full control
1	Adaptive Cruise Control, OR Lane Keeping Assistance	Must control other function, and still continuously monitor driving environment
2	Adaptive Cruise Control AND Lane Keeping Assistance	Must still continuously monitor the driving environment (system nags driver to ensure they are paying attention)
3	Highway driving pilot; Valet parking in garage	May read a book, text, watch a movie, but must still be prepared to intervene when needed
4	Automated taxi (even for children); Car-share repositioning system	No driver needed

The Maryland Department of Transportation is a customer-driven leader that delivers safe, sustainable, intelligent, and exceptional transportation solutions in order to connect our customers to life's opportunities

How can AV and CV move us forward?

- More than 90% of traffic crashes caused by driver error, and with automation of compliance with safety laws, driver errors and crashes can be significantly reduced
- Reducing crashes also reduces demand for law enforcement response, emergency rescue and medical services, and infrastructure repair
- Connected and interactive transportation network adapts to changing roadway conditions, improves traffic flow in real time, reduces congestion, delays, & emissions

Possible Benefits

- Increase mobility of young, elderly, and those with disabilities
- Potential synergies with Car-sharing
- Truck parking, real-time parking & routing
- Decrease operator insurance costs
- Provide easier first-and last-mile connections with major transit corridors
- Efficiencies in freight / transportation of goods and economic activity

Complex Issues

- Are they safe?
- Who is the "Driver"?
- Who is liable?
- What safety standards apply?
- Do current rules of the road laws apply?
- What infrastructure changes will be needed?
- How do we plan for changing technologies?
- Will this affect transportation investments?

MDOT's Involvement to Date

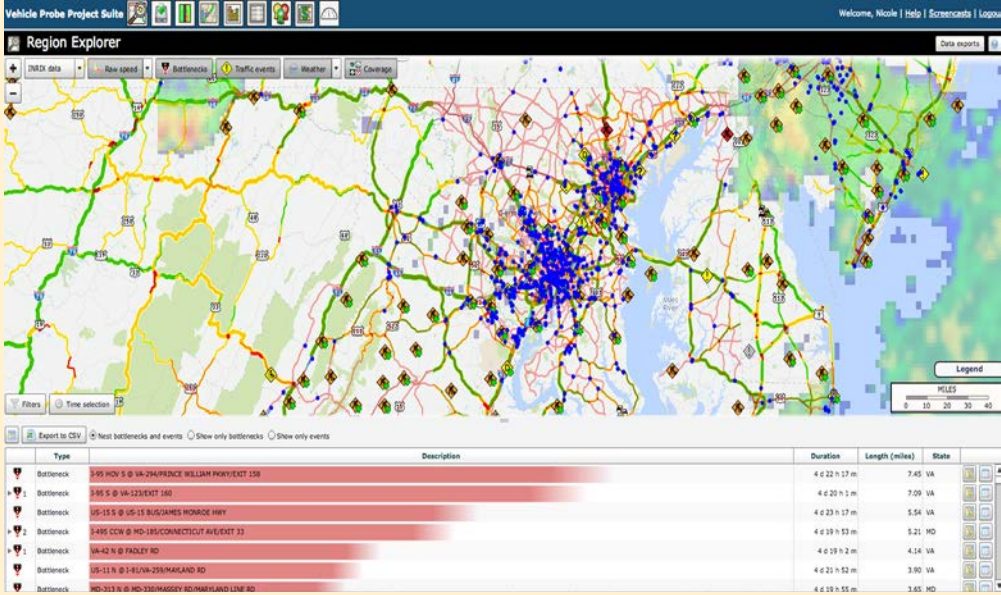
Current MDOT CV/AV Applications

Research & Gathering Information

Maryland Autonomous & Connected Vehicle Working Group

Participation in National Discussions and Workgroups

Current MDOT CV/AV Applications



- Supporting Operations – CHART
- Planning for CV/AV: Truck Probe Data
- Evaluating Potential CV Test Bed Opportunity with USDOT/FHWA
- Research and Analysis with Federally Sponsored Programs: CV Lanes

Research & Gathering Information

- Public policy to facilitate implementation
- Implications of AV for motor vehicle code
- Harmonization of state goals & regulations
- Business models of public & private interface
- Federal / state / local responsibilities
- Lessons learned from other states' pilots & policies

Participation in National Discussions and Workgroups

- Transportation Research Board of the National Academies of Sciences, Engineering, and Medicine
- Pooled Fund Studies with other States on Implementation Options
- American Association of State Highway Transportation Officials- (AASHTO) studies for planning, technology, State implications and integration
- USDOT & its agencies - Federal Highway Administration, National Highway Traffic Safety Administration, Federal Motor Carrier Safety Administration
  - FHWA leading work on truck platooning

Participation in National Discussions and Workgroups

American Association of Motor Vehicle Administrators (AAMVA)

Autonomous Vehicle Info Sharing Group

- Began in 2013 to analyze state laws and develop AV Information Library on AAMVA's website
- Focus on operator training, testing & licensing, vehicle registration & title, data privacy, security concerns and consumer safety

Autonomous Vehicle Working Group

- AAMVA jurisdictions, law enforcement, federal agencies
- Guide to assist state MVAs in regulating AVs – Best Practices – will be developed by Fall 2016

Maryland Autonomous & Connected Vehicle Working Group

- Secretary Pete Rahn charged this group to be central point of strategic planning of MDOT's role with AVs/CVs
- High-level group with diverse cross-section of members:
  - Secretary's Office and all business units within MDOT– MVA, SHA, MTA, MPA, MAA, & MdTA
  - Trucking Industry
  - Law Enforcement
  - County Public Works
  - Insurance Administration
  - Global Auto Makers
  - Department of Aging
  - Department of Disabilities
  - Department of Information Technology
    - Elected Officials
    - AAA

Maryland Autonomous & Connected Vehicle Working Group

Presentations

- Nat Beuse, NHTSA
- Ray Derr, Transportation Research Board
  - National Cooperative Highway Research Program
  - Pooled fund program
- Cathie Curtis, AAMVA
- Thomas Jacobs, UMD Ctr of Advanced Transportation Technology
- Greg Slater & Richard Woo, State Highway Administration
- Pat Keller & Laura Getty, Maryland Transit Administration
- Mark Riccobono, President, National Federation of the Blind

What Can You Do?

- Stay aware of the evolving technology and any possible effects on your jurisdiction
- Watch for updates from your MACo representative on the Maryland Workgroup
- Convey any concerns to be discussed at the Workgroup
- Help your constituents to stay informed of vehicle changes
  - mycardoeswhat.org

Next Steps

- Position Maryland to be responsive to emerging technology
- Prepare for recommendations from Federal Agencies
- Identify future economic development opportunities