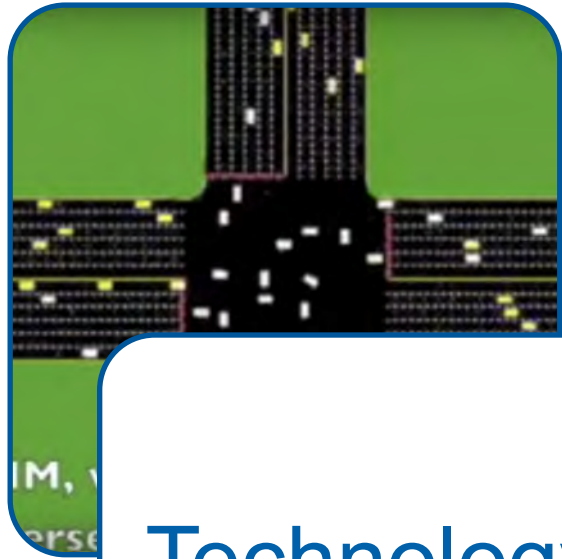


# CONNECTED AND AUTOMATED VEHICLES IN VIRGINIA

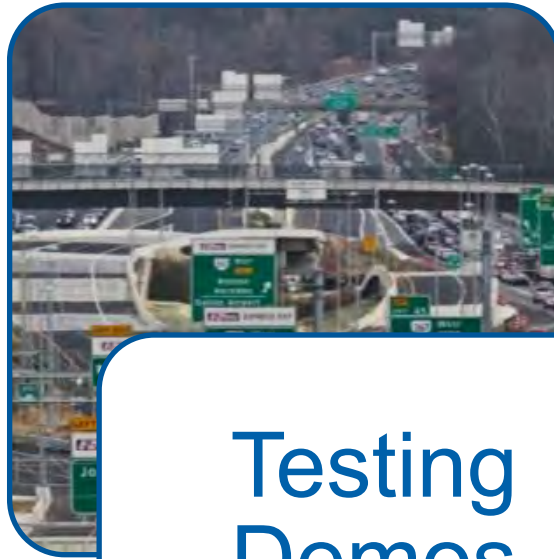
 Raymond Khoury, P.E., State Traffic Engineer

May 14, 2019  
Richmond Regional Transportation  
Planning Organization  
Active Transportation Work Group

# Overview



Technology  
Trends



Testing  
Demos  
and Pilots  
in Virginia



Next Steps

# Headlines: What is really happening out there

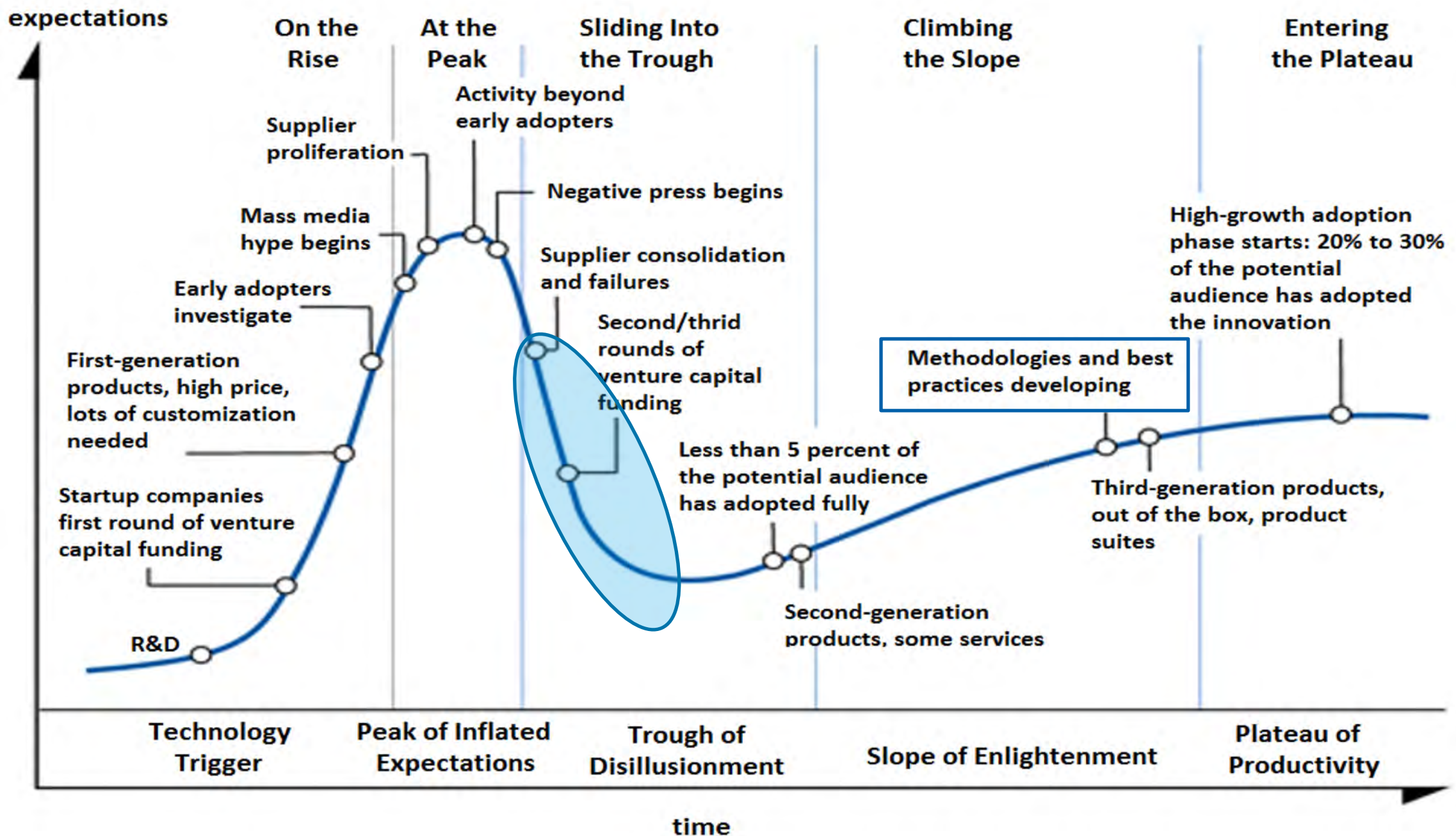
125 million connected vehicles by 2022, 5G coming

Tesla sued over California 'autopilot' death

Tesla pushes forward on autonomous driving with new computer chip

Coming soon to China: the car of the future

Uber scientist says some time before self-driving cars dominate the road




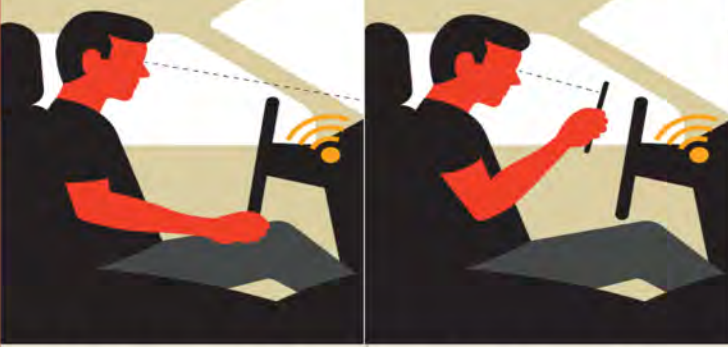
Gartner's Technology Hype Curve ([gartner.com](http://gartner.com))



# Quiz Time!

- **Connected Vehicle Environment**
- **Autonomous Vehicle (Self-Driving)**
- **Automated Vehicles**

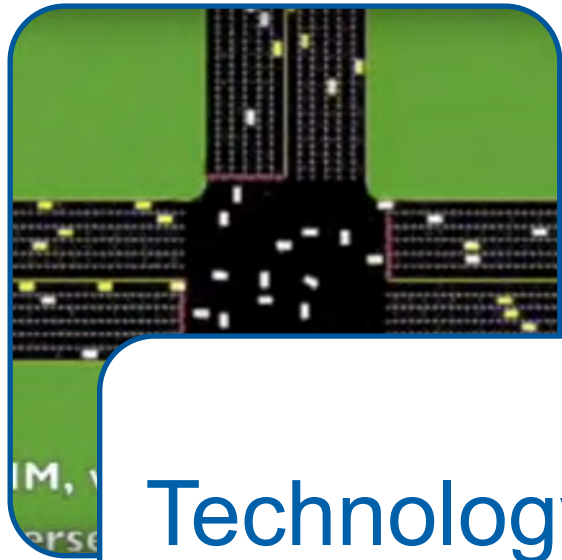


				Automated Driving Systems (ADS)		
Vehicle	Level 0 No Automation	Level 1 Driver assistance	Level 2 Partial automation	Level 3 Limited self-driving (conditional automation)	Level 4 Full self-driving under certain conditions (high automation)	Level 5 Full self-driving under all conditions (full automation)
	No automation.	Can assist driver in some situations.	Can take control of speed and lane position in certain conditions.	Can be in full control in certain conditions and will inform the driver to take control.	Can be in full control for the entire trip in these conditions and can operate without a driver.	Can operate without a human driver and need not have human occupants.
Driver						
	In complete control at all times.	Must monitor, engage controls, and be ready to take over control quickly at any moment.	Must monitor and be ready to take over control quickly at any moment.	Must be ready to take control quickly when informed.	Not needed	Not needed

Source: GHSA



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# *Testing, Demos, and Pilots are Active in Virginia*

## Virginia Tech Transportation Institute Fall 2017



More info at  
<https://www.youtube.com/watch?v=EwujR1ARsog>



# *Testing, Demos, and Pilots are Active in Virginia*

## Virginia Tech Transportation Institute Fall 2017



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# FHWA Truck Platooning Demonstration on I-66

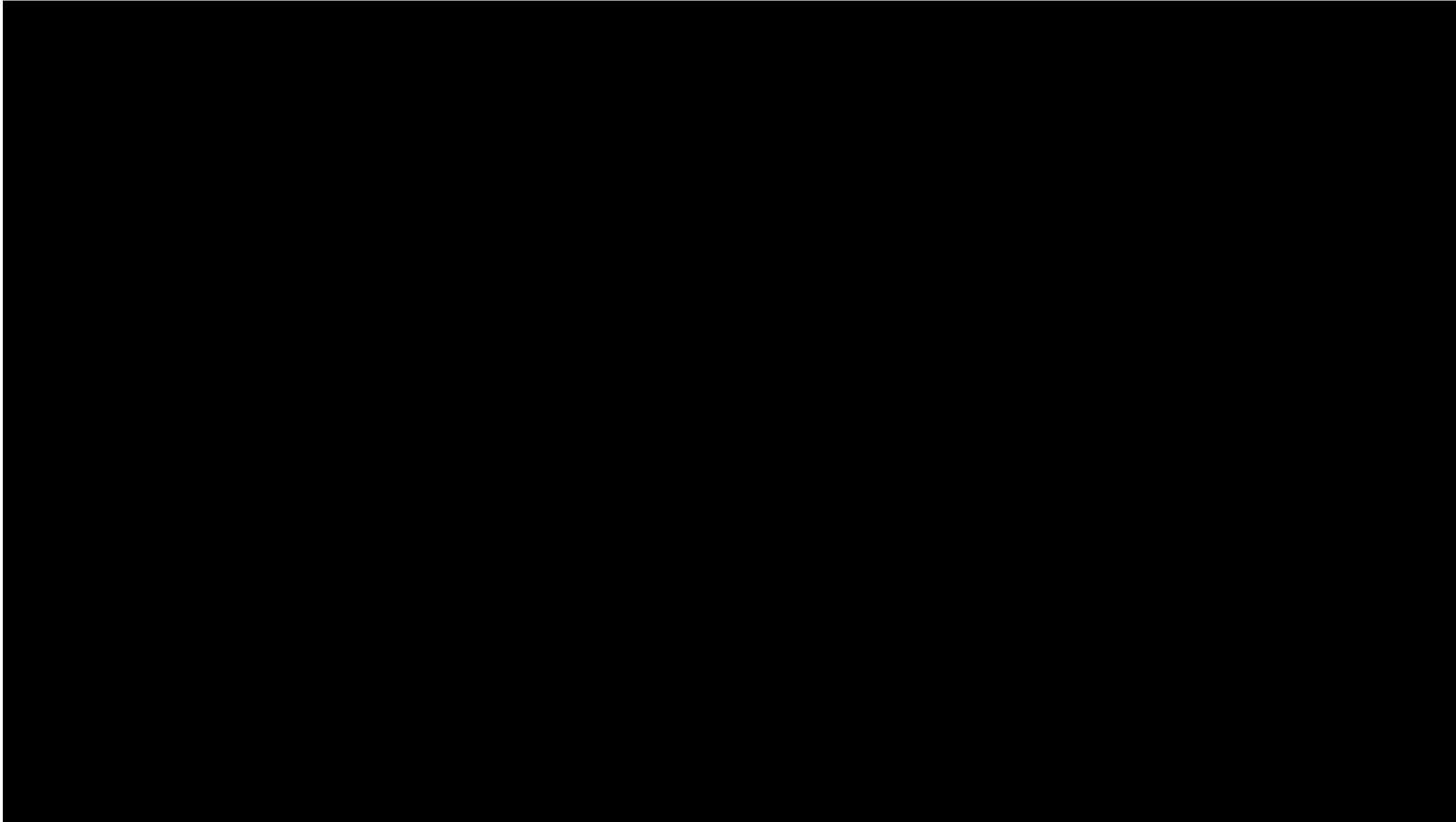
## September 13-15, 2017



More info at <https://www.youtube.com/watch?v=iNTKqh7i5jQ>

# FHWA Truck Platooning Demonstration on I-66

## September 13-15, 2017



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# VDOT's Vision for Connected and Automated Vehicles

**An environment where Connected and Automated Vehicle applications provide connectivity between vehicles, roadside infrastructure and wireless devices.**

**With these objectives:**

- **Increased Safety**
- **Improved Mobility**
- **Reduced Infrastructure Investments**
- **Enhanced Traveler Information**



# Virginia's Unique Strengths



Diverse highway system with a good state of repair



An “Open-for-business” regulatory environment for innovative transportation solutions



Data driven commitment to innovation



Trusted world-class research and testing capabilities



Capable knowledge based work force, including a strong military presence.

# Focus Areas of the Connected and Automated Vehicle Program



**Outreach  
and  
Coordination**



**Leadership**



**Deployments**



**Planning**



**Policy**





# Virginia Connected Corridors Partnership

To facilitate the understanding of CV deployment, the Virginia Department of Transportation has partnered with the Virginia Tech Transportation Institute to create the Virginia Connected Corridors.



# Smart Roads at Virginia Tech Transportation Institute



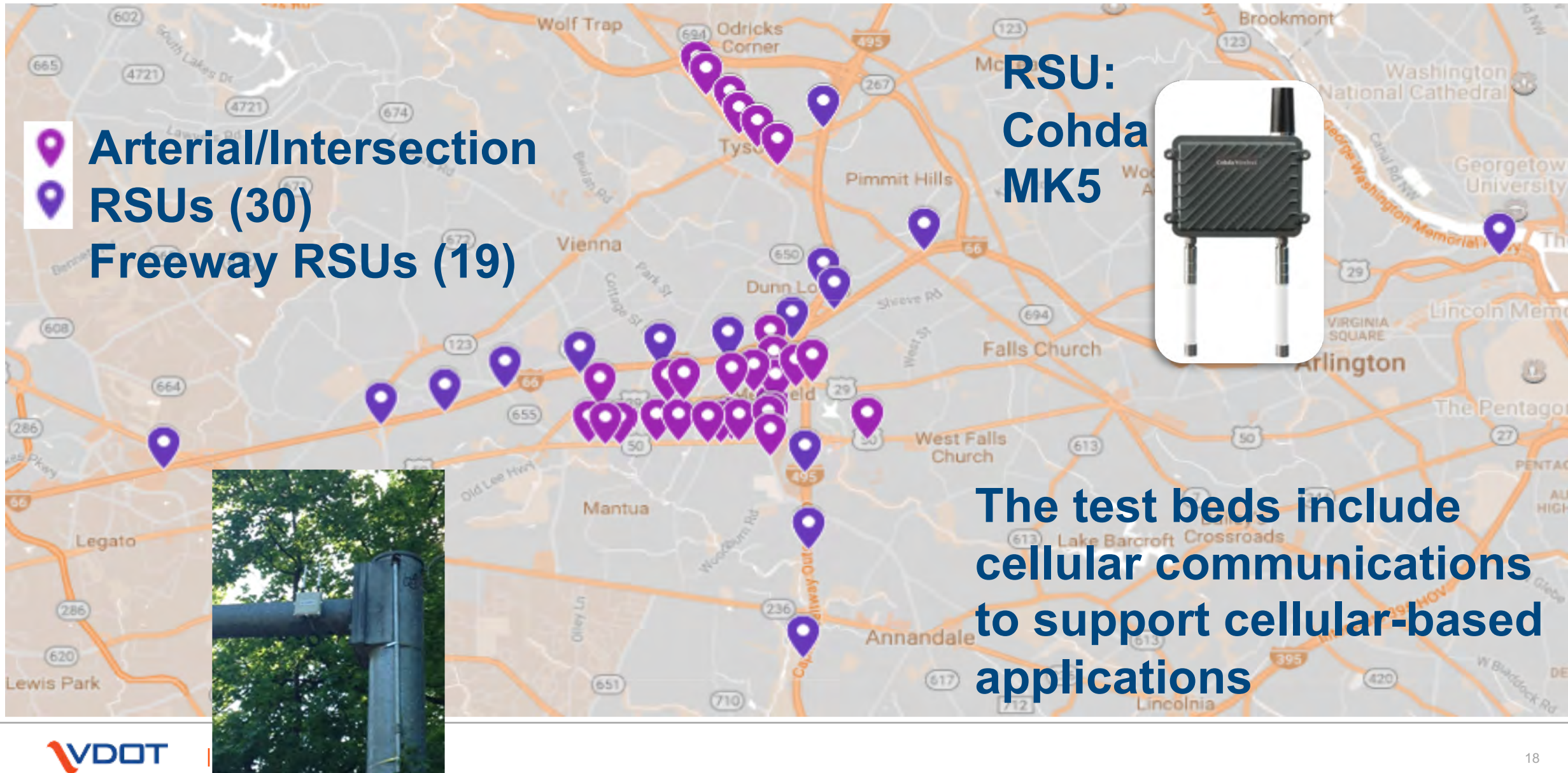


# Northern Virginia Challenges





# Northern Virginia Test Bed: DSRC Deployments



# National SPaT Challenge

**To challenge state and local public sector transportation to cooperate together to achieve deployment of DSRC infrastructure with SPaT broadcasts in at least one corridor or network (approximately 20 signalized intersections) in each state by January 2020.**

## What is SPaT?

**A Signal Phase and Timing (SPaT) message defines the current intersection signal light phases. The current state of all lanes at intersection are provided, as well as any active pre-emption or priority.**



# National SPaT Challenge Deployment Map

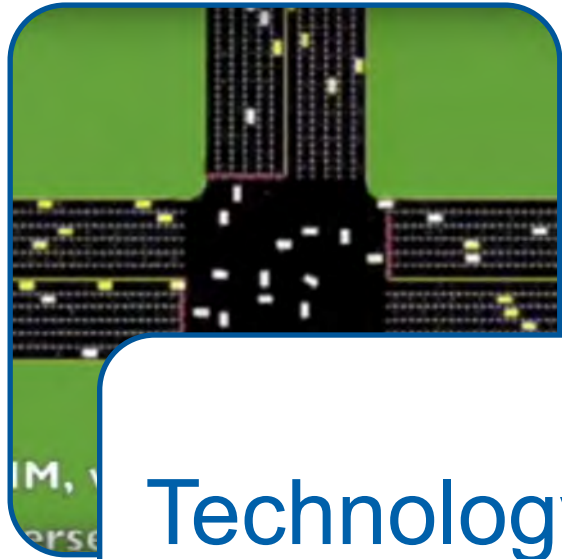




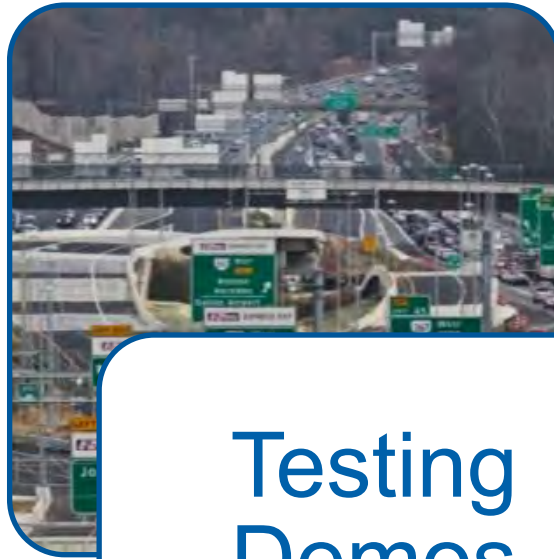
# National SPaT Challenge Deployment Map



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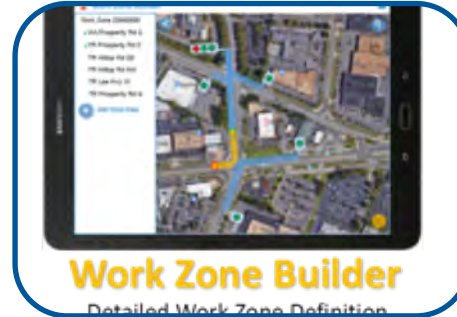
Next Steps



# Next Steps



**Automated  
Maintenance  
Vehicles**



**Work Zone  
Information**



**First and Last Mile  
Solutions**



**Work Force  
Development**



**Fleet Challenge**



**Industry  
Coordination**



**Data Management  
and Security**



**Leveraging  
Broadband**

# Thank you!