VDOT

Virginia Department of Transportation

Sixth Annual Richmond Region Transportation Forum

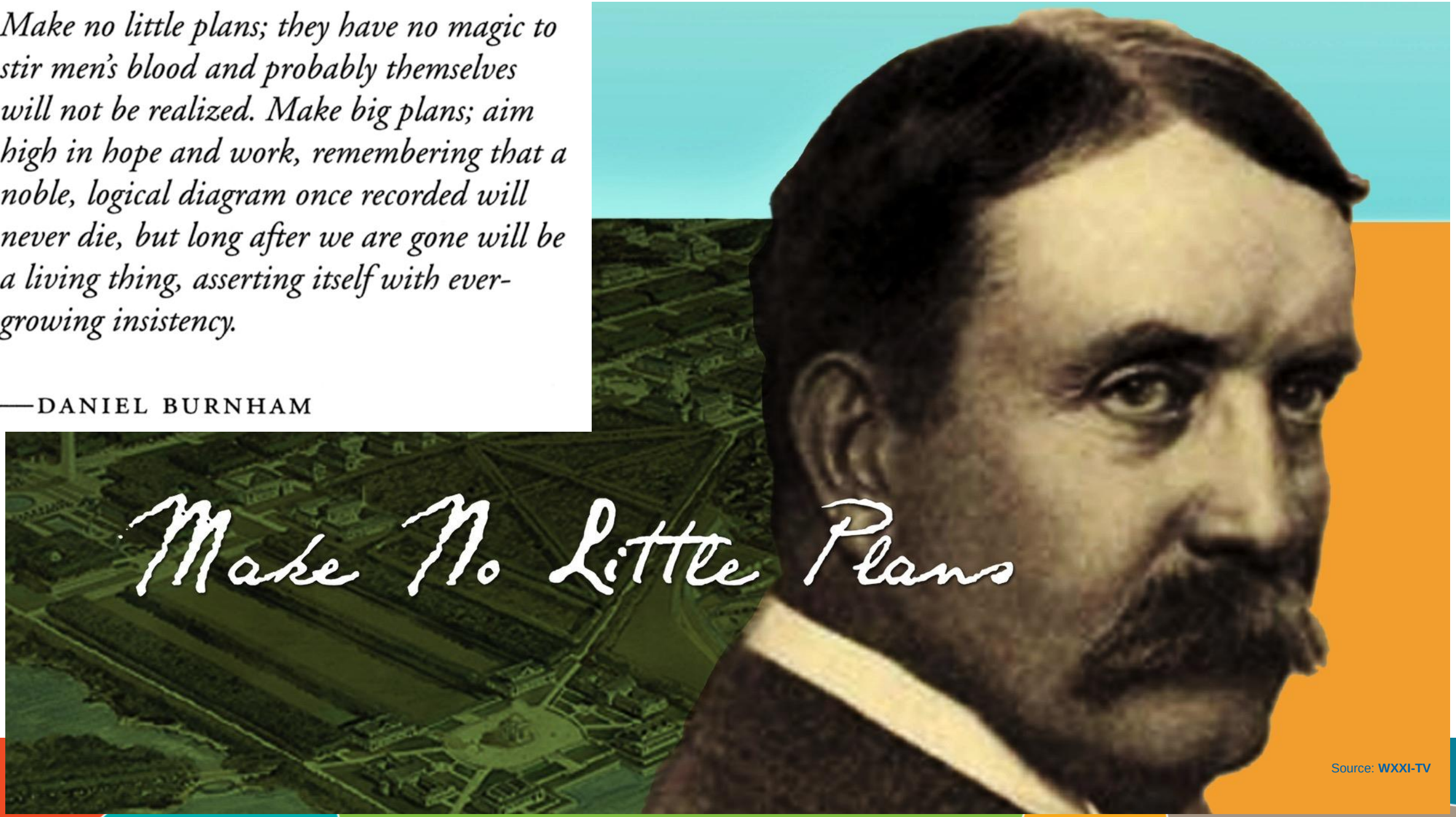
Think Big and Make No Little Plans

Virginia Lingham, P.E.
Connected and Automated Vehicle Program Manager
Office of Strategic Innovation
Virginia Department of Transportation

November 29, 2018

Make no little plans; they have no magic to stir men's blood and probably themselves will not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing, asserting itself with ever-growing insistency.

—DANIEL BURNHAM

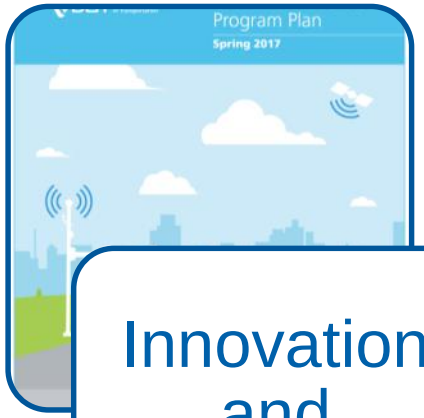


Source: **WXXI-TV**

Image Source: https://www.flickr.com/photos/sq09/8401320130/gghjjglisfhg

Overview

Testing Demos and Pilots in Virginia



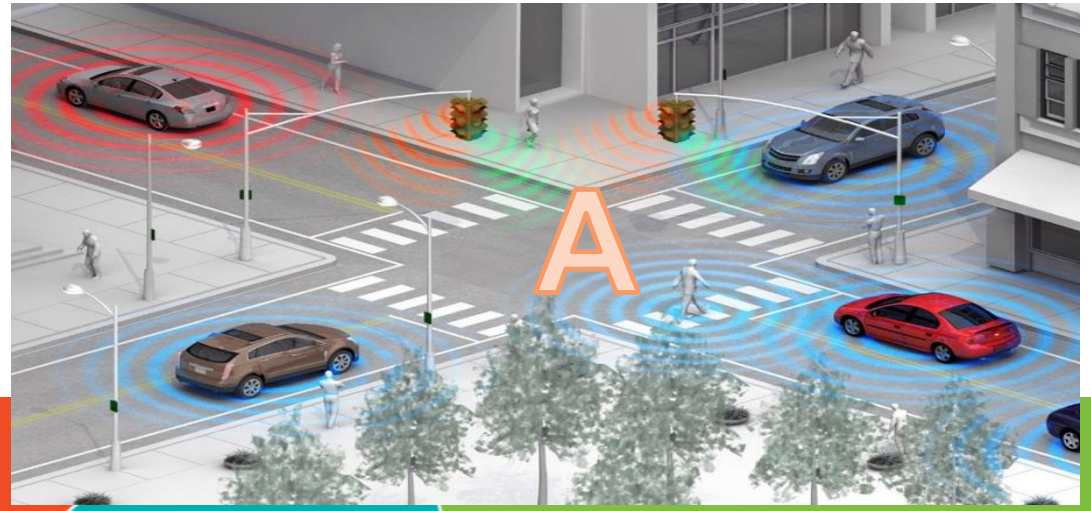
Innovation and Technology Cycles

Virginia Connected Corridors

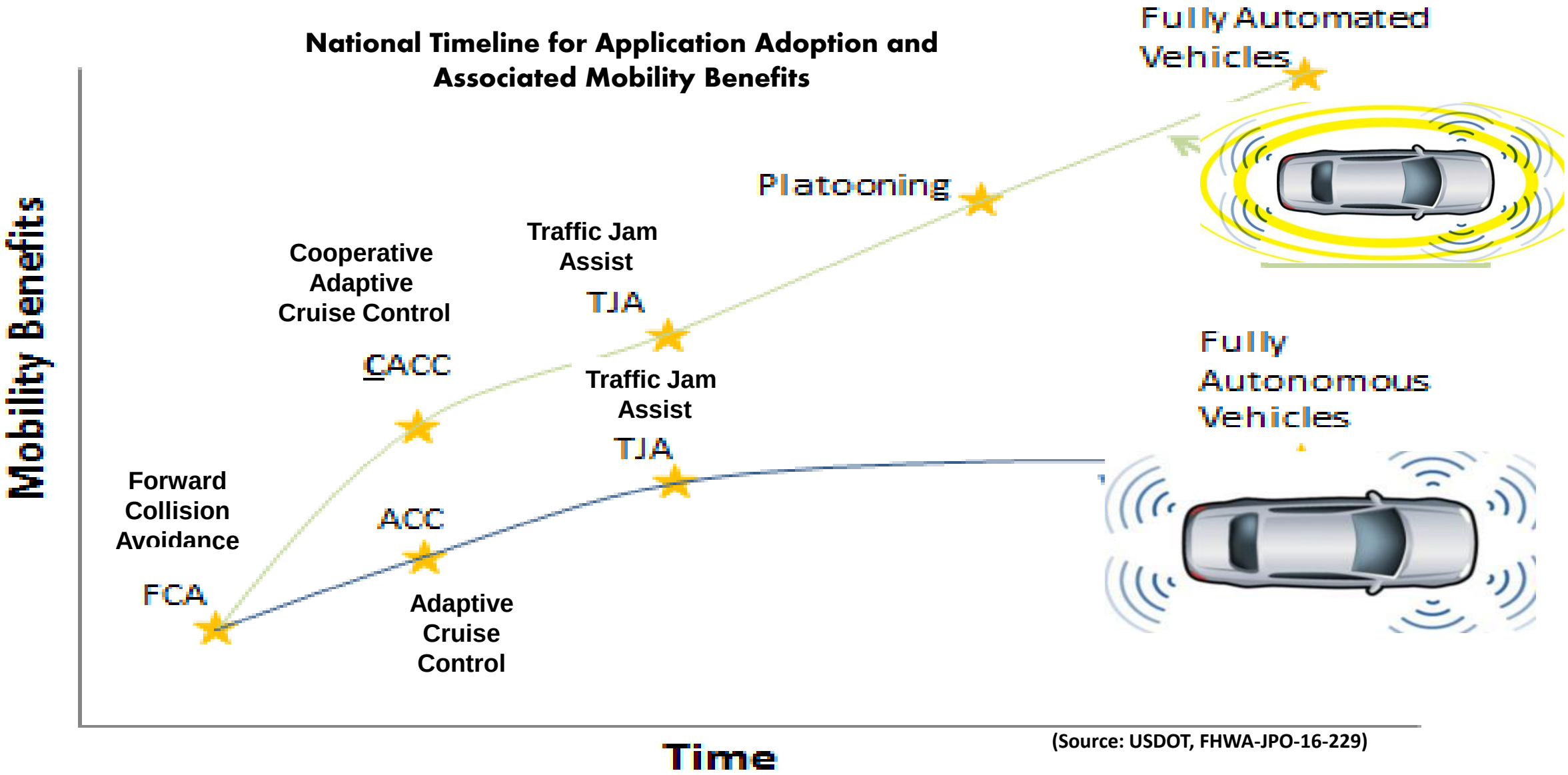
Next Steps

Quiz Time!

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

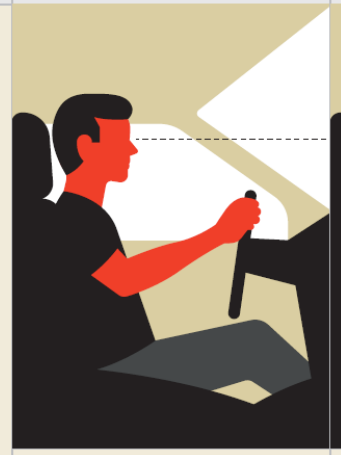
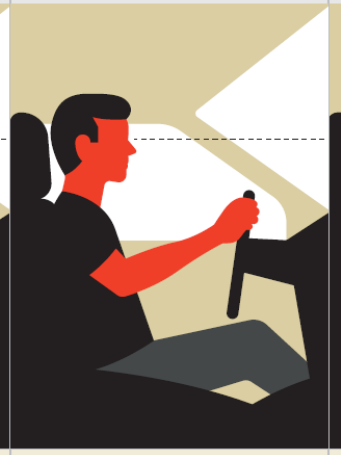
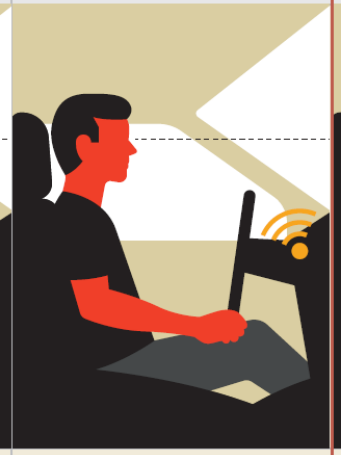
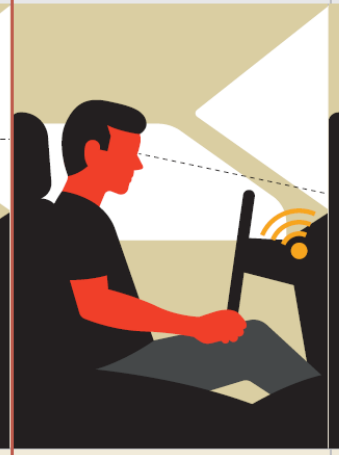
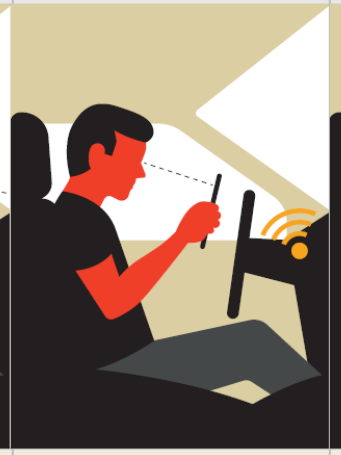


Why Connect?
What Benefits Can We Expect?



(Source: USDOT, FHWA-JPO-16-229)

Levels of Vehicle Autonomy

				Automated Driving Systems (ADS)		
	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)**
Vehicle	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

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

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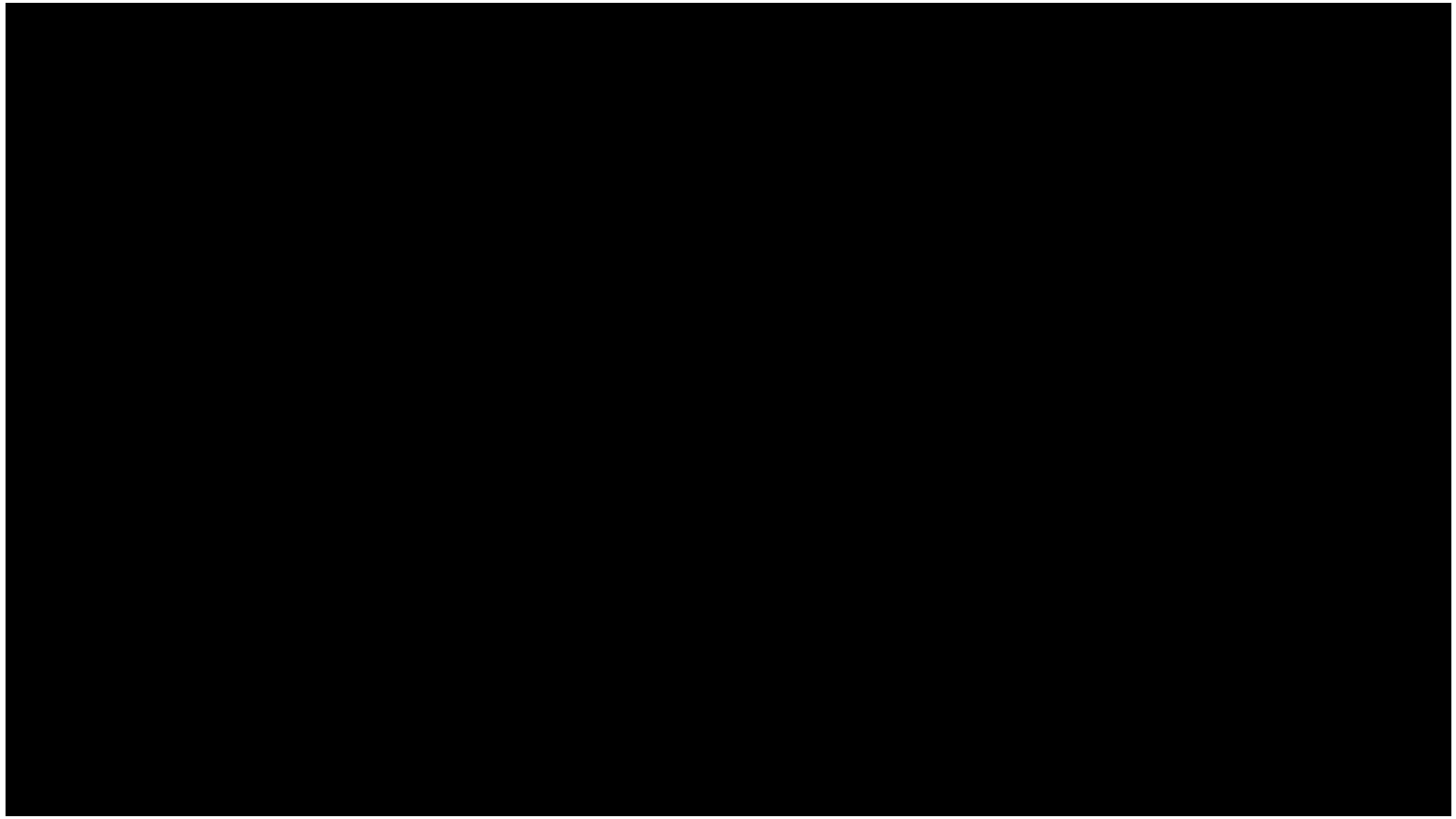
More info at
https://www.youtube.com/watch?v=EwujR1ARsog

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



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

Testing, Demos, and Pilots are Active in Virginia (cont.)

FHWA Connected Vehicle Testing on I-95 Express Lanes June 2018

Source: USDOT

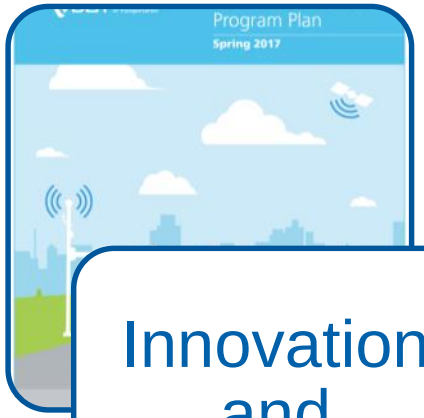
More info at https://www.youtube.com/watch?v=EwujR1ARsog

Testing, Demos, and Pilots are Active in Virginia (cont.)

[redacted]

Overview

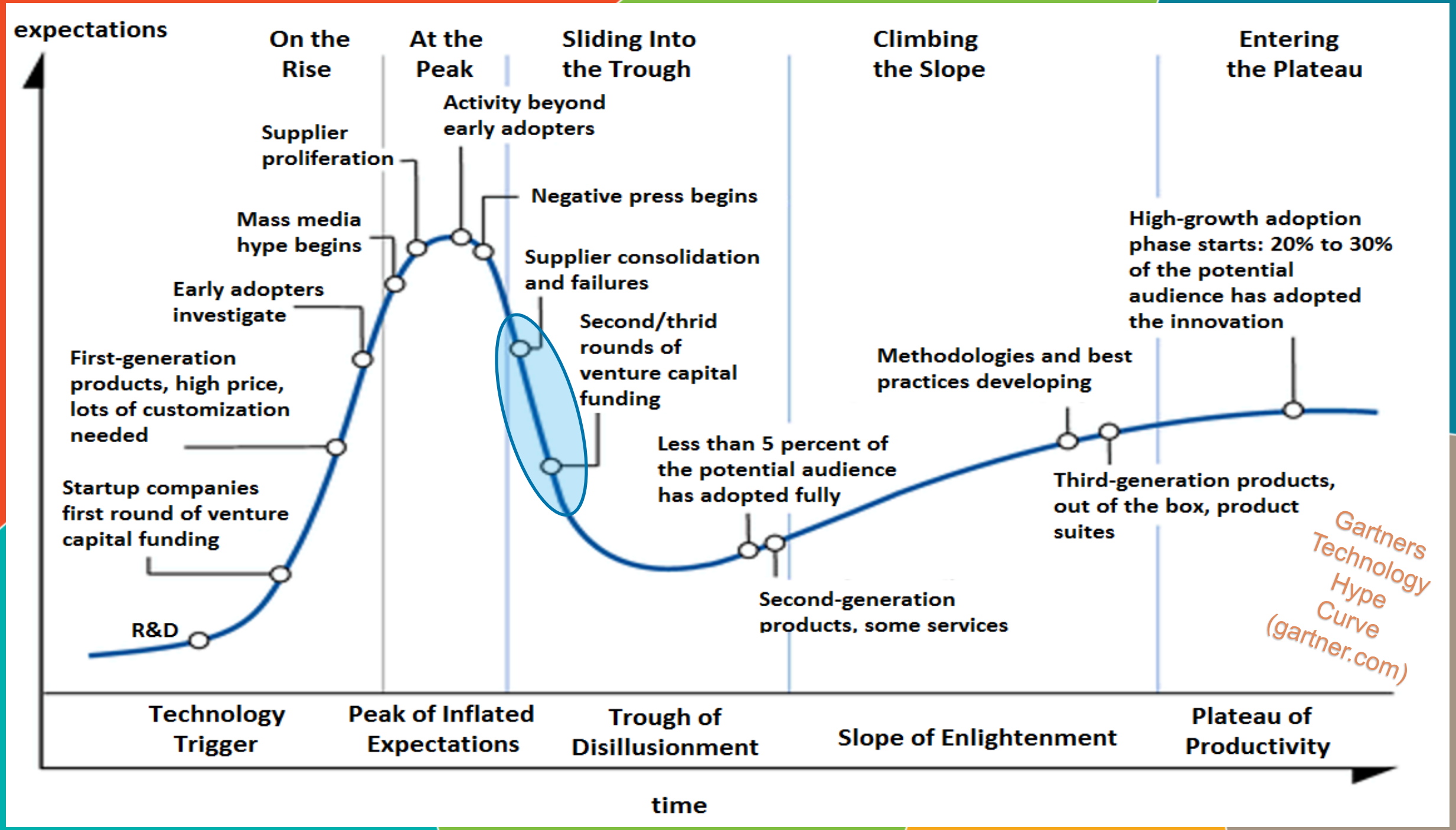
Testing Demos and Pilots in Virginia



Innovation and Technology Cycles

Virginia Connected Corridors

Next Steps

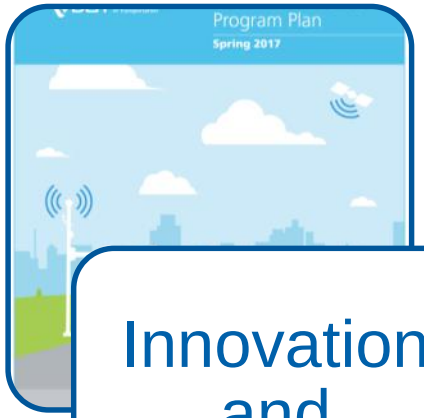

expectations
On the Rise
At the Peak
Sliding Into the Trough
Climbing the Slope
Entering the Plateau
Activity beyond early adopters
Supplier proliferation
Negative press begins
Mass media hype begins
Supplier consolidation and failures
Early adopters investigate
Second/thrid rounds of venture capital funding
First-generation products, high price, lots of customization needed
Less than 5 percent of the potential audience has adopted fully
Startup companies first round of venture capital funding
Second-generation products, some services
R&D
Methodologies and best practices developing
High-growth adoption phase starts: 20% to 30% of the potential audience has adopted the innovation
Third-generation products, out of the box, product suites
Gartners Technology Hype Curve (gartner.com)
Technology Trigger
Peak of Inflated Expectations
Trough of Disillusionment
Slope of Enlightenment
Plateau of Productivity
time

Soooo, what's really happening out there?

Soooo, what's really happening out there?

Overview

Testing Demos and Pilots in Virginia



Innovation and Technology Cycles

Virginia Connected Corridors

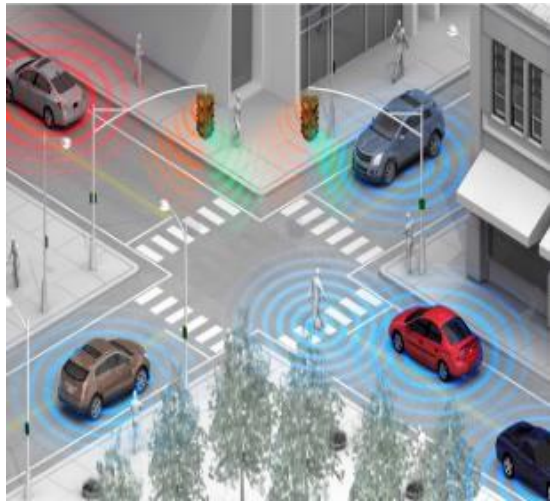
Next Steps

VDOT's Vision for Connected and Automated Vehicles

VDOT envisions a future environment where Connected and Automated Vehicle applications provide connectivity between vehicles, roadside infrastructure and wireless devices.

This interconnected environment is expected to meet the following 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.

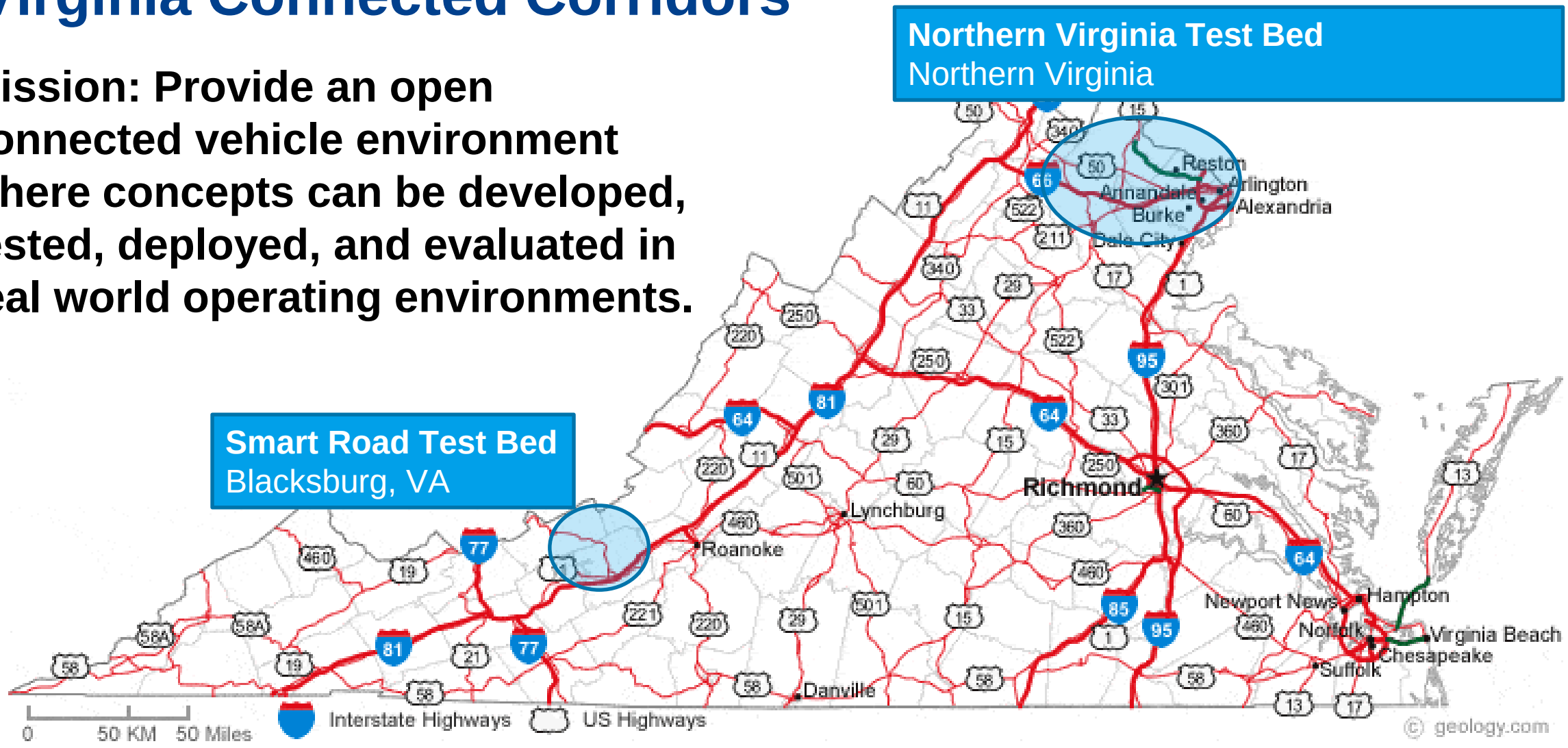
VDOT
Virginia Department of Transportation

VTRC
Virginia Transportation Research Council

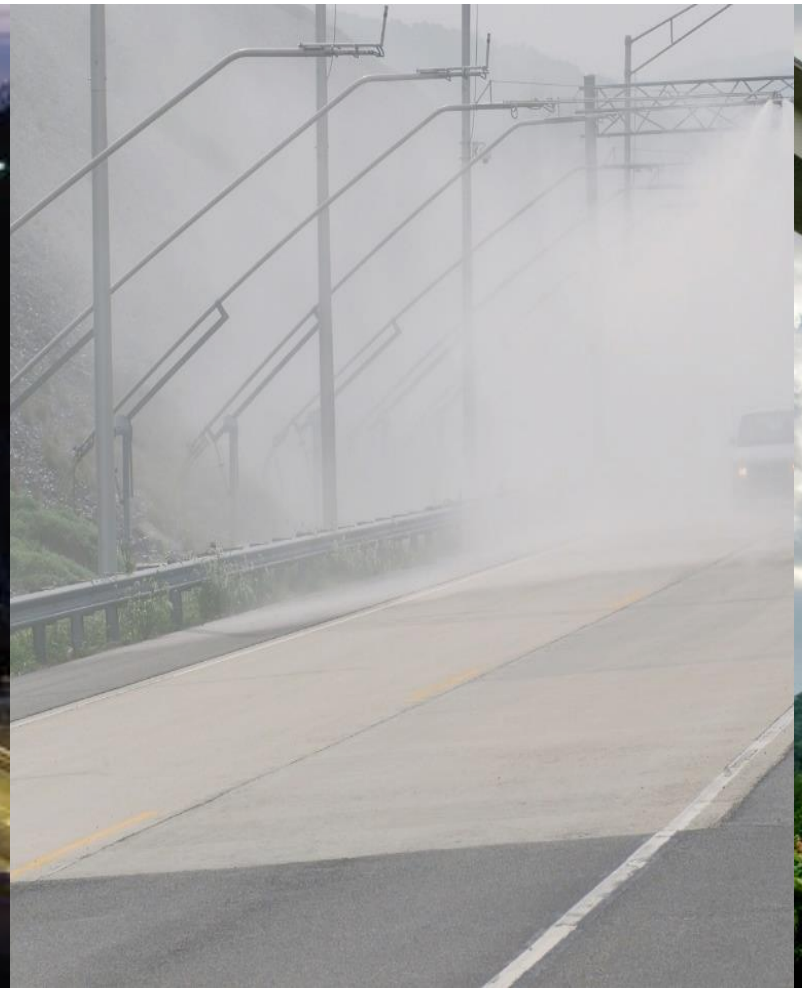
VIRGINIA TECH TRANSPORTATION INSTITUTE

Virginia Connected Corridors

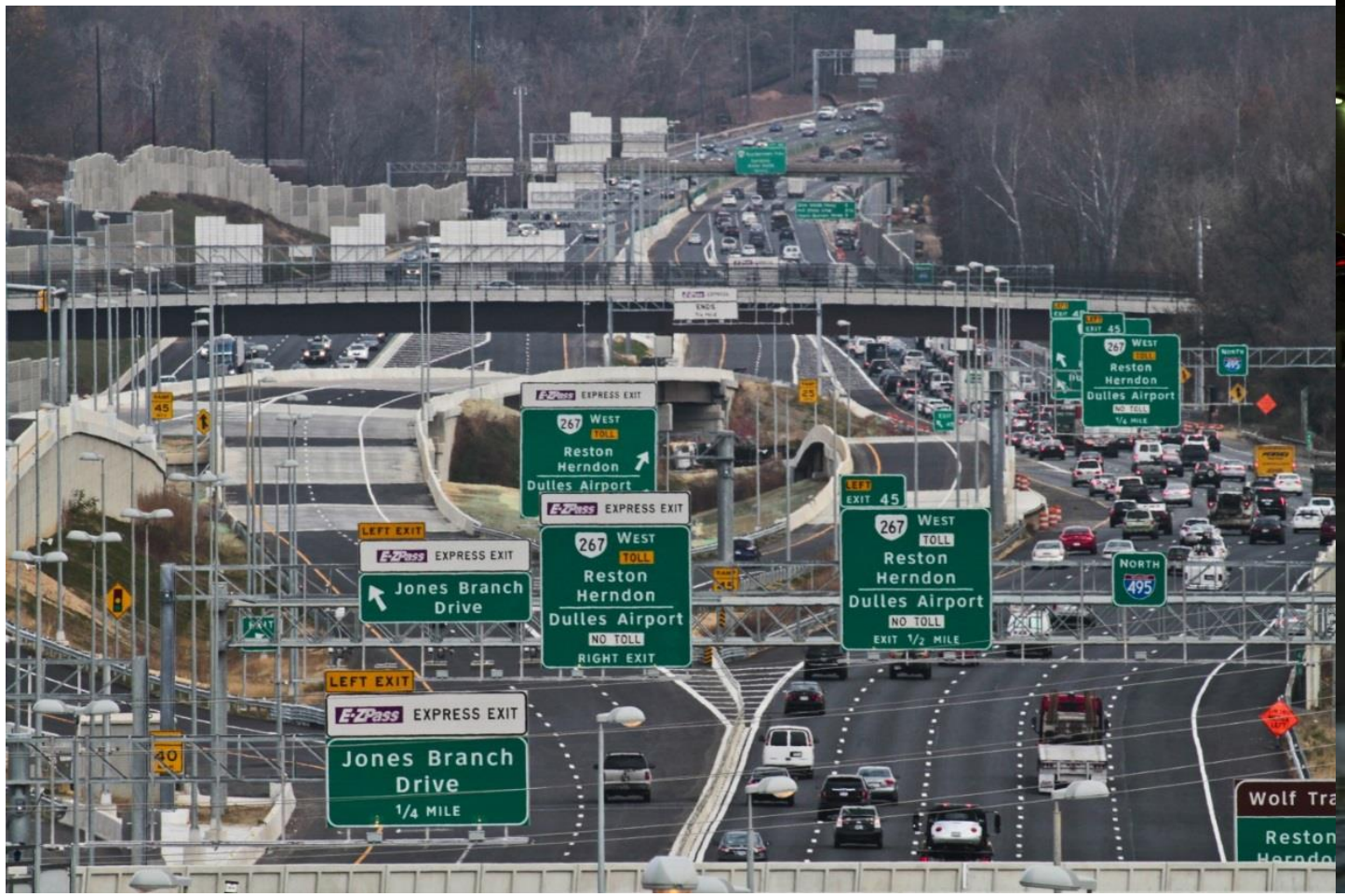
Mission: Provide an open connected vehicle environment where concepts can be developed, tested, deployed, and evaluated in real world operating environments.

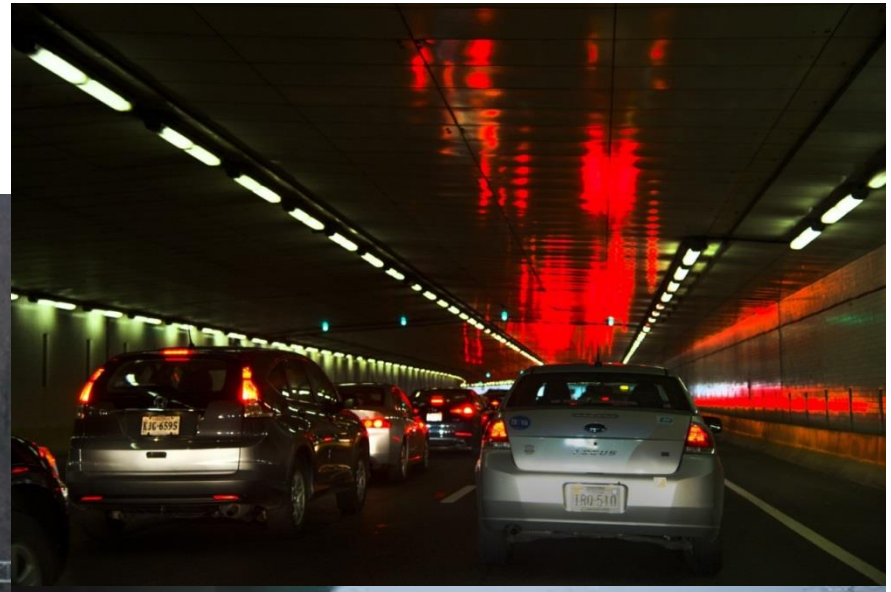


Smart Roads at Virginia Tech Transportation Institute

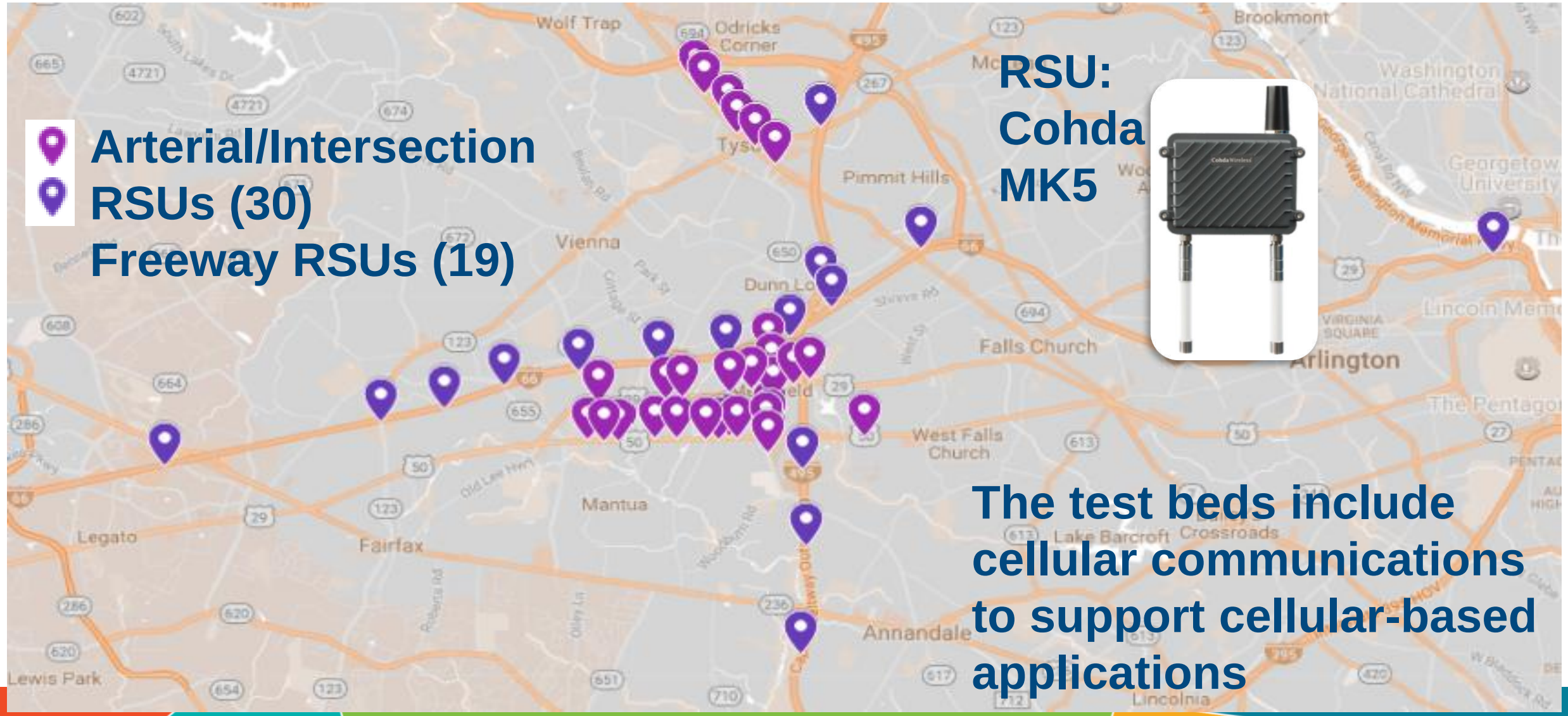


Northern Virginia Challenges

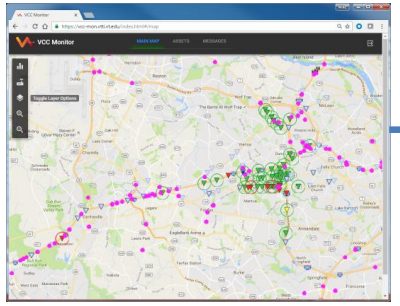




Northern Virginia Test Bed: DSRC Deployments

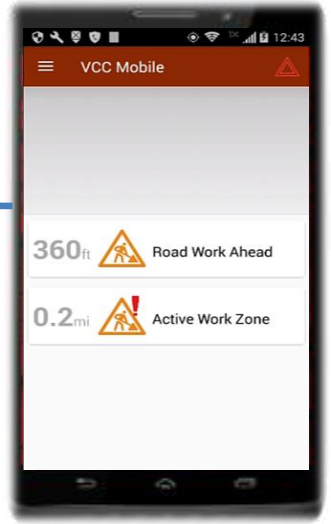


VCC Work Zone Components

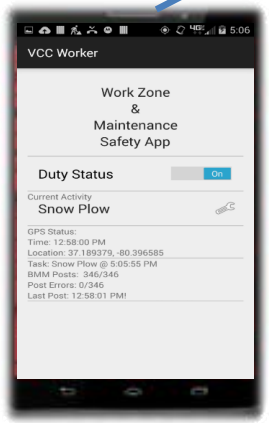


VCC Monitor
Situation Awareness

VCC Cloud
Data and Processing Hub



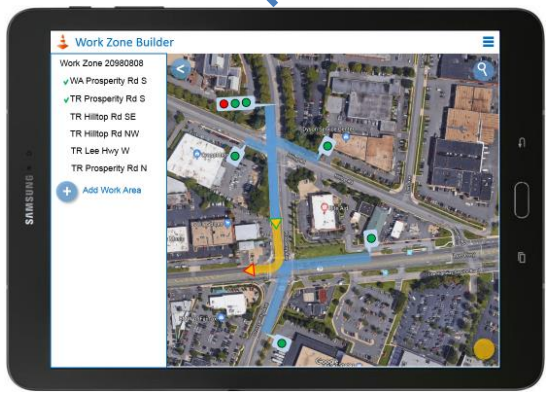
VCC Mobile
Driver Interface



VCC Worker

VCC Vest

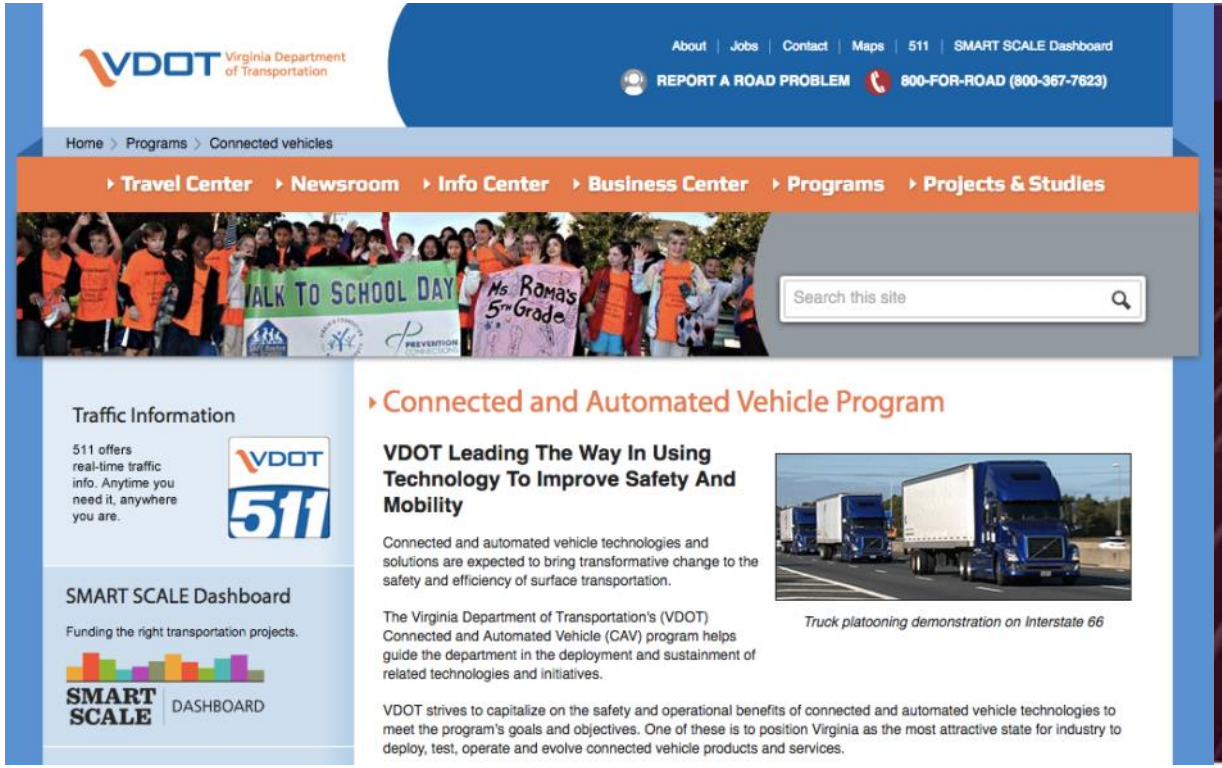
Dynamic Worker Location and Activity



Work Zone Builder
Detailed Work Zone Definition

Contact us for more information!

Please visit http://virginiadot.org/automated



National SPaT Challenge

What is the Challenge?

To challenge state and local public sector transportation IOOs 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. SPaT message defined by the SAE J2735 standard.

National SPaT Challenge Deployment Map

Source: NOCoE
Updated 3/2/17

National SPaT Challenge Deployment Map

Source: NOCoE
Updated 5-12-17

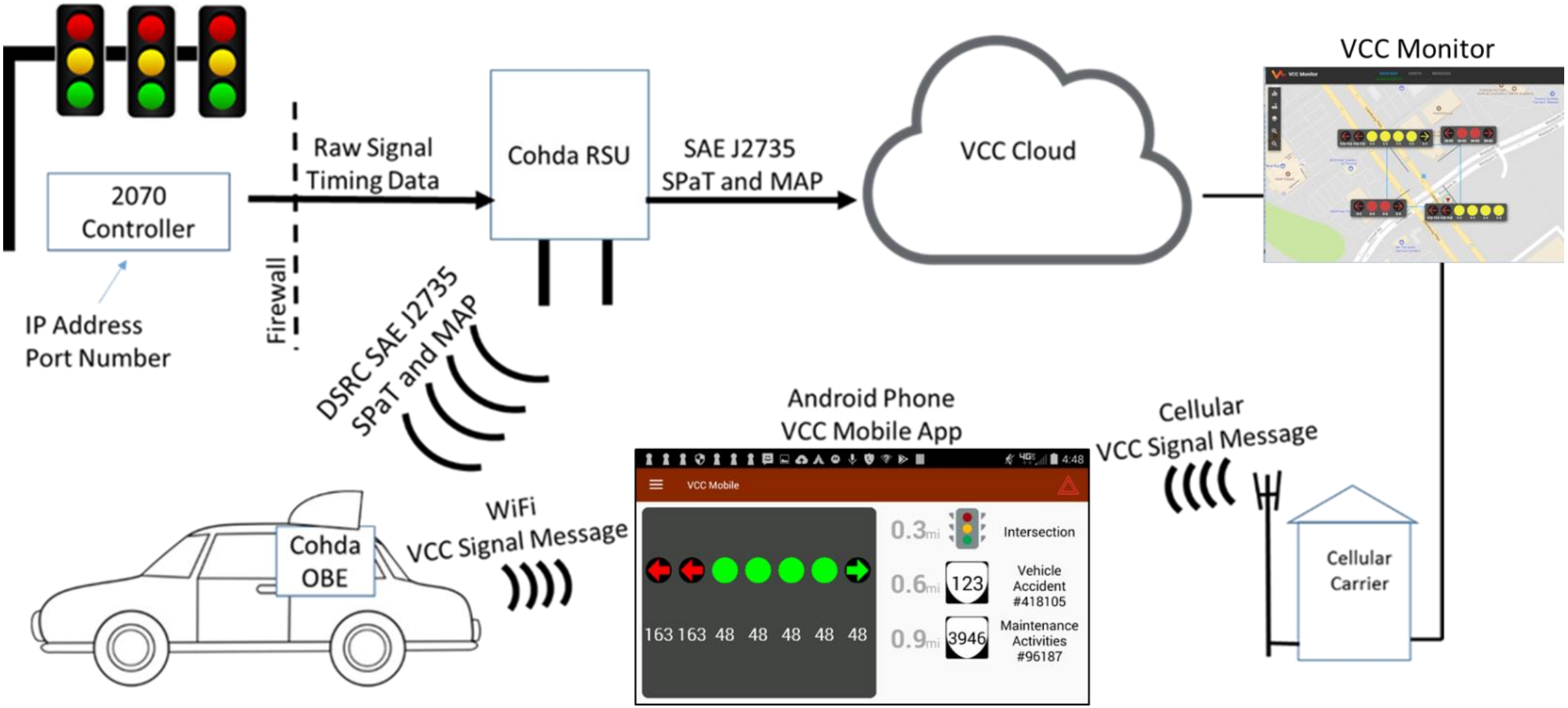
National SPaT Challenge Deployment Map

Source: NOCoE
Updated 11-17-17

National SPaT Challenge Deployment Map

Source: NOCoE
Updated 9/10/18

Virginia Connected Corridor's SPaT Challenge Architecture



Overview

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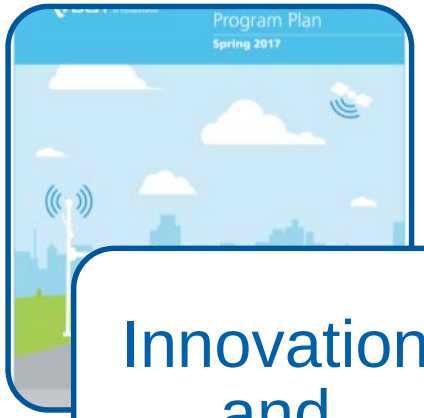


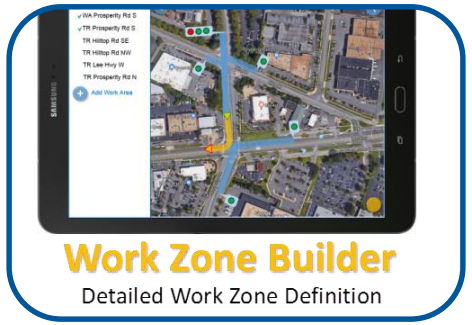
Innovation and Technology Cycles

Virginia Connected Corridors

Next Steps

Next Steps

Automated Maintenance Vehicles



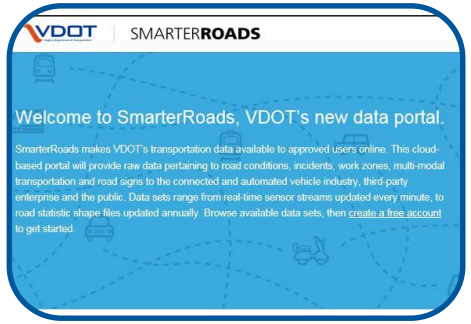
Work Zone Information

First and Last Mile Solutions

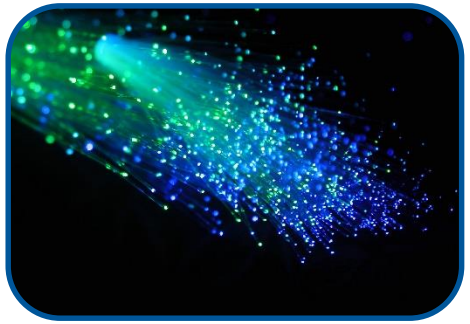
Work Force Development

Fleet Challenge

Industry Coordination



Data Management and Security



Leveraging Broadband

Get Involved!

ITS AMERICA

AASHTO
THE VOICE OF TRANSPORTATION

SAE INTERNATIONAL

ROADS & BRIDGES

U.S. Department of Transportation

I-95 CORRIDOR COALITION
Beyond Boundaries

ite

CVTA
CONNECTED VEHICLE TRADE ASSOCIATION

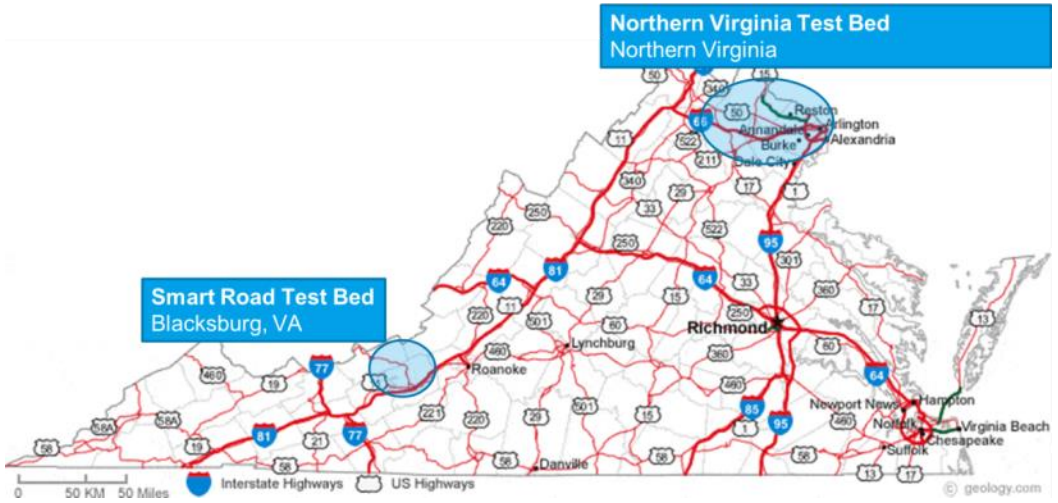
ASSOCIATION OF METROPOLITAN PLANNING ORGANIZATIONS

TRB
TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

APA
American Planning Association
Making Great Communities Happen

1

Thank you!



Virginia R. Lingham, P.E.

Connected and Automated Vehicle Program Manager

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Virginia Department of Transportation

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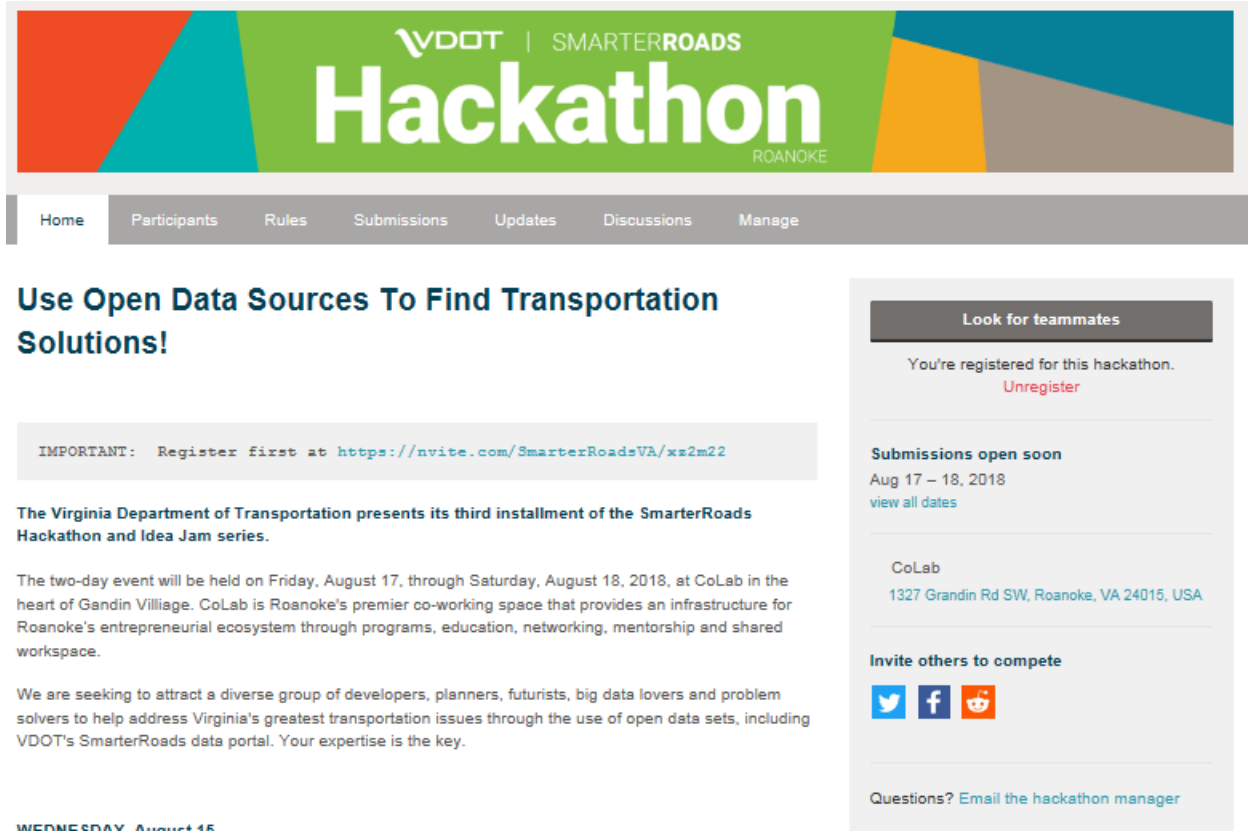
(804) 692-0455 #SmarterRoadsVA @VaDOT

VDOT | SMARTERROADS

SmarterRoads Hackathon Series



VDOT | SMARTERROADS

Hackathon

ROANOKE

Home | Participants | Rules | Submissions | Updates | Discussions | Manage

Use Open Data Sources To Find Transportation Solutions!

IMPORTANT: Register first at https://nvite.com/SmarterRoadsVA/xz2m22

The Virginia Department of Transportation presents its third installment of the SmarterRoads Hackathon and Idea Jam series.

The two-day event will be held on Friday, August 17, through Saturday, August 18, 2018, at CoLab in the heart of Gandin Villiage. CoLab is Roanoke's premier co-working space that provides an infrastructure for Roanoke's entrepreneurial ecosystem through programs, education, networking, mentorship and shared workspace.

We are seeking to attract a diverse group of developers, planners, futurists, big data lovers and problem solvers to help address Virginia's greatest transportation issues through the use of open data sets, including VDOT's SmarterRoads data portal. Your expertise is the key.

WEDNESDAY, August 15

Look for teammates

You're registered for this hackathon.
Unregister

Submissions open soon
Aug 17 – 18, 2018
view all dates

CoLab
1327 Grandin Rd SW, Roanoke, VA 24015, USA

Invite others to compete

Questions? Email the hackathon manager

#SmarterRoadsVA

SmarterRoads Hackathon & Idea Jam Objectives

- Accelerate Technology Development and Implementation
- Promote Existing Open Data Products
- Develop and Strengthen Relationships

GOAL: Create and share a model to follow for future events

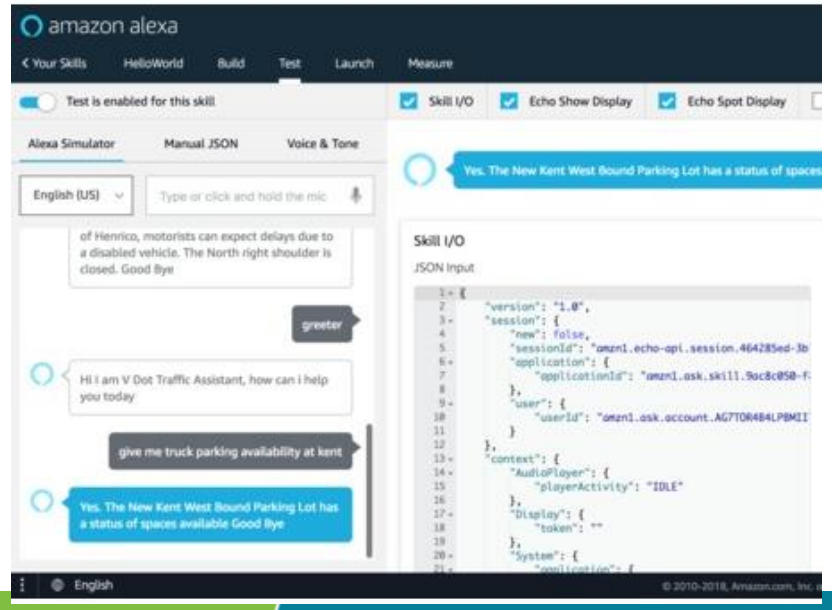
VDOT | SMARTERROADS

Hackathon

VIRGINIA BEACH

Talk DOT

This project enables users to consume traffic data and get insights through artificial intelligence and neuro-linguistic programming.



Inspiration

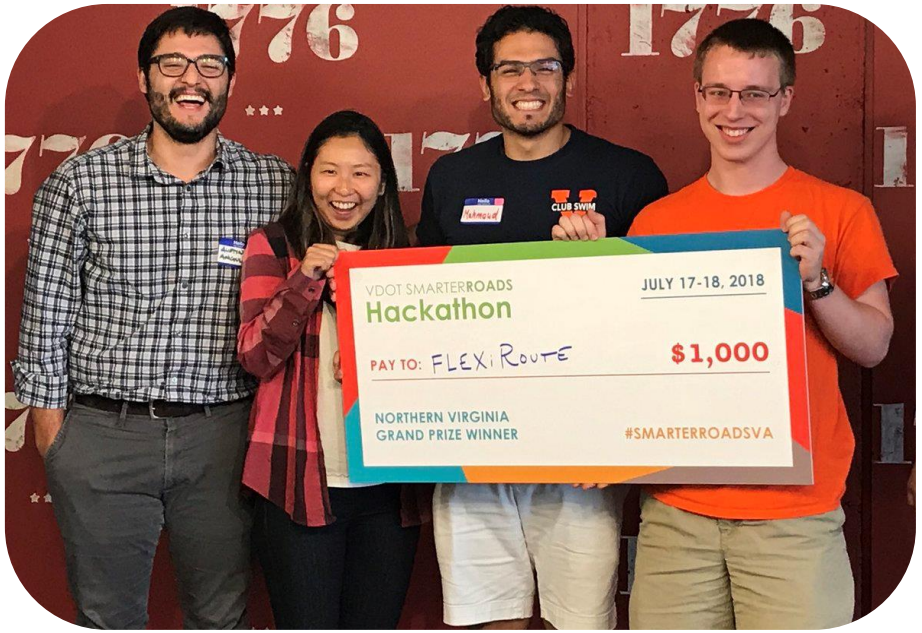
Availability of data sources in various places and different formats waiting to be consumed by users in an easy manner

https://smarter-roads-hackathon-vb.devpost.com

VDOT | SMARTERROADS

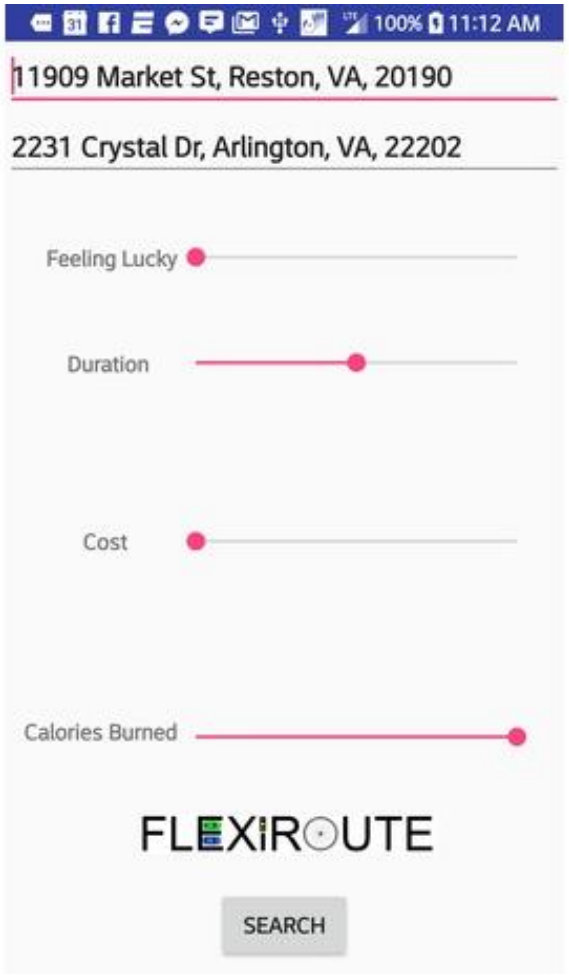
Hackathon

NORTHERN VIRGINIA



FlexiRoute

A user oriented customizable route optimizer.



Suggestions

README.txt files or code snippets of APIs consuming the data would prove really useful in understanding how the data is intended to be understood.

https://smarterroads-hackathon-nova.devpost.com

VDOT | SMARTERROADS

Hackathon

ROANOKE

EZ Speed

Android app designed to audibly tell the user the speed limit of the road they are on.

```
// again++;
SmartLocation.with(getBaseContext()).location().start(new OnLocationUpdatedListener() {
    //@Override
    public void onLocationUpdated(Location location) {
        String lat = String.valueOf(location.getLatitude());
        String lon = String.valueOf(location.getLongitude());
        String latlon = lat + " , " + lon;
        //ToastLong(latlon);

        SmartLocation.with(getBaseContext()).geocoding().reverse(location, new OnReverseGeocoding
            //@Override
            public void onAddressResolved(Location location, List<Address> addresses ) {
                if (addresses != null && addresses.size() > 0) {
                    Address address = addresses.get(0);
                    // Thoroughfare seems to be the street name without numbers
                    String street = address.getThoroughfare();

                    if (Example.prev_street.equals(street)) {

                        System.out.println("f");

                    }

                    else{
                        ToastLong(street);
                        readSpeedData(street);
```

What We learned

We learned how to develop an Android app using Android Studio. We also both improved our skills in java and learned the basics of xml.

https://smarterroads-hackathon-roanoke.devpost.com

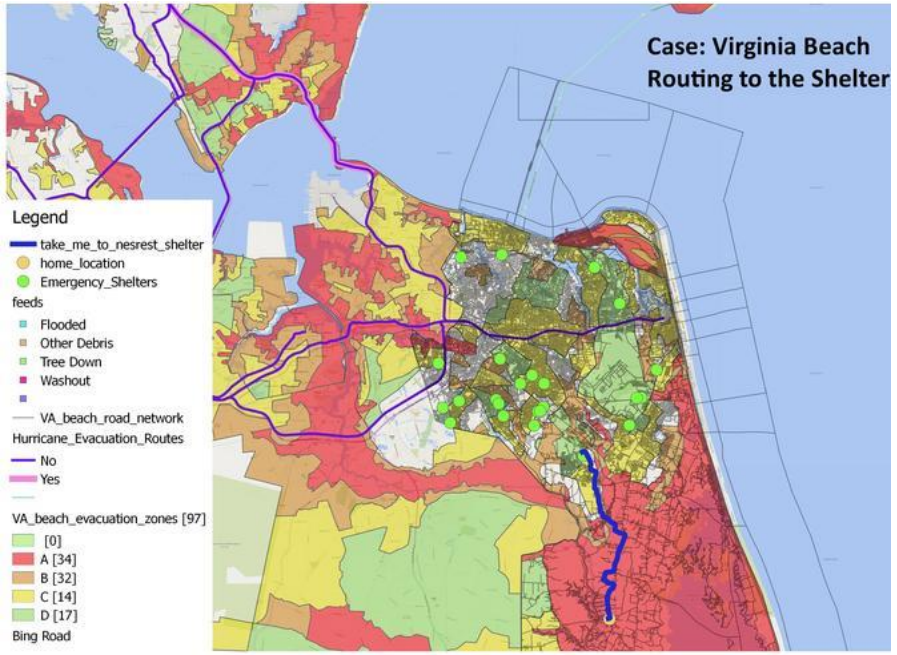
VDOT | SMARTERROADS

Hackathon

FREDERICKSBURG

EEvacPlan

All-in-one dashboard/app for emergency evacuation.



Challenges we ran into

Summarizing the problem and solution in 5 minutes.

Accomplishments that we're proud of

Illustrate our ideas through conceptual maps and dashboard.

https://smarterroads-hackathon-fxbg.devpost.com