



COMMONWEALTH *of* VIRGINIA
Office of the
SECRETARY *of* TRANSPORTATION

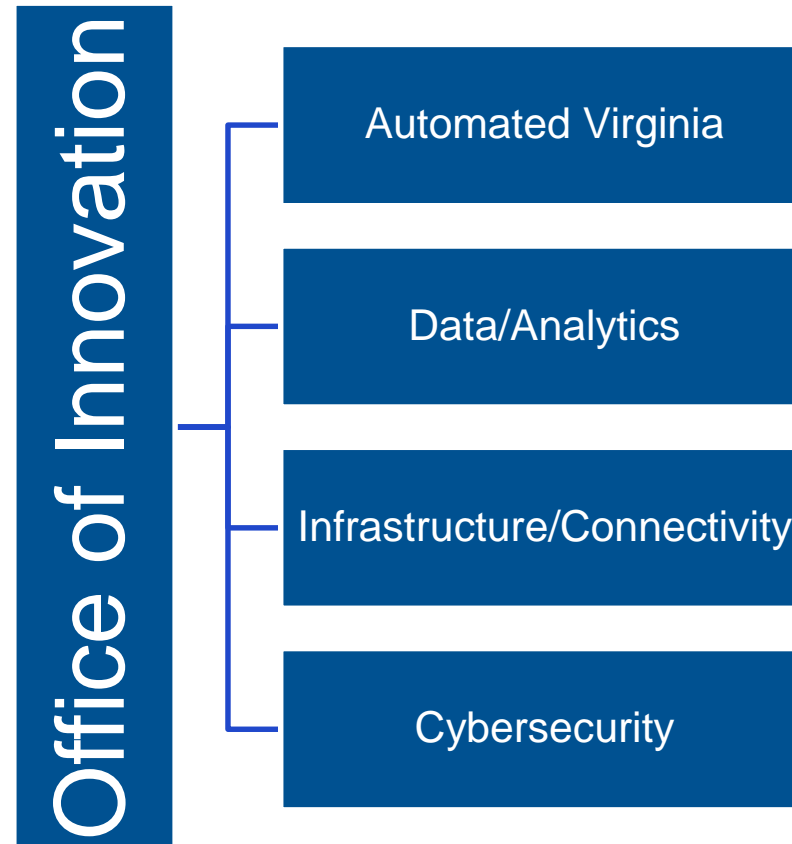
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Director of Research and Innovation

Office of Transportation Innovation

Drive and enable innovation in Virginia's transportation ecosystem to ensure advanced technology and ideas are leveraged to solve the most pressing transportation issues.



Office of Innovation – Initial Focus Areas



Innovation and Technology Transportation Fund

The ITTF provides funding specifically for the purposes of funding pilot programs and fully developed initiatives pertaining to high-tech infrastructure improvements with a focus on:

- Reducing congestion
- Improving mobility
- Improving safety
- Providing up-to-date travel data
- Improving emergency response

ITTF projects are guided by the members of the CTB Innovation and Technology Subcommittee

ITTF Project Selection

Projects can be recommended by VDOT, DRPT, or localities

Projects are evaluated based on:

- Contribution to innovation
- Potential for transferability
- Applicability across modes
- Anticipated benefit
- Acceptability of risk

ITTF Projects Currently Funded

- In January 2016, the Board was briefed on the ITTF and provided a spreadsheet of proposed projects
 - 7 projects proposed for Smart Roadway Technology Funds at \$25,931,214
 - 24 projects proposed for ITTF funds at \$74,771,332
- At February 2016 CTB meeting, approval for funding for ITTF was granted

Currently Funded Projects

- HRBT Control room upgrades
- Big Walker and East River Mountain Tunnel lane control systems
- Arterial corridor signal improvements (various locations, statewide)
- CCTV camera upgrades/enhancements (arterial corridors, NOVA region)
- HRBT Overheight detection system
- MMMBT traffic and safety improvements
- ITS Deployment – Fredericksburg
- ITS Deployment - Richmond
- Richmond TOC upgrades
- SSP Communications upgrade
- I-95 Ramp Metering (PE)
- Statewide truck parking management (I-81/I-95)
- ATMS statewide central system upgrade
- Statewide transit enabling technology (FY21)
- Community wide adaptive signal systems (FY21)
- Pedestrian collision avoidance (transit)
- Statewide advanced traffic signal controllers
- UAS Technology Pilot (crash reconstruction)
- Statewide emerging technology research

Proposed Projects

Automated Virginia	Infrastructure/Connectivity	Data/Analytics	Cybersecurity	Other
<ul style="list-style-type: none">• Virtual ATMS• I-95 Active Traffic Management• Hanover Specialized Transit• MicroTransit Pilot• Worker Alert	<ul style="list-style-type: none">• Signal Controller Connectivity	<ul style="list-style-type: none">• Regional Multimodal Mobility Program• Data Analytics for Safety• Performance Parking• Customer Service Bots• Arterial Operations Dashboard	<ul style="list-style-type: none">• Cybersecurity Upgrades for Operations	<ul style="list-style-type: none">• I-64 Afton Mountain Safety Improvements• Pilot Program for Innovation• Local Innovations

Proposed Projects

Improve Safety

- Regional Multimodal Mobility Program
- I-95 Active Traffic Management
- Virtual ATM
- I-64 Afton Mountain Safety Improvements
- Data Analytics for Safety
- Worker Alert
- Cybersecurity Upgrades for Operations

Reduce Congestion

- Regional Multimodal Mobility Program
- Performance Parking
- I-95 Active Traffic Management
- Virtual ATM
- Arterial Operations Dashboard
- Signal Controller Connectivity
- I-64 Afton Mountain Safety Improvements

Improve Traveler Information

- Regional Multimodal Mobility Program
- Performance Parking
- I-95 Active Traffic Management
- I-64 Afton Mountain Safety Improvements
- Data Analytics for Safety
- Customer Service Bots

Enhance Emergency Response

- Signal Controller Connectivity
- Data Analytics for Safety
- Worker Alert

Improve Mobility

- Hanover Specialized Transit
- MicroTransit Pilot

Northern Virginia Regional Multi-Modal Mobility Program (RM3P)

- Builds off an Integrated Corridor Management planning grant
- Includes four distinct but inter-related tasks
 - Enhance commuter parking data
 - Develop a Mobility as a Service (MaaS) Dynamic Service Gap Dashboard
 - Implement and AI-based decision support system with prediction
 - Deploy a data driven tool to incentivize customer mode and route choice
- Total cost - \$15 million

Data Analytics for Safety

- Integrate a variety of data (crash, weather, event, pavement condition, traffic/congestion, etc.) in a data platform to which artificial intelligence tools can be applied.
- Extension of the decision support tool developed in the RM3P project to address a wider range of safety challenges
- Nevada pilot indicated a 17% reduction in crashes through prepositioning of assets
- Total cost: \$2 million

Arterial Operations Dashboard

- Leverage ongoing efforts to upgrade signal controllers and a central signal system
- Dashboard will provide metrics on signal performance and travel time reliability
- Initial deployment on 70 corridor segments (1,128 intersections) including corridors through about 50 localities and towns
- Three to five corridors will combine automated signal performance metrics and travel time metrics to improve real-time operations
- Total cost: \$1.25 million

Performance Parking Deployment in Commercial Corridors

- **Focus on Arlington County's two Metrorail corridors to provide data-driven variable pricing coupled with real-time information**
- **Goal is to reduce congestion as travelers search for available parking (balance demand geographically)**
- **Similar program in San Francisco showed decreases in time to find a parking spot, reduced emissions, and lower vehicle miles traveled**
- **Total cost: \$5.4 million**

SFpark Evaluation Results

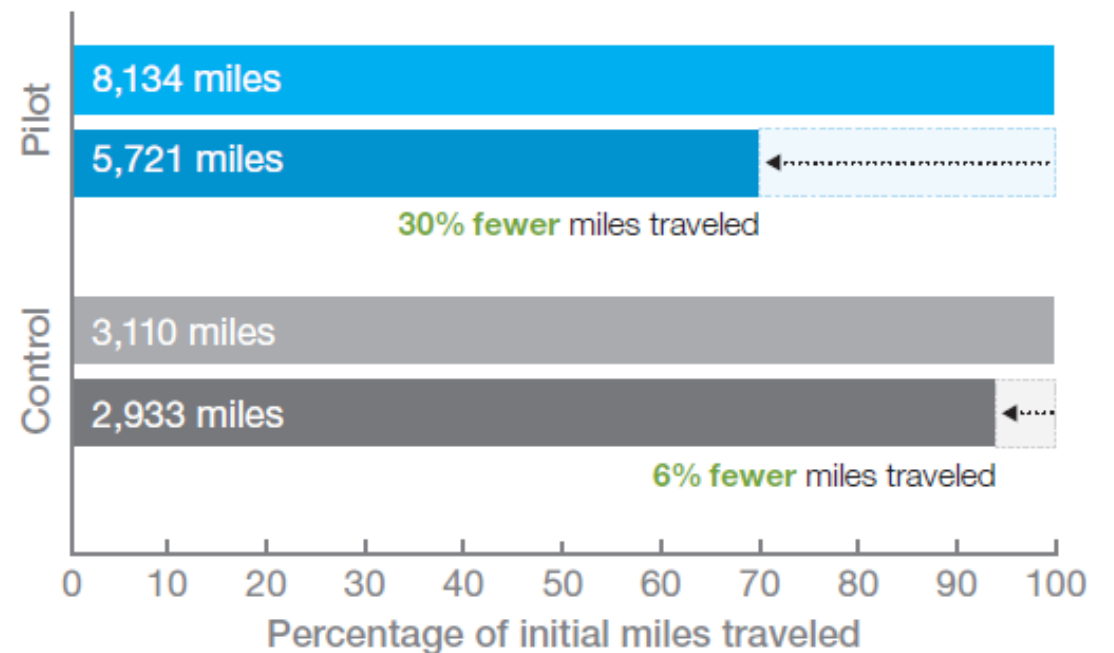
Hourly parking rates in SFpark areas

Before vs. after (10 rate changes)
On- and off-street rates



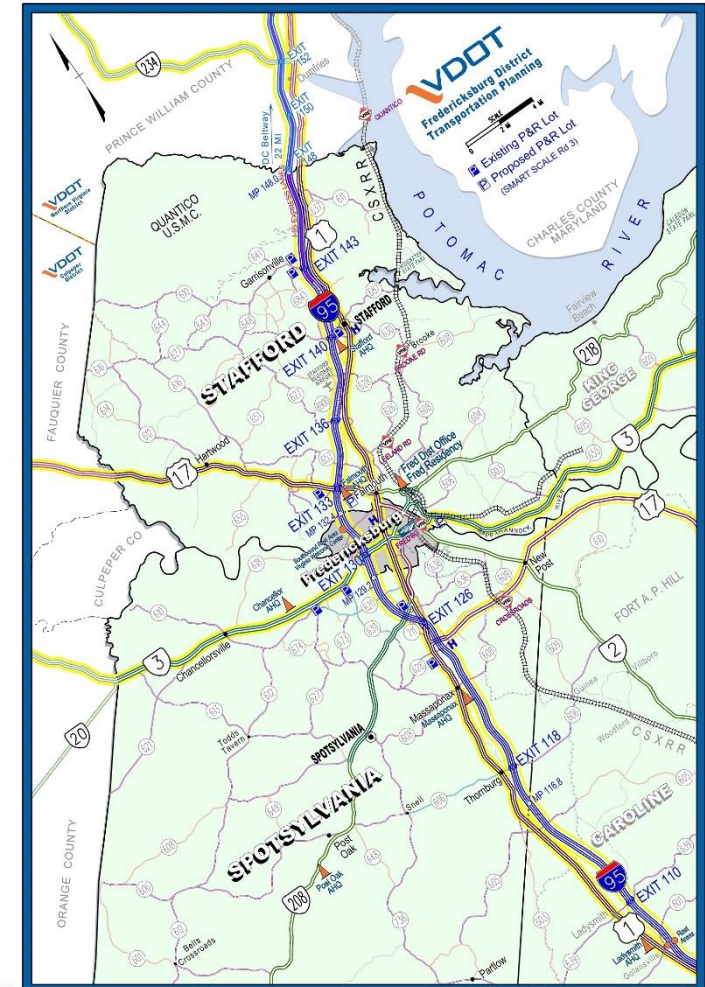
Daily vehicle miles traveled

Before vs. after
Pilot vs. control areas | Weekdays 9am to 6pm



Parking Demand Management System

- Provide real-time parking information for 8 park & ride lots on I-95 that support VRE
- Sensors at entry and exit
- Real-time information display and publication to portal for further dissemination
- Total Cost: \$1,950,000



Parking Demand Management System



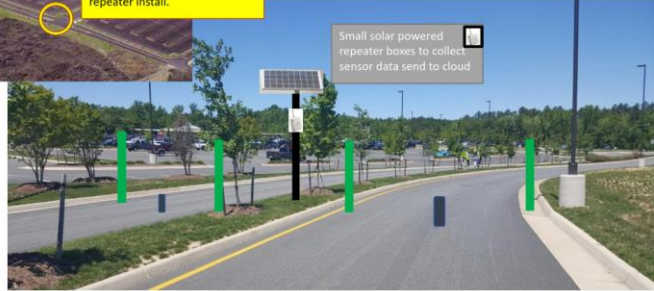
Updated location of sensors and repeater to simplify repeater install.

Installation Requirements:

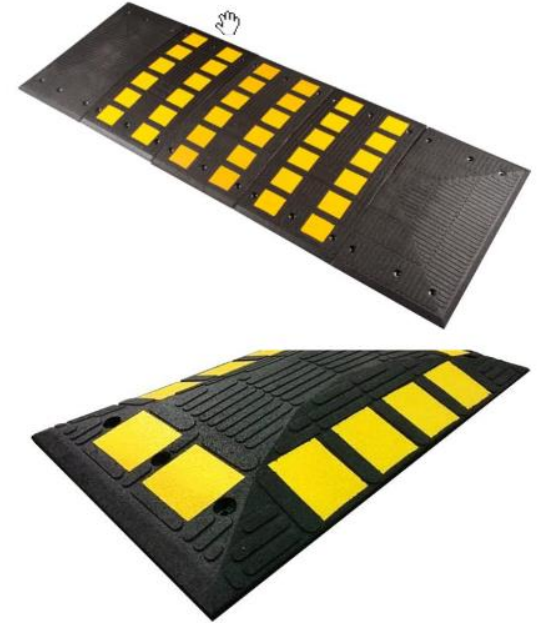
- Install u channel pole for repeater placement
- Assemble & attach repeater and solar panel to pole
- Drill 2 sensor holes & embed sensors
- Diagnostics & testing

Sensors are installed flush with the pavement at entry and exit lanes to count car traffic.

Rubber bendable delineators are installed 12 - 14ft apart to leave room for snow plows and funnel traffic over sensors



Small solar powered repeater boxes to collect sensor data send to cloud



Statewide Technology for Operations

- There are a number of strategies that have been tested or piloted that could result in significant operational improvement statewide
 - Customer service bots – handle routine or low-priority calls during high volume events to free customer service agents for higher priority issues
 - Worker alert system – emergency responders on the roadside are at high risk. Alert system would provide a geo-fenced presence alert through 3rd party apps or agency developed systems
 - Virtual ATM – provides benefits of an ATM without the heavy infrastructure investment
- Total cost: \$2 million

Remaining Projects

- **I-95 Variable Speed Limits**
- **I-64 Afton Mountain Safety and Congestion**
- **Innovative Transit Pilots**
- **Pilot Program for Innovation**
- **Innovation Program for Localities**
- **High Speed Communications for Signals**
- **Cyber Security Upgrades for Operations**



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