



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

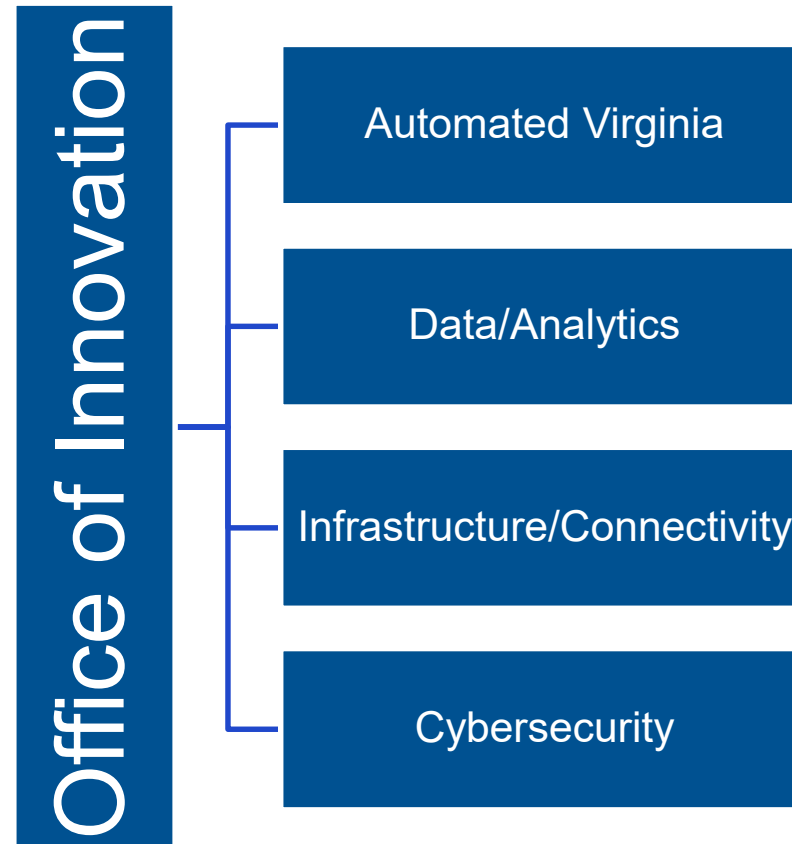
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Office of Transportation Innovation

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 an AI-based decision support system with prediction
 - Deploy a data driven tool to incentivize customer mode and route choice
- Total cost - \$15 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**

I-95 Variable Speed Limits

- **Experience internationally has shown VSL/speed harmonization to be effective in reducing congestion**
 - Germany saw 5-15% reduction in travel time, 30% decrease in crashes, 5% increase in throughput
 - United Kingdom saw 20% fewer property damage only crashes and 10% fewer injury crashes
- **Project will include compliance monitoring/education**
- **Total cost: \$ 15 million**

I-64 Afton Mountain Safety Improvements

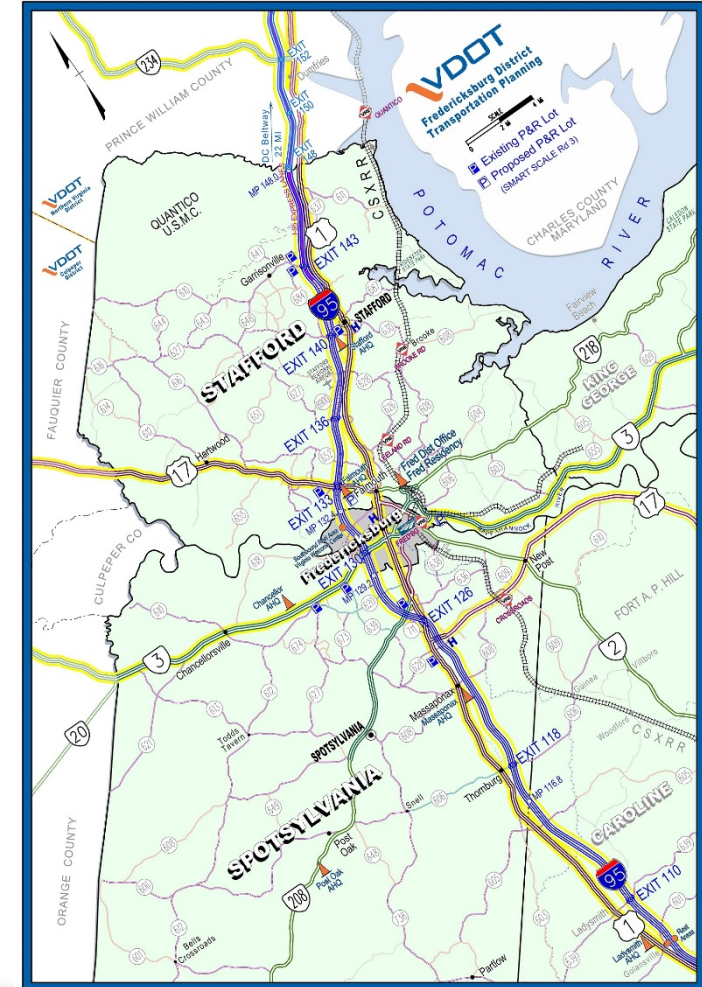
- Safety during the PM peak travel westbound is the biggest single concern
- Evaluating a range of potential strategies:
 - ATM designed to mitigate high speeds and speed differentials at the top of the mountain where fog is most likely
 - Speed feedback signs
 - Dynamic signing to alert trucks to travel in the right lane during the PM peak
 - Flashing chevrons, enhanced signs and markings, modified operation of existing fog lights
- Total cost: \$5 million

Innovative Transit Pilots

- **Hanover County Specialized Transit Program**
 - Target ambulatory and non-ambulatory services in rural and suburban areas through partnerships with reservation companies and TNCs to provide services
- **Microtransit Pilot**
 - Provide mobility-on-demand rideshare services using small to medium sized vehicles operating within pre-defined zones
- **Total cost: \$300,000 (\$150,000 each)**

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



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 repositioning of assets
- Total cost: \$2 million

Pilot Program for Innovation

- **Pilot program in partnership with the Center for Innovative Technology can bridge the gap between VDOT-identified transportation challenges and entrepreneurs who have potential solutions**
- **CTB Subcommittee for Innovation and Technology will help to identify high priority issues to put forward as problem statements**
- **Total cost: \$1.5 million**

Innovation Program for Localities

- Initiative to fund locally identified innovative strategies that meet the goals of the ITTF program
- Working group of VDOT and DRPT staff will prioritize submitted projects on the basis of congestion relief, safety improvement, innovation, and potential for widespread deployment
- Total cost: \$2 million

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

High-Speed Communications Upgrades for Signalized Intersections

- Real-time monitoring and operations of traffic signals requires reliable communications between the field controllers and the central system
- Currently, approximately 35% of signals statewide have substandard communications
- Effort will leverage a variety of approaches (VDOT fiber, resource sharing, leased lines, etc) to facilitate effective communications with all intersections
- Total cost: \$4.7 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

Cyber Security Upgrades for Operations

- **As technology advances, cyber security becomes a critical component of operations. Connected and automated vehicles will only increase this criticality**
- **VDOT has completed a cyber security assessment of the operations technology program**
- **Strategies to mitigate identified vulnerabilities have been developed**

- **Total cost: \$2 million**



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