Northern Virginia Transportation Authority
The Authority for Transportation in Northern Virginia

TRANSPORTATION TECHNOLOGY COMMITTEE
Wednesday, July 6th, 2022
8:30 AM
(In-person meeting and livestreamed via YouTube)

AGENDA

I. Call to Order/Welcome — Councilmember David Snyder, Chair

Action

II. Summary Notes of April 13th, 2022 Meeting — Councilmember David Snyder, Chair
Recommended action: Approve meeting notes

III. Transportation Technology Strategic Plan (TTSP) Content and Progress Update — Mackenzie Love, Regional Transportation Planner
Recommended action: Approve addition of new content and one new strategy to the TTSP

Discussion/Information

V. TransAction Update — Keith Jasper, Principal, Transportation Planning and Programming

VII. NVTA Updates — Ms. Monica Backmon, CEO

VIII. Member Updates

Adjournment

IX. Adjourn

Next Meeting
TBD

TRANSPORTATION TECHNOLOGY COMMITTEE
Wednesday, April 13, 2022, 8:30 am
Electronic meeting and livestreamed on YouTube

MEETING SUMMARY

I. **Call to Order/Welcome**

- Chairman Snyder called the meeting to order at 8:30 am.
- Attendees:
  - **TTC Members:** Councilmember/Chairman David Snyder (City of Falls Church and Authority Member); Mayor Jeanette Rishell (City of Manassas Park and Authority Member); Hari Sripathi (VDOT); Dr. Richard Mudge (Compass); Mike Garcia (FCDOT); Reginald Viray (Virginia Tech Transportation Institute) and Dr. Robert Schneider (Potomac and Rappahannock Transportation Commission).
  - **NVTA Staff:** Monica Backmon (Chief Executive Officer); Dr. Sree Nampoothiri (Senior Transportation Planner) and Mackenzie Love (Regional Transportation Planner).
  - **Others:** Amanda Hamm (Office of Strategic Innovation Virginia Department of Transportation).

Action

II. **Summary Notes of October 27th, 2021, Meeting**
The meeting summary was approved unanimously, with abstention from members not present.

Discussion/Information

III. **Transportation Technology Strategic Plan Update**

- Ms. Love provided an overview of progress that has been made towards implementation of the Transportation Technology Strategic Plan (TTSP) since the last meeting of the Committee in October 2021. This included continued work to integrate the TTSP into the TransAction update process; increased outreach and education through an update to NVTA's Driven By InNoVation newsletter which now features TTSP content monthly; and incorporation of a new position to NVTA's State and Federal Legislative Program and Legislative Priorities to "Support use of effective transportation technology."
- She also informed the Committee of any major developments locally and/or in the transportation sector as a whole that are relevant to each of the eight strategies included in the TTSP. She went on to note three important developments that did not directly map to one of the existing eight strategies, including OmniRide's consideration of a microtransit pilot, National Highway Traffic Safety

Administration's (NHTSA) finalization of the first occupant safety protection standards for autonomous vehicles (AVs), and the Virginia Department of Transportation's (VDOT) finalization of a Connected and Automated Vehicle Investment Roadmap.

IV. **Presentation of VDOT's Connected and Automated Vehicle Program**

- Ms. Amanda Hamm presented information about the VDOT's Connected and Automated Vehicles (CAV) Program. She indicated that CAVs could beneficially or adversely impact safe, accessible, and efficient travel in the Commonwealth, and this program is intended to prepare VDOT to maximize benefits. (She also noted that VDOT will not seek to regulate what is inside an AV, such as sensor arrays.)
- There are four primary tasks associated with the program including:
    - A literature review and CAV readiness assessment;
    - Identification of use cases and creation of an investment roadmap;
    - Production of an education strategy and;
    - Development of a business strategy.
- Ms. Hamm provided examples of CAV developments across the Country, such as:
    - TuSimple, an autonomous trucking company operating routes from Tucson to Phoenix at night;
    - General Motors' Cruise Program has petitioned the NHTSA to allow the sale of low/Zero Emissions autonomous vehicles to begin next year;
    - The NHTSA has issued a narrow initial ruling on occupant safety for Automated Driving Systems (ADS). Additional rule making is expected.
    - Nuro has been developing external airbags to protect pedestrians in the event of a crash of one of their autonomous delivery vehicles.
- She also shared information on several CAV efforts already underway in Virginia:
    - A Cellular Vehicle-to-Everything (C-V2X) Deployment;
    - The Fairfax County Automated Shuttle;
    - A Work Zone Builder App; Connected Smart Vests prototype and pilot and;
    - The Automated Truck Mounted Attenuator (ATMA) program.
- VDOT is also participating in external initiatives like Federal Highway Administration's (FHWA) Cooperative Automation Research Mobility Applications (CARMA) testing; Daimler's testing of automated trucks on I-81; and two US DOT grant funded projects led by the Virginia Tech Transportation Institute. The first will work to develop a Concept of Operations (CONOPS) for managing mixed trucking fleets that include Automate Driving Systems (ADS), and the second will create an optimized automated driving corridor demonstration.
- Ms. Hamm closed her presentation with additional information about the VDOT CAV Program, focusing on the recently completed Readiness Project. This effort detailed I-495 readiness factors and used a maturity scale of 1-4 (with 4 being the readiest) to assess these. She noted that the Commonwealth received a rating of 2 for most factors and pushed into level 3 in some areas (like the Research Council), but none reached level 4.
    - The project also selected 12 of the 80 use cases for AV technologies initially proposed for VDOT to focus on going forward. These translate to 24 different potentials for investments on a roadmap that covers the next 6 years.
- Mayor Rishell asked if VDOT could share its plans for public education.
    - Ms. Hamm indicated that the Department's efforts will be more focused on the investment aspects of CAVs currently, but some bigger projects will

eventually involve public engagement. However, she was unable to provide detail on this, as a procurement effort was underway for related actions.

- Ms. Backmon noted that the consultant team working on TransAction informed her that the lifecycle of a vehicle is approximately 15 years. She asked how we can encourage use of technology in the face of these trends. She also asked if VDOT was considering the potential retrofitting of existing vehicles.
    - Ms. Hamm said that retrofitting vehicles for automation would be complicated but that it may be feasible to increase connectivity on existing vehicles through aftermarket systems or apps.
    - This led to a discussion of the distinctions between "autonomous," which means the functioning of the vehicle is completely self-contained, and "automated" which could provide incremental benefits to Human Driven Vehicles overtime.
    - Dr. Mudge added that he thinks retrofits to increase automation or support autonomous functioning will be more likely on special purpose vehicles and provided the example of precision docking in trucking.
    - Dr. Schneider suggested that since vehicles are lasting longer, the marketplace may begin to focus more on software updates/subscriptions than sales.
- Dr. Nampoothiri indicated that NVTA may be interested in sharing some of the resources the Commonwealth has developed as part of its CAV Program with the Regional Jurisdiction Coordination Committee (RJACC.) Ms. Hamm invited NVTA staff to contact her about this.
- Mr. McAndrew expressed a desire to see the Commonwealth address safety of those outside CAVs. Further he suggested there may be an opportunity for the Commonwealth to lead efforts to address speed assistance features which are currently optional by working with manufacturers.
    - Ms. Hamm indicated that the Connected Vehicle Pool Fund (in which VDOT is a leader), is exploring concepts like sue warnings that may help with speed and is addressing safety for Vulnerable Road Users.

V. **TTSP candidate topic overview and discussion**

- Chairman Snyder led the members of the Committee in a discussion of topic areas for potential addition to the TTSP. Throughout that discussion the Committee also asked questions of and received information from Amanda Hamm and NVTA Staff, who provided an overview of the relationship between the TTSP and the ongoing update of Northern Virginia's long-range transportation plan, TransAction. Several Committee members also shared their unique expertise on an array of transportation innovations including AVs, hydrogen propulsion systems, pedestrian safety, and the status of vehicle fleets including turn-over rates and the prospects for existing personal and public vehicles to be modified for emerging technologies.
    - Chairman Snyder indicated a desire to translate all of this information into projects that are fundable in the near term.
    - Mr. Sripathi emphasized the importance of not prescribing how an objective should be achieved, and instead to allow flexibility to encourage innovation.
    - Dr. Nampoothiri added that NVTA's update of TransAction is looking at prioritizing projects as VDOT mentioned. This includes working with jurisdictions to develop a list of projects and use of gap analysis to identify gaps, particularly those that are interjurisdictional and/or not tied to a location. Examples of this can include low/ZEV (Zero Emissions Vehicles) and fueling

stations, projects to prepare for CAV deployments, the Regional Multimodal Mobility Program (RM3P), Bus Rapid Transit (BRT) systems and microtransit. He also noted that the next NVTA Six Year Program (SYP) onwards will be based on this updated TransAction.

- Ultimately the Committee advised NVTA Staff to explore two topics further and make recommendations for incorporating them into the plan. These topics were connected and automated vehicles and related infrastructure like smart intersections, and transit innovation with a focus on microtransit. The committee made special emphasis to NVTA's Core Value of safety while noting the Core Values of Equity and Sustainability will also be applied. Finally, the Committee requested recommendations on how to enhance the representation of hydrogen propulsion systems and infrastructure within the TTSP.

VI. **7th Annual Northern Virginia Transportation Roundtable Recap**

- The 7th Annual Northern Virginia Transportation Roundtable was held on Wednesday March 30, 2022. The event was comprised of two panels, the first of which focused on electrification and also touched on other propulsion options like hydrogen. Both the content of the panel and the subsequent moderated discussion were highly relevant to TTSP strategy #8 to "Advance decarbonization of the transportation system." The speakers in the second panel presented on an array of innovations being developed in the transportation sector in the Northern Virginia region and beyond. This included a presentation on how the TTSP is informing scenario analysis work as part of the TransAction update; information on New York City's Central Business District Tolling Program, which is relevant to TTSP Strategy #5 to "Develop pricing mechanisms that manage travel demand and provide sustainable travel options"; an update on the Regional Multi-Modal Mobility Program (RM3P), which is relevant to several TTSP strategies, most notably #5 to "Develop pricing mechanisms that manage travel demand and provide sustainable travel options" and #7 to "Enhance regional coordination and encourage interoperability in the transportation system"; and a presentation on use of AVs for local deliveries, which is relevant to TTSP Strategy #4 to "Minimize potential for Zero Occupancy passenger Vehicles" and the discussion of potential topics to add to the TTSP as described above.

VII. **NVTA Update**

- Ms. Backmon informed the Committee of upcoming opportunities to provide feedback on NVTA's FY2022 – 2027 Six Year Program (SYP). These include the Public Comment Period, which will be open from April 15th – May 22nd; the Annual Northern Virginia Joint Transportation Meeting on May 4th, which will also serve as the Open House for the SYP; and the Public Hearing on May 12th.

VIII. **Member Updates**

- Chairman Snyder invited all members to provide any feedback on developments in their own work and/or on TTSP-related content and deliverables, at any time.

Adjournment

- The meeting adjourned at approximately 10:14 am.

Transportation Technology Strategic Plan (TTSP) Update

July 6th, 2022

Mackenzie Love, AICP
Regional Transportation Planner

History of the Transportation Technology Strategic Plan (TTSP)

The TTSP describes **strategies** for advancing the beneficial use of technology in transportation, in **alignment with NVTA Core Values**, and identified **roles the NVTA can take** in pursuit of them.

It also recognizes that the objectives of the TTSP cannot be achieved by NVTA alone, and relies on the **strong coordination and partnerships** that are foundational to NVTA's work in the region.

Year	Month	Milestone
2017	October	• An update to TransAction was adopted, which contained the genesis of the Transportation Technology Committee (TTC)
2018	October	• TTC established by the NVTA CEO
2019	January	• First meeting of the NVTA Transportation Technology Committee
2020	December	• Draft TTSP "core content" (8 strategies, 9 NVTA roles and 3 core values) shared with the TTC
2021	January	• Draft structure for the TTSP (minus Action Plan) proposed to the TTC
	February/ March	• First full draft of the TTSP and draft structure for the Action Plan presented to the TTC • Draft structure for the TTSP shared with TAC, PCAC and PPC • TTSP mini-session at the 6th annual NoVA Transportation Roundtable
	April	• TTC, PCAC and PPC all recommend the Authority adopt the 8 strategies and Action Plans of the TTSP
	May	• The Authority adopted the inaugural NVTA Transportation Technology Strategic Plan's Action Plan and 8 Strategies within
	Summer	• TTSP-related topics included in TransAction outreach and survey
	October	• TTC receives an update on the first six months of implementation of the TTSP
	November	• The Authority receives an update on the first six months of implementation of the TTSP
	December	• The Authority unanimously adopted the 2022 State and Federal Legislative Program and Legislative Priorities, which included a new position to "Support use of effective transportation technology"
2022	February	• The format of NVTA's Driven By InNoVation was updated and now includes monthly features of TTSP-related content.

Updates to TTSP Technology Timeline

- The TTSP Timeline is typically updated retrospectively, to allow time for the full impacts of any development to be fully realized.
- Here are a few developments that could be added to the timeline in this update:

Year	Technology Milestone	
	Event	Description
2017	Internal Combustion Engine (ICE) vehicles hit peak global sales	*"Most importantly, the market is shifting from being driven primarily by policy, to one where organic consumer demand is the most important factor,'*
2020	VDOT issued its Connect and Automated Vehicle Program Plan	"This document provides direction to Virginia Department of Transportation (VDOT) in preparing for the deployment of connected and automated vehicle (CAV) technologies and solutions, which are expected to bring transformative change to the safety and efficiency of surface transportation."
2021	The Biden-Harris Electric Vehicle Charging Action Plan	"President Biden has united automakers and autoworkers to drive American leadership forward on clean cars, and he set an ambitious target of 50% of electric vehicle (EV) sale shares in the U.S. by 2030."

Continued on the next slide…

Updates to TTSP Technology Timeline, continued

Year	Technology Milestone	
	Event	Description
2022	TPB adopts CAV Principles	These ten principles will be incorporated into Visualize 2045.
2022	Connected DMV issued the "DMV Hydrogen Greenprint"	"The DMV Hydrogen Greenprint is a better kind of blueprint. In addition to a conceptual plan for deploying infrastructure, it provides a data-driven analysis that quantifies potential hydrogen supply and demand across the DMV over the next ten years."
2022	NHTSA issues first occupant protection safety standards for AVs	This is a first-of-its-kind rule regarding AVs. Additional rulemaking is anticipated.
2022	President Biden invokes Defense Production Act for EV battery production	"President Joe Biden will invoke the Defense Production Act to encourage domestic production of minerals required to make batteries for electric vehicles and long-term energy storage."

Other updates to watch:

- 2022 - *"Now after a decade and some bumpy starts, it's robotaxis, robot-driven deliveries, and autonomous trucks that are emerging as the most promising money-makers in the market."*
- 2022 - Passage of SB 575 in Virginia, that requires state fleet managers for to use Total Cost of Ownership in evaluating procurements.
- 2022 – SCOTUS ruling in EPA vs. West Virginia said that the Clean Air Act does not provide authority to regulate GHG from power plants.
- Ongoing - Developments in Advanced Air Mobility (AAM).

TTSP Report Card, as of July 2022

Strategy		NVTA Roles								
		Authority Roles			Shared Roles			Staff Roles		
Number	Name	Funding	Policy	Advocate	Champion	Facilitate	Stakeholder	Planning	Outreach/ Education	Observer
1	Reduce congestion and increase throughput	○		◕	◕	◕		◕	◕	
2	Maximize access to jobs, employees and housing	○			◕	◕		◕	◕	
3	Maximize cybersecurity and privacy for members of the public	○					◔			◔
4	Minimize potential for Zero Occupancy passenger Vehicles		○	◑	◔	◔		◑	○	
5	Develop pricing mechanisms that manage travel demand and provide sustainable travel options		○	◑			○	◕	○	
6	Maximize the potential of physical and communication infrastructure to serve existing and emerging modes	○			◔	◑		◑	○	
7	Enhance regional coordination and encourage interoperability in the transportation system	○			◕	◕		◕	◕	
8	Advance decarbonization of the transportation system	○	◕	◕	◕	◑		◕	◑	

Key	
	No role identified for NVTA
○	Role identified for NVTA
◔	Some progress has been made
◑	Moderate progress has been made
◕	Substantial progress has been made
●	Task has been completed

Watch this space:

- NVTA's NoVA Gateway

Staff Recommendations for integrating topics into the TTSP

Topic for which TTC requested Staff Recommendations	Staff Recommendation
Connected and Automated Vehicles, and Related Infrastructure	Incorporate this topic into the existing TTSP strategy #4 (Minimize Potential for Zero Occupancy passenger Vehicles) and rename the strategy.
Hydrogen propulsion systems	Incorporate this topic into the existing TTSP strategy #8 (Advance Decarbonization of the Transportation System) and retain the strategy name.
Transit Innovations, like Microtransit	Create an entirely new strategy.

Staff Recommendations for updates to TTSP strategy #4

Expand from a focus on reducing the potential negatives of Zero passenger Occupancy Vehicles (ZOVs), to include efforts to maximize the potential benefits of Connected and Autonomous Vehicles.

Recommendation for the title of this strategy:

1. Maximize the benefits and minimize the negatives of connectivity and automation
2. **Enhance operations of the multimodal transportation system through connectivity and automation** (Recommended)
3. Maximize safe and efficient operation of the transportation system while minimizing environmental impacts

Staff Recommendations for updates to TTSP strategy #8

Expand focus on EVs to include other low/Zero Emissions technologies like hydrogen. Also add content on synergistic technologies that could improve resiliency, like Vehicle to Grid (V2G) technology.

Recommendation for the title of this strategy:

- **Retain: Advance Decarbonization of the Transportation System**

Staff Recommendations for creation of a new TTSP strategy

Create a strategy that focuses on transit innovations like microtransit and BRT but is also flexible enough to include other forthcoming transit technologies that are as yet unknown.

Recommendations for the title of this strategy:

1. Enhance transit through innovation and emerging technologies
2. Support the critical functions of transit through innovation
3. **Enhance mobility in the region through transit** (Recommended)

Staff Recommendations for integrating topics into the TTSP

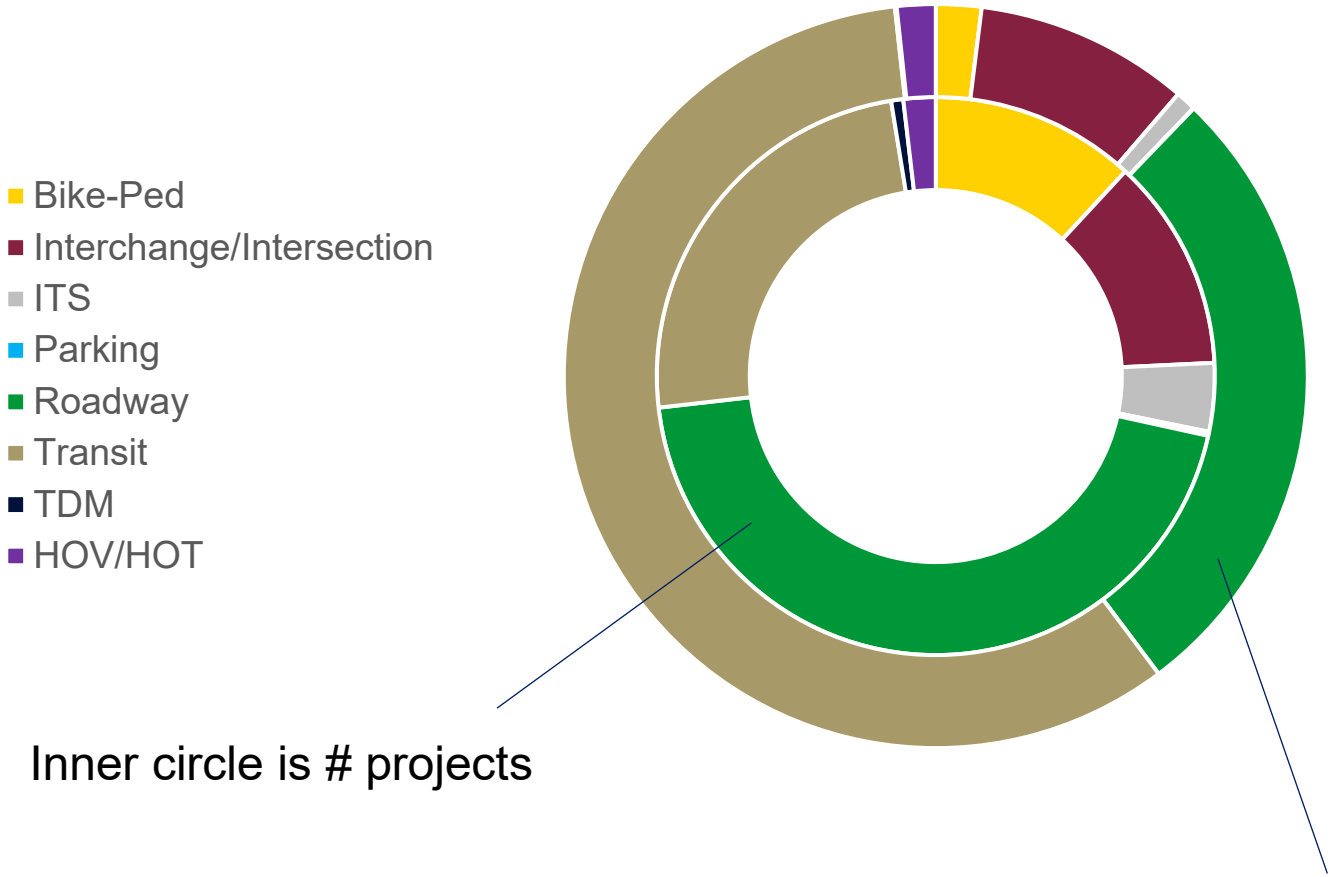
	Strategy		NVTA Roles								
			Authority Roles			Shared Roles			Staff Roles		
	Number	Name	Funding	Policy	Advocate	Champion	Facilitate	Stakeholder	Planning	Outreach/ Education	Observer
	1	Reduce congestion and increase throughput	✔		✔	✔	✔		✔	✔	
	2	Maximize access to jobs, employees and housing	✔			✔	✔		✔	✔	
	3	Maximize cybersecurity and privacy for members of the public	✔					✔			✔
Candidate for Expansion of Focus	4	Minimize potential for Zero Occupancy passenger Vehicles Enhance operations of the multimodal transportation system through connectivity and automation		✔	✔	✔	✔		✔	✔	
	5	Develop pricing mechanisms that manage travel demand and provide sustainable travel options		✔	✔			✔	✔	✔	
	6	Maximize the potential of physical and communication infrastructure to serve existing and emerging modes	✔			✔	✔		✔	✔	
	7	Enhance regional coordination and encourage interoperability in the transportation system	✔			✔	✔		✔	✔	
Candidate for Expansion of Focus	8	Advance decarbonization of the transportation system	✔	✔	✔	✔	✔		✔	✔	
Candidate for Addition	X	Enhance Mobility in the Region through Transit	✔		✔	✔	✔		✔	✔	

Action Item: Committee Vote on Potential additions to the TTSP

Topic	Recommendation	Recommended Title	Vote
Connected and Automated Vehicles, and Related Infrastructure	Incorporate this topic into the existing TTSP strategy #4 (Minimize Potential for Zero Occupancy passenger Vehicles) and rename the strategy.	Enhance operations of the multimodal transportation system through connectivity and automation	
Hydrogen propulsion systems	Incorporate this topic into the existing TTSP strategy #8 (Advance Decarbonization of the Transportation System) and retain the strategy name.	Retain: Advance Decarbonization of the Transportation System	
Transit Innovations, like Microtransit	Create an entirely new strategy.	Enhance mobility in the region through transit	

TransAction Updates

Project Costs by Project Type



Inner circle is # projects

Outer circle is total cost of projects

Average Cost	
Bike-Ped	$ 27.9M
Interchange/ Intersection	$125.1M
ITS	$ 37.3M
Parking	$ 10.0M
Roadway	$102.1M
Transit	$399.8M
TDM	$ 18.3M
HOV/HOT	$149.5M

NVTA's TransAction

Initial Scenario Results

What could happen to transportation in Northern Virginia by 2045?

Change in No-Build Results Under Each Scenario

Measure	New Normal	Technology	Incentives/ Pricing
Motorized Person Trips	-4.5%	-3%	-4.5%
Transit Trips	-11%	-13%	+12%
VMT	-4%	-1.4%	-9%
Person-Hours of Delay	-14%	-25%	-20%
Duration of Severe Congestion	-21%	-37%	-25%
Job Accessibility	+8.3%	+6.1%	+6.5%
Emissions	-3.5%	-28%	-7.9%

Thank you!

Supplementary Slides

Candidate Topics: Transit Innovations

Definitions:

Term	Definition	Prop. for topic area?	Source
Demand Responsive Transit (DRT)	""Demand response" is any non-fixed route system of transporting individuals that requires advanced scheduling by the customer, including services provided by public entities, nonprofits, and private providers."	Yes	Federal Transit Administration.
Microtransit	"A privately owned and operated shared transportation system that can offer fixed routes and schedules, as well as flexible routes and on-demand scheduling. The vehicles generally include vans and buses." An example of a company that provide microtransit services is Via. It may also be possible to have publicly offered microtransit.	Yes	TTSP Glossary.
Bus Rapid Transit (BRT)	"Bus Rapid Transit (BRT) is a high-quality public transportation system designed to be fast, reliable, and more convenient than traditional bus routes. It operates much like rail service but uses rubber tire bus vehicles. "Key components/features of a BRT system include frequent and efficient service, dedicated lanes and traffic signal priority, information technology systems (like real-time bus tracking and innovative fare collection methods), enhanced stations and specially designed, high-capacity buses.	Yes	TTSP Glossary.
Transit Signal Priority (TSP)	"Transit Signal Priority (TSP) tools modify traffic signal timing or phasing when transit vehicles are present either conditionally for late runs or unconditionally for all arriving transit. TSP can be a powerful tool to improve both reliability and travel time, especially on corridor streets with long signal cycles and distances between signals."	Yes	TTSP Glossary.
Paratransit	"In general, ADA complementary paratransit service must be provided within 3/4 of a mile of a bus route or rail station, at the same hours and days, for no more than twice the regular fixed route fare."	No	National Aging and Disability Transportation Center.
Transportation Network Companies (TNC)	"A transportation network company (TNC) provides prearranged rides for compensation using a digital platform that connects passengers with drivers using a personal vehicle." Examples include Lyft and Uber.	No	TTSP Glossary.
Micromobility	Micromobility "refers to a range of small, lightweight devices operating at speeds typically below 15 mph, and is ideal for trips up to [approximately 6 miles.]" These devices can be human-powered or electric and can be privately owned or shared. Examples include bikes, scooter and skateboards	No	TTSP Glossary.

What is the Transportation Technology Strategic Plan (TTSP)?

- Tool that will inform a proactive approach to adoption of transportation technology;
- TTSP considers how transportation technologies support the region's vision, i.e. needs-driven NOT technology-driven;
- Includes eight strategies, and up to nine NVTA roles for each strategy;
- TTSP is a living document that will be updated as transportation technologies evolve;
- TTSP Action Plan enables NVTA to think big, start small, and build momentum with respect to adoption of transportation technologies in the region.

Adopted Strategies

Recommended Strategies		Intent of Strategy (long term)
1	Reduce congestion and increase throughput	Support deployment of transportation technologies that improve performance and optimize efficiency of the regional multimodal transportation system
2	Maximize access to jobs, employees and housing	Support deployment of transportation technologies that increase travel options and awareness of them
3	Maximize cybersecurity and privacy for members of the public	Monitor concerns on behalf of Northern Virginians, and leverage NVTA processes where appropriate and feasible
4	Minimize potential for Zero Occupancy passenger Vehicles	Identify measures to address avoidable increases in passenger vehicle miles traveled
5	Develop pricing mechanisms that manage travel demand and provide sustainable travel options	Identify technology-related measures at a regional scale to dynamically address congestion, including incentives; revenues will be re-invested in equitable solutions
6	Maximize the potential of physical and communication infrastructure to serve existing and emerging modes	Support adaptation of existing resources to support desirable technologies such as CASE vehicles, travel apps, micro modes and robust data collection
7	Enhance regional coordination and encourage interoperability in the transportation system	Leverage regional synergies in the deployment of transportation technologies
8	Advance decarbonization of the transportation system	Support deployment of transportation technologies that reduce greenhouse gas emissions

TTSP Strategies and NVTA Roles

Strategy		NVTA Roles								
		Authority Roles			Shared Roles			Staff Roles		
Number	Name	Funding	Policy	Advocate	Champion	Facilitate	Stakeholder	Planning	Outreach/ Education	Observer
1	Reduce congestion and increase throughput	✓		✓	✓	✓		✓	✓	
2	Maximize access to jobs, employees and housing	✓			✓	✓		✓	✓	
3	Maximize cybersecurity and privacy for members of the public	✓					✓			✓
4	Minimize potential for Zero Occupancy passenger Vehicles		✓	✓	✓	✓		✓	✓	
5	Develop pricing mechanisms that manage travel demand and provide sustainable travel options		✓	✓			✓	✓	✓	
6	Maximize the potential of physical and communication infrastructure to serve existing and emerging modes	✓			✓	✓		✓	✓	
7	Enhance regional coordination and encourage interoperability in the transportation system	✓			✓	✓		✓	✓	
8	Advance decarbonization of the transportation system	✓	✓	✓	✓	✓		✓	✓	

TTSP Action Plan
Consolidated Actions Table

Roles									Immediate				Near Term					Mid Term	Long Term
									Jan - March, 2021	April - June, 2021	July - Sept, 2021	Oct - Dec, 2021	Jan - March, 2022	April - June, 2022	July - Sept, 2022	Oct - Dec, 2022	2023 - 2025	2026 - 2029	2030 and Beyond
Title	Applicable Strategies								TransAction kick-off			Completion of TransAction Phase 1		TransAction adoption		Development of legislative program			
	1	2	3	4	5	6	7	8				Development of legislative program	Six Year Program Update FY2022-2027						
Funding	1A, 1B	2A	3A, 3B			6A, 6B	7A	8A											
Policy				4B	5A			8B											
Advocate	1C			4C,4D, 4E	5A			8C											
Champion	✓	✓		✓		✓	✓	✓											
Facilitate	✓	✓		✓		✓	7B	✓											
Stakeholder			✓		✓														
Planning	1A	2A	3A	4A	5B	6A	7A	8A											
Outreach/ Education	✓	✓		✓	✓	✓	✓	✓											
Observer			✓																

Key				
Preparatory Action	Potential Direct Action	Direct Action	Follow Up Action	Continual/ Serendipitously

Bold text indicates this Role is a focus of the Strategy-Specific mini-action plans.

Technologies Mapped to TTSP Strategies

Strategies		Technologies										
Number	Name	Automated/ Autonomous vehicles	Shared Mobility Devices (SMDs)	Signal technologies	Apps	System optimization	Drones	Changes to delivery and freight systems	Surveillance/ monitoring (including telematics)	Data generation/ collection/ sharing	Improvements to mass transit (including BRT)	Smart technologies/ cities and IoT
1	Reduce congestion and increase throughput	◑	◕	●	◑	◕	◑	◕	◕	●	●	◕
2	Maximize access to jobs, employees and housing		◕	◔	◕	●	◔	◔	◑	●	●	●
3	Maximize cybersecurity and privacy for members of the public	◔	◔	◑	◔	◑			◔	◑		◑
4	Minimize potential for Zero Occupancy passenger Vehicles	◑	◕	●	◑	◕	◑	◕	◕	●	●	◕
5	Develop pricing mechanisms that manage travel demand and provide sustainable travel options	◑	◕		◑	●	◑	◕	◕	●	●	●
6	Maximize the potential of physical and communication infrastructure to serve existing and emerging modes	●	●	●		◕	◕	◑			●	●
7	Enhance regional coordination and encourage interoperability in the transportation system	●	◑	◕	◑	◕	●	◑	◑	●	●	◕
8	Advance decarbonization of the transportation system	●	◑			◑						

Key	
Will definitely be helpful	●
Potential to be helpful	◕
Equal potential to be helpful or detrimental	◑
Potential to be detrimental	◔
Likely to be detrimental	○
Not applicable or Insuffecient Information Available	