Transportation Technology Strategic Plan (TTSP): Recommendations

April 21, 2021

NVTA's Vision for TransAction

"Northern Virginia will plan for, and invest in, a **safe, equitable, sustainable, and integrated** multimodal transportation system that enhances quality of life, strengthens the economy, and **builds resilience**"

Approved by NVTA on December 17th, 2020

Three Core Values - Overarching Principles

1. **Equity**
   - Fairness in mobility and accessibility to meet needs of the region/sub-regions/communities
   - Facilitate social and economic opportunities by providing equitable levels of access to affordable and reliable transportation options to serve the needs of all and in particular underserved populations (low-income, minority, elderly, children, people with Limited English Proficiency (LEP), and/or people with disabilities)

2. **Sustainability**
   - Focus on meeting the needs of the present without compromising the ability of future generations to meet their needs.
   - Concept of sustainability is composed of three pillars: economic, environmental, and social

3. **Safety**
   - Minimize transportation system fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.

Timeline – Technology versus NVTA

2004/5 – Apple begins product development on a computer that uses a touch screen instead of a physical keyboard/mouse or stylus

July 2002 – NVTA created by General Assembly

January 2007 – Launch of iPhone 2G

September 2006 – TransAction 2030 adopted

November 2012 – TransAction 2040 adopted

July 2013 – NVTA revenue stream begins

January 2017 – 2.2M apps in App Store

October 2017 – TransAction update adopted

October 2020 – Launch of iPhone 12

April 2021 – draft TTSP/Action Plan

2035 – Which version of the iPhone?

2035 – Where should NVTA be?

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.

Expected Benefits of the TTSP

1. Proactive approach will leverage transportation technologies that support NVTA's vision, and mitigate those that do not, through planning, policy, advocacy, funding, and other means;

2. TransAction scenario (sensitivity) analysis will support data-driven decision making by the Authority with respect to development of TransAction and subsequent project selection during future funding programs. While scenarios could reflect a range of external considerations, the TTSP will guide the development of technology-related scenarios;

3. Consistent approach to NVTA's transportation technology investments will increase synergies and maximize return on investments and taxpayer dollars;

4. Coordinated planning, deployment and operations, especially enabled by secure, real time information, will enhance multimodal travel choices and contribute to a more seamless travel experience for Northern Virginians;

5. By raising awareness and understanding of transportation technologies, NVTA will inform Northern Virginians about the features, benefits, costs, and appropriateness of deploying such technologies in the region.

6. Open and regular exchange of ideas between NVTA staff and jurisdiction/agency staff will strengthen the regional approach to transportation technologies.

Recommended 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	✓	✓	✓	✓	✓		✓	✓	

Example 1:
# Electric, Autonomous Transit Shuttle

Features

- Not reliant on infrastructure type
- ADA accessible
- Can operate in inclement weather and in mixed traffic

Assumptions

- There have already been successful pilot(s) of the technology in the region
- Public acceptance of the technology is growing
- The shuttles have been determined to be a sound investment and/or market is nearing price parity

Ratings

Key		
🔴	🟡	🟢
Intervention needed	Proceed with caution	Embrace

Electric, Autonomous Shuttles

Vision Statement	🟢	This type of shuttle has the potential to provide a **safe** first/last mile connection when **integrated** with transit. This would encourage use of **sustainable** mass transportation, and contribute to an **equitable** system through improved access.

Core Values			Description	Action
	Equity	🟢	• Potential first/last mile connection • Improved access • Reduced congestion and more reliable travel times	• Encourage/conduct diverse public outreach that starts with needs identification through listening • Develop white paper(s) to analyze feedback received and research, and identify best practices and/or deployment guidance • Conduct public education initiatives, to dispel myths and encourage adoption
	Sustainability	🟢	• Reduce congestion and increase throughput through mass travel options. • Reduce tailpipe emissions.	• Identify potential additions to NVTA's Legislative Program
	Safety	🟡	• Fewer fallible drivers on the road • Potential reduction in crashes • Slow speeds may not be harmonious with traffic • Object detection/differentiation abilities are an important consideration	• Develop white paper(s) to analyze state of the field and research, and identify best practices and/or project/vendor selection guidance

Strategies			Sub-Actions
	1	✔	• Increase consideration of EV, AV shuttles and pricing mechanisms in TransAction and/or SYP project selection process • Consider EV, AV shuttles and data/analysis needs and cybersecurity and/or privacy measures in NVTA procurements • Advocate for jurisdictional policies that support deployment of EV, AV shuttles • Develop and support policy(s) regarding EV charging infrastructure and/or support technology-based pricing mechanisms and investment of revenues • Advocate for Commonwealth policies that contribute to/support creation of a network of EV charging infrastructure
	2	✔	
	3	✔	
	4		
	5	✔	
	6	✔	
	7	✔	
	8	✔	

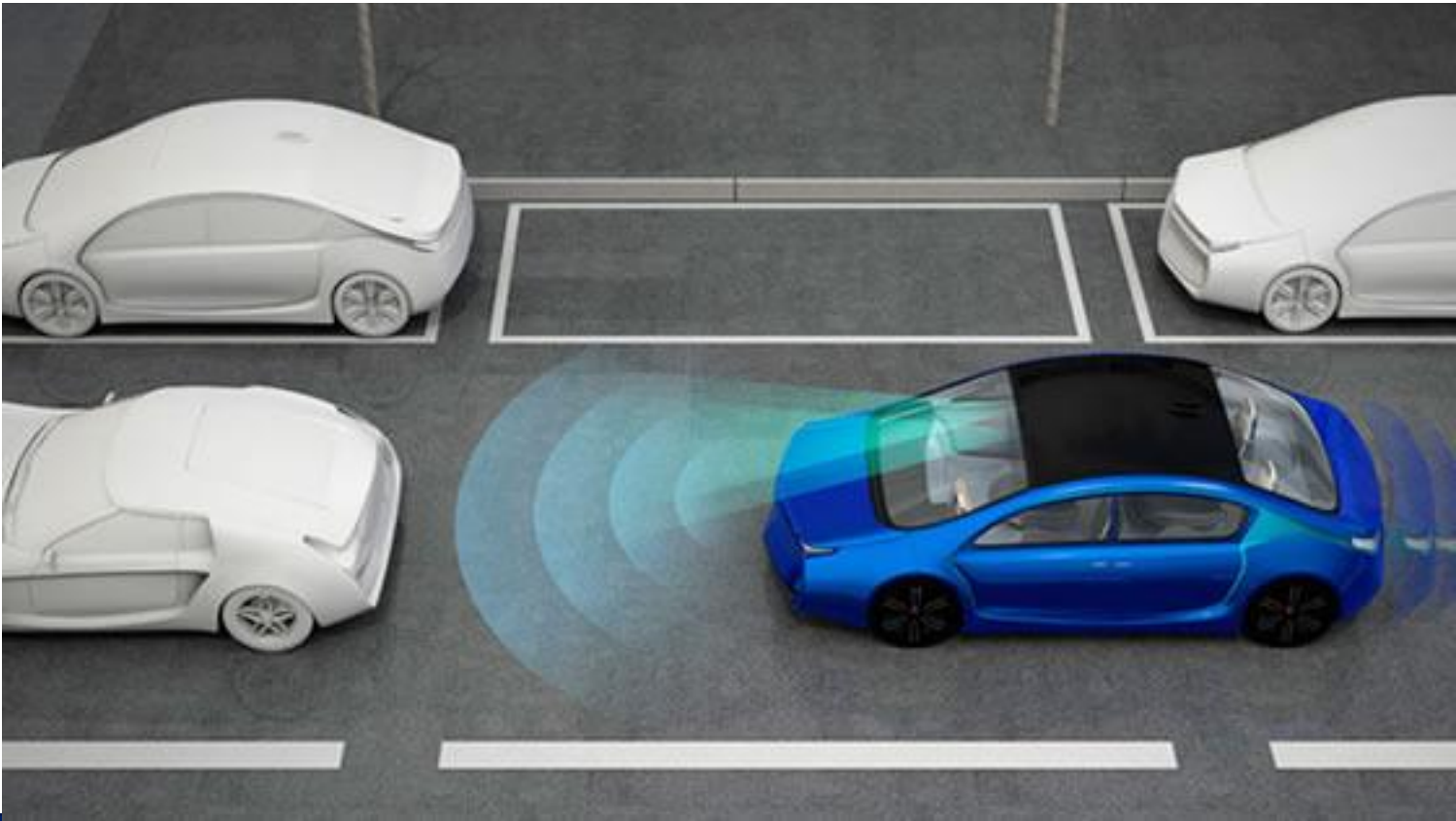# Example 2: Personal, Electric Autonomous Autos

Features

- SAE Level 5 vehicles can operate autonomously under all conditions
- May not have steering wheel or pedals

Assumptions

- Public acceptance of the technology is growing
- Fully autonomous vehicle have or are nearing entry to the public marketplace

Ratings

Key	
🔴	Intervention needed
🟡	Proceed with caution
🟢	Embrace

Personal Electric, Autonomous Vehicles

Vision Statement	🟠	Personal use of electric, autonomous vehicles have the potential to improve **safety,** and improve **sustainability** of the transportation system by reducing congestion. However, proactive steps will be necessary to ensure they are well integrated with existing modes and the

			Description	Action
Core Values	Equity	🔴	• Shared ownership or subscription based usage could contribute to equitable access to personal electric, autonomous vehicles • Any revenues generated from personal use of EV AVs could be reinvested in programs, infrastructure or services that support equitable access to the transportation network • AVs may contribute to more reliable travel times in the region and increased safety	• Encourage/conduct diverse public outreach that starts with needs identification through listening • Develop white paper(s) to analyze feedback received and research, and identify best practices to accommodate this mode in a manner consistent with NVTA core values
	Sustainability	🟠	• Reduce congestion and increase throughput through efficiencies of automation • Zero Occupancy passenger Vehicles may increase VMT and congestion • Reduce tailpipe emissions	• Identify potential additions to NVTA's Legislative Program • Conduct public education initiatives, to dispel myths and encourage shared usage and/or occupancy
	Safety	🟢	• Fewer fallible drivers on the road • Potential reduction in crashes • Object detection/differentiation abilities are an important consideration	• Develop white paper(s) to analyze state of the field and research, and identify best practices to accommodate this mode in a manner consistent with NVTA core values

			Sub-Actions
Strategies	1	✔	• Increase consideration of EV, AVs, pricing mechanisms and minimization of ZOV miles traveled in TransAction and/or SYP project selection process
	2	✔	
	3	✔	• Consider EV, AVs and data/analysis needs and cybersecurity and/or privacy measures in NVTA procurements
	4	✔	• Advocate for jurisdictional policies that support equitable use of EV, AVs
	5	✔	• Develop and support policy(s) regarding EV charging infrastructure, support technology-based pricing mechanisms and investment of revenues or discourage ZOV miles traveled
	6	✔	
	7	✔	• Advocate for Commonwealth policies that contribute to/support creation of a network of EV charging infrastructure
	8	✔	• Advocate for state provision/funding of pilots and research efforts

Recommendations

1. Approve the eight TTSP strategies, as described in the TTSP document*

2. Approve the TTSP Action Plan, subject to:
    - No significant TTSP changes/additions, as determined by the NVTA Executive Director, will occur without prior Authority approval. Examples of significant changes include:
      - changes to the methodology for the project selection process associated with NVTA's Six Year Program
      - changes/additions to NVTA's annual legislative program
      - development of regional transportation policies

Note (*): NVTA staff is not seeking NVTA approval of the TTSP document (see next slide for details)

Recommendations – Note (*)

NVTA staff is not seeking NVTA approval of the TTSP document because:

- The TTSP will be maintained as a living document to reflect the continued evolution of transportation technologies;

- NVTA staff requires flexibility to update the TTSP and, where necessary, refine the strategies and action plan, as new technologies emerge or approach market thresholds that may trigger big shifts in travel demand or behavior; and

- New federal/state legislation, or initiatives undertaken by the federal/state government or the region and its partners, may also trigger refinements to the strategies and the action plan.

TTSP Action Plan: Possible Outcomes

- Development of technology-related scenarios for TransAction scenario (sensitivity) analysis, potentially on the following:
  - Incentives and pricing mechanisms to reduce car dependency
  - Climate change and resiliency of regional transportation system
  - Pandemic 'new normal' implications of increased work-from-home and e-commerce
- Technology-related outreach/education
  - Facts and Myths: Connected, Autonomous, Shared, and Electric (CASE) vehicles
- Identify potential technology-related additions to NVTA's Legislative Program, these may include:
  - Support EV infrastructure
  - Support Zero Emission Vehicles
  - Concern regarding Zero Occupancy passenger Vehicles

TTSP Action Plan: Possible Outcomes

- Identify potential technology-related refinements to TransAction and future NVTA SYP project selection process (post-TransAction update)
  - Funding commitments could be made to be contingent on TTSP related criteria, to be identified and approved through the process laid out in the Action Plan.
  - Projects selected for future funding could be required to participate in standardization of things like transit signal priority communications

- Funding
  - TransAction Project List is the first filter for projects that can be funded using NVTA regional revenues
  - NVTA staff is currently coordinating with jurisdiction/agency staff to create the projects list(s)

- Develop a process for, and White Papers to help prioritize, future regional transportation policy, potentially on the following topics:
  - Shared mobility devices
  - Autonomous transit shuttles
  - Zero Occupancy passenger Vehicles

- Human Services transportation

Planned Actions (May thru October 2021)

- Integration of technology-related strategies into the TransAction scenario analysis work

- Public engagement under the TransAction umbrella

- Ongoing monitoring of market trends and trigger points

- Development of a more comprehensive approach to technology-related outreach and education that builds upon the 'Driven by Innovation' eblast

- Collaborate on a process for development of future regional transportation policies

- Develop White Papers to prioritize potential future regional transportation policies

Review and Reporting

Using the Executive Director's monthly report, summarize status on topics such as:

- Progress against specific measures;

- Citizen and stakeholder feedback;

- Trigger points observed or anticipated;

- Relevant TransAction analyses;

- Revisions to the TTSP living document to reflect changing circumstances;

- Upcoming TTSP-related activities; and

- Consideration of significant changes/additions to the strategies or Action Plan (requiring future Authority action).

Supplementary Slides

TTSP Draft 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

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	

	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	●	◑		◑							