

Fact Sheet – Transportation Technologies

Emerging technologies have the power to disrupt traditional processes by offering innovative ways to address our existing and future transportation challenges including safety, mobility, efficiency, and environmental concerns.

It is clear that emerging technologies will impact transportation in West Virginia in the future, but the rate, scale, and extent of impact are hard to predict. The timing of these impacts is dependent upon several industry factors, and how effectively technology fits within West Virginia's operating environment – notably the mountainous terrain and widespread network of low volume, rural roadways.

Based on an analysis of current and future technology trends, considering the unique challenges of West Virginia, and under the ongoing uncertainty due to COVID-19 effects on mobility, there are opportunities for West Virginia to prepare for the future. The West Virginia Department of Transportation (WVDOT) is uniquely positioned to leverage lessons learned from peer states and others to chart its own response to emerging technologies through the 2050 LRTP.

Emerging Technologies That Will Transform Transportation

Automated Vehicles

(AVs): Vehicles that can navigate the environment around them with varying levels of human input.



Connected Vehicles

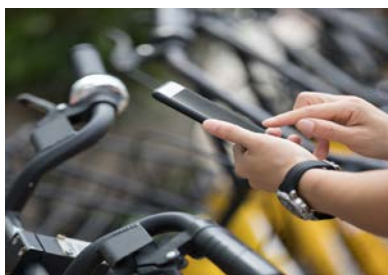
(CVs): Vehicles that use smart connectivity to communicate with other vehicles, infrastructure, pedestrians and bicyclists, and the cloud.



Transportation

Network Companies

(TNCs): Companies that provides riders with ridesharing services via mobile applications. They provide on-demand trips with integrated payment systems based on a dynamic pricing model.



Intranet of Things (IoT): Is the integration of devices with sensors, software, and technology to allow for the exchange of data without requiring a human factor.

Alternative Energy:

Renewable energy sources that are used and favored in place of fossil fuels, such as electric vehicles.



Hyperloop:

An innovative transportation system to move people and goods through low pressured tubes that enables traveling at hypersonic speed while being energy efficient.



Intelligent Transportation

Systems (ITS):

Advanced technologies that can increase safety, mobility, and efficiency of transportation networks. For example, traveler information systems, and applications specific to transit or commercial vehicles operations.



Big Data: The availability and collection of large amounts of data that can be used to improve safety, operations, planning, and decision making.

Refer to the Transportation Technologies Research Paper for more analysis and information.

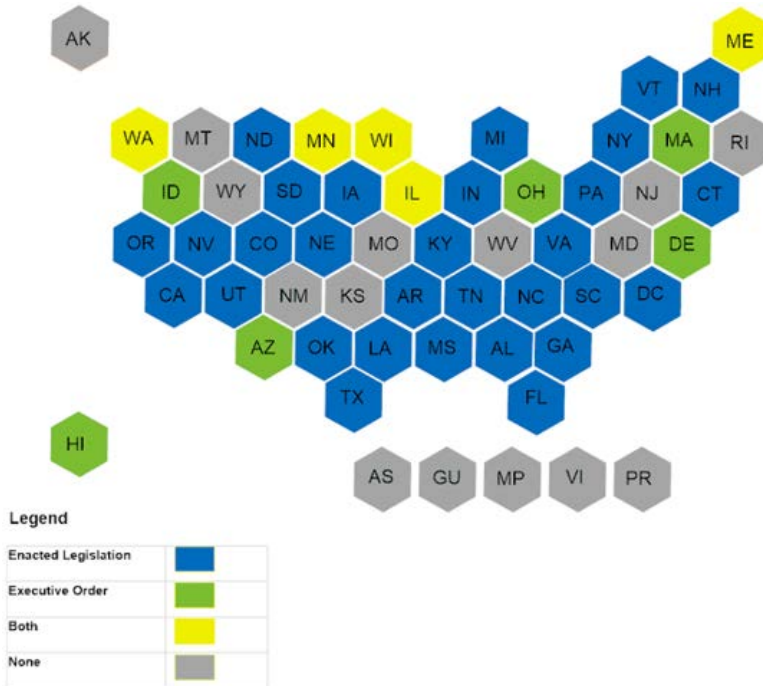
WVDOT 2050 LRTP

TRENDS, DRIVERS, AND OPPORTUNITIES



Where Are We Today?

Congress has announced plans to develop a AVs legislation framework, while the USDOT continues to make progress in defining its role and response to AVs throughout the nation. The USDOT published the *Automated Vehicles 4.0* report in 2019, to provide high-level guidance to Federal agencies, government stakeholders and the industry on the U.S. government posture towards AVs.



State AV Regulations

- At least 29 states and Washington D.C. have passed legislation related to AVs.
- 11 states have passed executive orders related to AVs, some of which have also enacted AV legislation.
- 15 states have not enacted any AV regulations.
- West Virginia considered but did not enact legislation (House Bill 2910), which would have allowed the operation of AVs by anyone with a valid driver license on public roadways.

TNCs - such as Uber and Lyft – continue to disrupt traditional travel. As of June 2017, 48 states and the District of Columbia have passed TNC legislation. Through House Bill 4228 (2016), West Virginia joined the states which regulate TNCs, allowing them to operate in the state under specific vehicle inspections and permit requirements.

West Virginia Activities and Partnerships

In 2019, the Virginia Tech Transportation Institute (VTTI) was awarded a \$7.5 million grant from USDOT to provide guidance for the safe integration of automated driving systems into truck fleets. As part of this research program, VTTI has assembled a team of automated driving system technology developers, trucking fleets, six state DOTs, West Virginia Division of Highways (WVDOT), and others.

In November of 2019, Facebook broke ground on an extensive broadband development project, called the “New River Project”. Through a subsidiary company, Middle Mile Infrastructure, Facebook plans to implement a high capacity fiber optic cable network from Virginia to Ohio within the next two years, including a 275-mile route through West Virginia.

Volkswagen provided West Virginia \$12.1 million for transportation projects that can reduce NOx as part of its settlement. With the funds from the settlement, as well as the ability to submit proposals to Electrify America, West Virginia can contribute to shaping future EV infrastructure. As of October 2020, there are 93 public charging stations with 258 outlets across West Virginia.



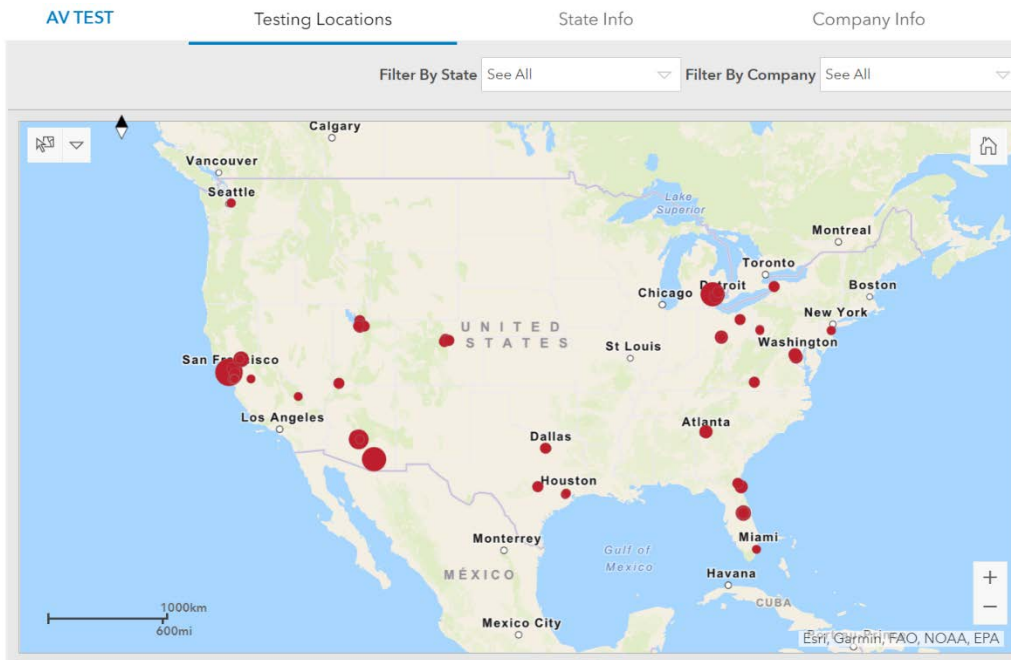
Refer to the Transportation Technologies Research Paper for more analysis and information.

TRENDS, DRIVERS, AND OPPORTUNITIES



Where Are We Going?

The reality of AVs is becoming tangible, as more automated driving system features are being introduced in vehicles today, and as the industry continues to heavily invest in the development and testing of AVs with the goal of producing self-driving vehicles. The effort in piloting of shared automated vehicles (SAV) across the country as shown in the map below, indicate that the shared AV fleet model may be far more prevalent than personally owned AVs, at least in the initial years of AV deployment, provided that communication infrastructure is available to allow for their operation.



National Highway Traffic Safety Administration AV TEST Initiative

- NHTSA launched the AV TEST Initiative in June 2020 to provide the public with direct access to information on the testing of AVs
- The tracking tool includes voluntarily provided information from states and companies

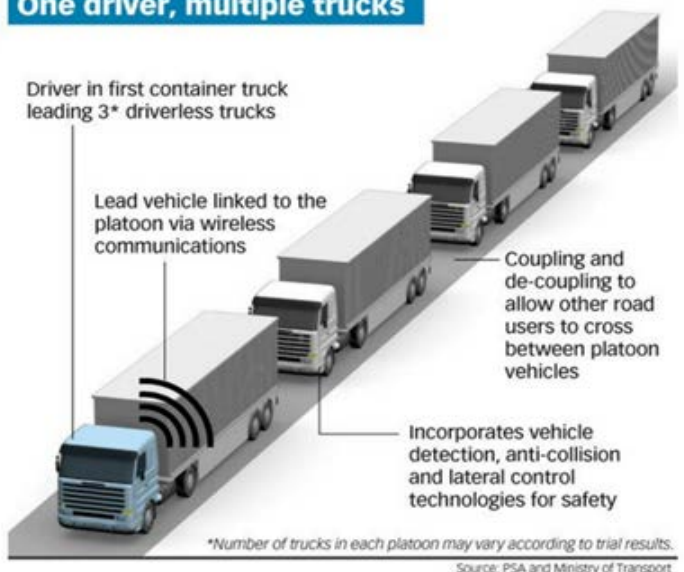
<https://www.nhtsa.gov/automated-vehicles-safety/av-test-initiative-tracking-tool>

CV technology is being developed simultaneously and is often grouped together with AV technology. Most long-range scenarios on vehicle trends expect the population of CVs to exceed 90% by 2050. One of the most common emerging application of CVs is truck platooning, where several trucks travel in convoy, closely following each other with the aid of communicating driving support systems.

It is anticipated that fleets of Connected and Automated Vehicles (CAVs) will also be electric to maximize environmental benefits. The US Energy Administration estimates that EVs will comprise 19% of US market share by 2050.

As experts anticipate massive increases in the connectivity of vehicle fleet and infrastructure due to IoT technologies, more data will become available. Transportation agencies are already looking to leverage Big Data to help manage transportation networks and improve safety. More and more public agencies are developing open data portals to increase the transparency of government data.

One driver, multiple trucks



Refer to the Transportation Technologies Research Paper for more analysis and information.

WVDOT 2050 LRTP

TRENDS, DRIVERS, AND OPPORTUNITIES



WVDOT Future Direction

Future impacts of technology may occur unevenly across West Virginia. Interstates and heavily traveled highway corridors provide an attractive proving ground for technology pilots and programs, and neighbor state coordination opportunities. Coordinated planning and partnerships with third-party providers – who drive high-speed telecommunication – enable technology advances and achieve public and private sector objectives.

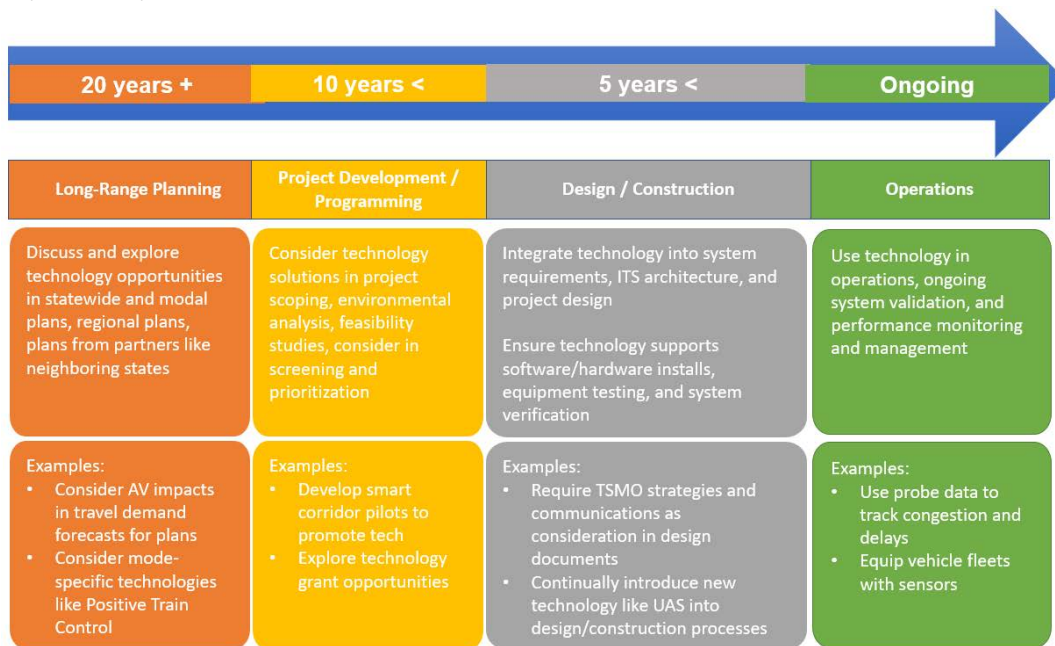
West Virginia has taken initial steps to link technology and transportation. Current efforts focus on developing plans and procedures to extend broadband connectivity under the 2018 “Dig Once” policy through highway and bridge rights of improvements. To successfully navigate the changing technological landscape, and to position the West Virginia for continued prosperity, it is important for WVDOT to elevate and establish a **“technology awareness”** within the agency. This could be achieved by undertaking the following key actions.

Assessment of Agency Capabilities, Roles and Responsibilities

WVDOT would benefit from an assessment of their capability maturities related to planning for, engaging with, and utilizing advanced technologies. Understanding the existing gaps and weaknesses will support the agency in building up capabilities where needed. To help integrate technology into WVDOT normal operations, WVDOT could consider the option of a dedicated technology unit or division with a centralized role to manage and coordinate technology activities.

Establishing Processes to Advance Technology Across Project Life Cycles

WVDOT should prepare for and consider technologies at multiple levels within the agency, and along several points of the project development process. This can help WVDOT better leverage transportation investment decisions at the individual project, corridor, or network level.



Embracing Technology to Support Agency Performance Management

Disruptive technologies may provide new ways to measure key aspects of WVDOT’s transportation system and/or offer insight into how traditional measures are adjusted to communicate technology’s impact. Data streams and systems are critical to performance management. Over time, new data streams – connected with ITS and other smart mobility systems - could supply WVDOT with a broader set of parameters to link and strengthen programmatic investment decisions to defined network goals.

Refer to the Transportation Technologies Research Paper for more analysis and information.