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**State of Vermont Agency of Transportation  
Division of Policy, Planning and Intermodal Development**

**219 North Main Street  
Barre, VT 05641  
vtrans.vermont.gov**

[phone] 802-828-1647  
[fax] 802-828-3983  
[ttd] 800-253-0191

This document provides responses to written comments offered by participants during the Vermont Automated Vehicle Xchange Forum, held on February 8, 2021 by the Vermont Agency of Transportation. The forum was a virtual event, and the comments were collected from the on-line chat function. A video of the AV-Xchange Forum is available here:

<https://youtu.be/LammYmD3KI4>

**Question:** Wondering why no one from the Route 7 Corridor, Rutland County or Addison County Regional Planning?

**Response:** Over the last year, Agency of Transportation staff have made presentations on the Automated Vehicle (AV) Testing Act and AVs in general to regional planning commissions along the US 7 corridor in Bennington, Rutland, Addison, and Chittenden counties. Currently, no municipalities or individuals in those regions have expressed an interest in considering AV testing.

**Question:** With the new AV testing permit policy in place, have any test permit applications been received? If so, have any been approved?

**Response:** There have not been any test permit applications received to date, but we look forward to starting to engage with the private around operational opportunities highlighted during the Forum and on the video we have prepared.

**Question:** Given that you are showing images of shared-use AV shuttles in the slides, I am interested to know what is the involvement in AV planning of the very innovative and active Vermont small city and rural transit network?

**Response:** The Agency has not engaged external transit providers extensively on this topic yet, although they were represented on a stakeholder group a couple of years ago as we began developing the AV legislation. Conversations have occurred with internal public transit officials.

**Question:** It seems like the AV industry is driving the AV testing process in Vermont. What is Vermont doing in AV planning to ensure accessibility for people with disabilities and older adults and equity for low-income populations? These less profitable populations are often sidelined in our current transportation system.

**Response:** The Agency of Transportation made the decision to seek approval from the Legislature to establish an AV Testing permit process because we track emerging issues in the transportation industry and felt Vermont needed to begin preparing for this new technology. There was no pressure from the AV industry. People with disabilities and older adults that may not be able to drive, could benefit significantly from AVs, but it will take time. If the use case for a proposed test is a service that will be available to the public, the permit application must describe how senior citizens and people with mobility, vision, or other challenges would be accommodated; and how the Applicant will serve the public while maintaining overall safety for the test. In the longer term, AVs may also benefit people with lower incomes because they will reduce household transportation costs and may also make it more cost effective to expand transit service.

**Question:** How can a municipality feel comfortable with pre-approval without any details on the testing scenario requested?

**Response:** Pre-approval means that a municipality is willing to allow testing on their local roads. However, a test may only be implemented with a permit issued by the Traffic Committee after reviewing the information that must be provided in the application. Municipalities can withdraw their approval and may include conditions in their pre-approval.

**Question:** Are the State or the municipalities providing any funding / resources for testing?

**Response:** Other than the staff time and consultant support that was required to develop the details of the AV Testing permit process, the State has not dedicated any significant resources to AV testing. We are not aware of any municipalities that have dedicated funding or other resources.

**Question:** At this juncture of rethinking the transportation network, are you also rethinking systematically and through public engagement, what improvements your residents need or want?

**Response:** The Agency's Policy and Planning section is continuously involved in planning for the State's transportation system. All our planning efforts involve significant public outreach. Goals and objectives related to connected and automated vehicles are included in the State's 2040 Long Range Transportation Plan and connected and automated vehicles will be included in rail, public transit, bicycle/pedestrian and other plans as appropriate.

**Question:** I wonder if we can require that test vehicles that could interact with pedestrians and cyclists have 2 drivers and that all safety systems be active? This was not the case with AV test vehicle that resulted in a pedestrian death in Tempe. We can learn from that and make an improvement that will keep folks safe.

**Response:** Per the AV Testing Act, a safety driver is required in a test vehicle and must be able to take control, as necessary. The law does not preclude a second safety driver and authorizes the Traffic Committee to approved test permits with conditions. If there was a justifiable need, it is possible to require a second safety driver.

**Question:** Can we find your video online?

**Response:** The video is available on YouTube here:

<https://www.youtube.com/watch?v=Ohz3FjqGuBw&feature=youtu.be>

**Question:** I am a former staff member in the Vermont state legislature, who on retirement from that became a long-hall tractor-trailer owner operator. My take on the desire to achieve acceptance of AV is primarily from the self-interest by policy intellectuals and digital technology businesses, and not from people on the ground in transportation industries. I know first-hand as a driver of tractor-trailers, particularly in the flat-bed sector, that it is absurd to think that the human presence and decision making, moment to moment, day to day, in that industry could be automated. Moreover, I see AV as yet another instance of digital technology used to make money for high-tech business while preventing humans exercising their brains or possessing status in society for performing useful work. I am sorry to see my dear state of Vermont undercutting the historic values of self-reliance and self-sufficiency in this manner. Ben Huffman, benjhuffman@comcast.net, 802 249-9158.

**Response:** Vehicle automation is a disruptive technology and there are many policy implications and unintended consequences that will need to be addressed. There are, as suggested in this comment, technological hurdles that need to be addressed. However, we do believe the technology will come and that it is important for Vermont to prepare for and guide the resulting changes in a manner that will best serve the State. Testing is an important strategy that will help us prepare.

**Question:** My comments today are as a 64yr old with decades of experience in technical fields and as an instrument-rated commercial pilot. The policy supporting this program is deeply flawed. Whether you've experienced a failure during a phone call or zoom meeting, you were lucky because when the failure occurred you weren't short-seconds away from colliding with a vehicle, obstacle or pedestrian. Towards the goal of driverless vehicles, our State is the game board and the 630,000 Vermonters are the unwitting players. This push is the spawn of tech companies mostly based out of state. Their corporate image, stock prices, and executive pay will be their priorities. interest in safety and social impact will take-up the rear. Moreover, the market isn't demanding the technology - it's the other way around with the tail wagging the dog. This program is all about an aggressive solution searching for a transportation problem that simply doesn't exist. The future in Boston or Palo Alto needn't be the future for Vermont.

**Response:** The AV Testing Program recognizes the risks and includes many measures intended to lead to safe testing. We believe AVs will benefit Vermont's residents, businesses, and visitors by improving safety, providing mobility for people that cannot

currently drive, and reducing transportation costs for households and businesses. Vermonter's that so choose will still be able to drive, but the technology will improve self-reliance for people that cannot currently drive.

**Question:** What engagement or outreach did you do to reach out to the local governments?

**Response:** The Vermont League of Cities and Towns is helping the Agency of Transportation to spread the work on the AV Testing Act via email to municipalities, an in-depth article in its January 2021 newsletter, and through its website. Vermont Agency of Transportation staff provided education at the 2019 municipal training days held across the State, have made presentations at Regional Planning Commission meetings, and followed up with municipalities that are interested.

**Question:** Isn't putting a driver out of job, whether an autonomous vehicle "guide", or a volunteer driver for micro transportation, a loss of employment? Cost? the price of an autonomous vehicle, vs the cost of a 20-passenger E-bus or E-Van?

**Response:** As with any industry disruption, there will be a shift in jobs. This shift, however, will not happen overnight. Currently, most AVs have 1-2 safety operators in the vehicle. Throughout the next few years, these safety operators will be reduced and, ultimately, removed in specific operational design domains. In the meantime, AVs are expected to create new jobs around technology development, vehicle maintenance, supply chain management, etc.

AVs are also seen as supplements to existing transit, rather than a replacement. For example, May Mobility's 4 to 6 passenger shuttles are a smaller option and serve a different purpose than city buses. May Mobility is working with a coalition of industry partners through PTIO to ensure that it is leveraging the technology to minimize the impact on the current workforce and expand job opportunities in the future.

With regard to pricing, AV pricing varies greatly by vehicle, but there is a premium to purchasing a vehicle that is both electric and autonomous. There is great opportunity over the next few years to transition a fleet of diesel, manned vehicles to electric and autonomous. This will introduce potential cost savings and a reduction in greenhouse gas emissions.

EasyMile has provided that it would be happy to work with an organization to evaluate the opportunity associated with this transition.

**Question:** What are your thoughts on the prospect of federal regulation and how that might change work at the state and local levels?

**Response:** Two AV focused bills have been considered by Congress, but did not pass. These were the "SELF DRIVE" Act and the "AV START" Act. With a new administration, there is a good likelihood that federal legislation is introduced again. Impediments to

the passage of federal legislation include finding compromise around the roles and responsibilities of local governments, liability, and data sharing. Federal legislation can provide more certainty for regulations around the operation of AVs as opposed to differing from state to state. On the other hand, there are concerns that federal legislation may challenge existing roles and responsibilities for states and local governments around vehicle operation.

**Question:** Without fog or centerlines on gravel roads, how does the technology work to guide the vehicle? How about a washed-out culvert with a 20' stretch of missing pavement? Can the technology see this in time to stop safely?

**Response:** Road markings are one of many environmental cues that AVs can use to validate the vehicles' location and trajectory. While good road markings can be helpful in certain environments, they are not mandatory for the safe operation of AVs. May Mobility added that while this may not be true for every AV company, May Mobility's vehicles do not rely on road markings. May builds out its own maps as part of its deployment process.

**Question:** How will this push internet and cell services for communication?

**Response:** Automated vehicles and connected vehicles are currently two separate technologies. If they are merged, then the potential for wireless broadband to support connectivity of vehicles will require more broadband infrastructure to support a more connected world. Also, the potential for infotainment within AVs will likely require additional connectivity and may cause tensions between use of broadband for infotainment over safety. The current connected vehicle technologies being considered are Dedicated Short-Range Communications and 5G cellular.

**Question:** How reliant are AVs on road markings and how does that translate to gravel roads, not to mention the always fading pavement markings?

**Response:** Road markings are one of many environmental cues that AVs can use to validate the vehicles' location and trajectory. While good road markings can be helpful in certain environments, they are not mandatory for the safe operation of AVs.

Today, gravel roads are tough for AVs; however, as with any technological challenge, we expect there will be significant improvements in the coming years.

May Mobility added that while this may not be true for every AV company, May Mobility's vehicles do not rely on road markings. May builds out its own maps as part of its deployment process.

**Question:** What do you think the impact of AVs will have on drunk driving fatalities?

**Response:** Industry representatives have not done any specific studies on this topic to date, but would be eager to see more scholarship on how self-driving technology could play a role in reducing these occurrences.

**Question:** In response to your comments about infrastructure improvement, signalized connectivity does not work in VT. Can you talk about rural service?

**Response:** EasyMile stated it would be interested in learning more about how signalized connectivity does not work in Vermont. EasyMile's technology operates in pre-defined, pre-mapped locations and can be in rural or urban areas. Connectivity at and communication with the infrastructure has been one of the most efficient ways that EasyMile, and our industry in general, have come up with to safely operate AVs at signalized intersections and we always work with local municipalities to ensure that all relevant stakeholders (e.g., emergency personnel, road crews) are aware of our deployments.

**Question:** Easy Mile's work is fabulous, but Lauren's comments give me pause. Local governments have never had adequate road marking budgets and is safe AV operation dependent on the lack of some teenager defacing a few road signs? I am not sure that we have enough funding yet - public or private - to solve these possible vulnerabilities.

**Response:** Road markings are one of many environmental cues that AVs can use to validate the vehicles' location and trajectory. While good road markings can be helpful in certain environments, they are not mandatory for the safe operation of AVs.

### **Contact**

Joe Segale, P.E., PTP | Policy, Planning & Research Bureau Director  
Vermont Agency of Transportation  
219 N. Main St. | Barre, VT 05641  
802-477-2365 | [joe.segale@vermont.gov](mailto:joe.segale@vermont.gov)