**State of Vermont**
*Agency of Transportation*
**Division of Policy, Planning and Intermodal Development**
**219 North Main Street** [phone] 802-828-1647
**Barre, VT 05641** [fax] 802-828-3983
**vtrans.vermont.gov** [ttd] 800-253-0191

# MEMO

**To:** Vermont House Transportation Committee
**From:** Joe Segale, PE/PTP
VTrans Policy, Planning and Research Bureau Director
**Re:** Automated Vehicle Testing Update
**Date:** January 15, 2020

The Automated Vehicle Testing Act in Title 23 Chapter 41 ("Act") was passed by the Vermont General Assembly and signed into law by Governor Scott on June 14, 2019 as part of the overall DMV Miscellaneous Bill (Act 60). The Act creates a permitting framework to allow the testing of automated vehicles on state and local highways in Vermont. This memorandum summarizes VTrans activities to implement the Act.

**Municipal Outreach Activities**. The Act authorizes the VT Traffic Committee to approve the testing of automated vehicles on all state highways and class 1 town highways, and all other town highways only if the municipality has pre-approved testing. To make municipalities aware of the Act and their role in the test permit approval process, VTrans staff provided training at "Municipal Day Training" events in Springfield (October 23, 2019), Montpelier (October 25), and Essex (November 7). Staff also provided presentations to the Chittenden County RPC Technical Advisory Committee (June 4), CCRPC board (July 17), and the Central VT RPC Transportation Advisory Committee (September 24). VTrans staff will continue to meet with RPC Boards and TACs in 2020. To date, the Town of Springfield, Village of Bellows Falls and City of Rutland have requested meetings with VTrans staff to learn more about the Act. The attached brochure titled "Your Guide to Automated Vehicle Testing in Vermont" was prepared by VTrans to provide a high level, user-friendly overview of automated vehicles and the testing Act.

**Automated Vehicle Testing Guidance and Permit Application.** The Act requires that VTrans publish an Automated Vehicle Testing Guidance and permit application as soon as practical but no later than January 1, 2021. The guidance must identify municipalities that have pre-approved testing. A working draft of the Guidance is complete and was recently reviewed by an Assistant Attorney General and the Agency of Administration's Office of Risk Management. The next step is a technical peer review by consultants with expertise in automated vehicle testing, technology and policy. We expect to release a draft of the Guidance for comment by stakeholders and the general public in March, with a goal of having the Traffic Committee adopt it in May. The table of contents from the working draft is attached.

**New England and National Activities.** VTrans staff continued to participate in quarterly meetings of the New England Connected and Automated Vehicle Coordination Working Group (NECAV). The group consists of practitioners from all New England departments of transportation and is supported by staff from the I-95 Corridor Coalition. The group shares information and will be working on initiatives to coordinate across state lines. The group adopted the attached Vision, Mission, Goals and Actions. Massachusetts and Rhode Island are the only two New England States with active tests. At the last NECAV meeting, the Massachusetts DOT shared information about its first responder training program, and the Rhode Island DOT shared information about its data sharing requirements. New Hampshire passed legislation related to the testing of automated vehicles in 2019 that establishes and authorizes a commission to develop the specific requirements and details.

At the National level, there was an effort during the summer of 2019 in Congress at passing self-driving car legislation that had been stalled since 2017. However, no progress has been reported since then. On January 8th, 2020 USDOT published "Ensuring American Leadership in Automated Vehicle Technologies: Automated Vehicles 4.0". It is a broad policy document that establishes principles for US Government Agencies to follow as they coordinate and facilitate the testing and deployment of AVs. The National Highway Traffic Safety Administration continues to conduct a variety of research efforts and pilot initiatives to evaluate potential changes in the Federal Motor Vehicle Safety Standards specific to automated vehicle technology.

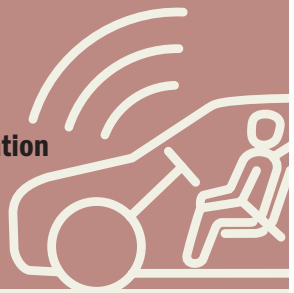
Attachments

- Brochure: "Your Guide to Automated Vehicle Testing in Vermont"
- Vermont Automated Vehicle Testing Permit Guidance and Application, Table of Contents, Working Draft (January 8, 2020)
- New England Connected and Automated Vehicle Coordination Working Group. Vission, Mission, Goals and Actions (May 2019).

## Automated Vehicles Overview

Automated vehicles are equipped with an automated driving system (ADS) that enables them to operate with little to no human assistance, with the use of cameras, radar, lidar (image sensing), GPS, and computer vision to sense their surroundings. ADS can carry out the real-time dynamic driving tasks required to operate a vehicle in on-road traffic. There are five levels of automation, and a permit from the Vermont Traffic Committee is required to test vehicles on state and town highways with level 3, 4, or 5 automation (the most highly automated).

**1** Driver Assistance
**2** Partial Automation
**3** Conditional Automation
**4** High Automation
**5** Full Automation



## The Systems Behind Autonomous Vehicles

**CAMERAS**
Provide a 360-degree view to detect traffic lights and road signs

**LIDAR**
Laser scanner used to map surroundings in high definition

**ARTICULATING RADARS**
Scan a wide field to monitor position of vehicles, pedestrians, objects

**SHORT-RANGE RADAR**
Detects objects, pedestrians, vehicles near the car

**LONG-RANGE-RADAR**
Measures speed of traffic down the road

**VEHICLE LOCATION**
Information gathered from sensors plus GPS data determine the vehicle's precise location

**HIGH-SPEED PROCESSORS**
Crunch data from sensors to direct the cars movements.

### Questions? Reach out!

Joe Segale, PE/PTP
Policy, Planning and Research Bureau Director
Vermont Agency of Transportation
802-477-2365
joe.segale@vermont.gov

YOUR GUIDE TO

# Automated Vehicle Testing in Vermont

VERMONT
AGENCY OF TRANSPORTATION

## Overview of the VT Automated Vehicle Testing Act

The Automated Vehicle Testing Act ("the Act") became law in June 2019 (24 VSA Chapter 41) and creates a permitting process to allow the testing of automated vehicles, often referred to as self-driving cars, on state and town highways in Vermont. A testing permit is required from the Traffic Committee, whose members are the Secretary of Transportation, Commissioner of Motor Vehicles, and Commissioner of Public Safety. The Traffic Committee is authorized to issue testing permits for the state highway system, class 1 town highways which are the continuation of US and state numbered routes through municipalities, and class 2, 3, and 4 town highways in municipalities that have pre-approved testing on their roads.

## Why Allow Testing on Vermont's State and Town Highways?

Opinions vary about the time it will take for automated vehicles to be deployed and in use by the general public. One forecast suggests that vehicles with some level of automation will increase to 40-60% of all vehicles on the road by 2050[1]. A more assertive forecast suggests that 95% of passenger miles travelled will be in automated vehicles by 2030[2]. Vermont needs to prepare for automated vehicles, which have the potential to improve safety, increase mobility for people who cannot currently drive, and reduce travel costs for Vermont households, businesses, and visitors. Like computers and smart phones, automated vehicles will become increasingly important to our economic vitality. Testing in Vermont will help build public confidence that automated driving systems are feasible in our rural, cold, hilly state, and along our famous "dirt" roads. Testing will also provide an opportunity for law enforcement, emergency responders, road crews, engineers, transit operators, and other stakeholders to learn and gain experience with the technology.



## What would testing look like?

Testers may evaluate private passenger vehicles, ride-for-hire services similar to Uber or Lyft, shuttles, buses, delivery vehicles, or trucks. The testing could be limited to a specific geographic area such as a college campus, resort, downtown, or office park. Testing may be limited to specific roads, types of roads, and paved and/or gravel surfaces. Certain weather conditions, daylight hours, or other conditions may also be defined. Testing is underway or complete in approximately 30 cities across the United States and 100 cities worldwide[3].


Little Roady autonomous shuttle project operated by RI DOT

Snow and pedestrian testing in Minnesota by MN DOT

## State Role in Automated Vehicles Testing Permit

- The Agency of Transportation (AOT) will administer the permitting process and is required to publish an automated vehicle testing permit application and guideline by January 2021.
- The Traffic Committee is required to conduct a hearing per Vermont's Open Meeting Law before deciding on an Automated Vehicle Testing Permit application. Municipalities where testing is proposed must be notified 60 days prior to the hearing.
- AOT is required to maintain and publish in the guideline a list of municipalities that have pre-approved testing on class 2, 3, and 4 town highways.

## Municipal Role in Automated Vehicles Testing Permit

- Local legislative bodies determine if they want to allow testing of automated vehicles on their class 2, 3, and 4 town highways. The decision to pre-approve testing must be made at a duly warned meeting of the Selectboard, City Council, or Village Trustees.
- Municipalities can identify specific class 2, 3, or 4 town highways to include or exclude in testing.
- Municipalities can revoke or modify the conditions of their approval at any time by submitting a letter to the Vermont Secretary of Transportation.

## Other Sources of Information

Automated Driving Systems: A Vision for Safety 2.0, September 12, 2017, National Highway Traffic Safety Administration

Preparing for the Future of Transportation: Automated Vehicles 3.0 (AV 3.0), October 2018, US Department of Transportation

National League of Cities Autonomous Vehicle Pilots Across America, 2018. https://www.nlc.org/sites/default/files/2018-10/AV%20MAG%20Web.pdf

National Association of Counties. Connected and Automated Vehicle Tool Kit. https://www.naco.org/resources/featured/connected-autonomous-vehicles-toolkit#link-1

[1] *"Preparing for Automated Vehicles: Traffic Safety Issues for States". Governor's Highway Safety Association*

[2] *"Rethinking Transportation 2020-2030 The Disruption of Transportation and the Collapse of the Internal-Combustion Vehicle and Oil Industry", RethinkX, May 2017*

[3] *Bloomberg Philanthropes Initiative on Cities and Autonomous Vehicles https://avsincities.bloomberg.org/*

# Vermont Automated Vehicle Testing Permit

## GUIDANCE AND APPLICATION

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

219 North Main Street
Barre, VT 05641
802-828-2784
**www.vtrans.vermont.gov**

January 8, 2020
Working Draft

# TABLE OF CONTENTS

# Northeast Connected and Automated Vehicle Coordination Group (NECAV)

## Vision, Mission, Goals and Actions

**VISION**

Seamless operation of connected and automated vehicles (CAV) across New England States and surrounding regions of the United States and Canada.

**MISSION**

To share resources and information and work collaboratively with neighboring transportation agencies and other stakeholders to facilitate the deployment of CAVs in New England and its surrounding region for freight and passenger movement.

**GOALS AND ACTIONS**

**Legal and Regulatory:** Identify opportunities to align relevant policies, regulations and laws where appropriate.

1. Prepare a legal and regulatory assessment report for the region that can be used as a resource for individual states to:
    - Engage local and elected officials using consistent terminology and framing
    - Propose and coordinate policy and legislation

**Technical Projects:** Support the development of the technology and infrastructure to facilitate cross-border operation of CAVs.

1. Conduct CAV infrastructure readiness assessment for the NHS in New England
2. Develop a regional ITS architecture
3. Develop regional concept of operations for highway connected vehicle deployments
4. Develop regional concept of operations for arterial connected vehicle deployments
5. Develop regional winter weather standard operating procedures
6. Data management and sharing
    a. Identify CAV data that could be useful/beneficial to state DOTs
    b. Identify data collection, storage and sharing capabilities
7. Implement cross-border CAV pilot(s)
8. Complete a communication study
9. Develop a regional qualified products list (QPL)

**Education and Training:** Coordinate the development of consistent CAV education and training opportunities across the New England Region.

1. Develop educational materials tailored to specific audiences (Governors/Legislators/DOT CEOs, Agency Staff, emergency responders, Public, etc.)