PRESENTATION

- Automated Vehicles Overview
- Potential Benefits and Consequences
- Federal and State Roles
  - VT AV Testing Act
    - State and Municipal Roles
CAMERAS
Stereo and infrared camera data helps avoid obstacles, identify road sign messages, and visualize lane markings.

SOFTWARE
On-board computers run advanced software to analyze data collected by sensors to make intelligent maneuvers and real-time route determination.

RADAR
Radar tracks nearby objects, which helps maintain the car’s distance from vehicles ahead and detect blind spot obstacles.

LIDAR
Light detection and ranging system generates a point cloud that gives the car a 360-degree view.

DEDICATED SHORT RANGE COMMUNICATION
Provides communication between vehicles (Vehicle to Vehicle - V2V) and between vehicles and the transportation infrastructure (Vehicle to Infrastructure – V2I). DSRC is expected to be utilized where existing Intelligent Transportation Systems (ITS) are already in place, such as urban areas, high volume limited access facilities, and managed lanes.
AUTOMATED VEHICLE TESTING ACT

Human driver control

Levels of Automation

System control

0  No Automation
1  Driver Assistance (e.g., cruise control)
2  Partial Automation (e.g., adaptive cruise control, lane keeping assist)
3  Conditional Automation
4  High Automation
5  Full Automation

Emerging Technology

SOURCE: Liberty Mutual “Automated Vehicles: Changing Role of the Driver”

AV TEST PERMIT REQUIRED FOR VEHICLES WITH LEVEL 3-5 AUTOMATED DRIVING SYSTEMS
AUTOMATED VEHICLES ON THE ROAD
(CONSERVATIVE FORECAST)

Autonomous Vehicle Fleet Projections
(as a percentage of all vehicles on the road)

- **2020's**: Large Price Premiums (01%-02%)
- **2030's**: Moderate Price Premiums (10%-20%)
- **2040's**: Minimal Price Premiums (20%-40%)
- **2050's**: Standard on Most New Vehicles (40%-60%)

Source: GHSA

[Diagram showing projected percentages of autonomous vehicles on the road by decade, with lower and higher estimates.]
IMPACTS DEPEND ON OWNERSHIP MODEL

Individual Ownership

Shared Ownership & Mobility as a Service
# Federal and State Roles

<table>
<thead>
<tr>
<th>Federal (NHTSA) Role</th>
<th>State Role</th>
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<tbody>
<tr>
<td>Set Federal Motor Vehicle Safety Standards (FMVSS)</td>
<td>Operator licensing</td>
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<tr>
<td>Ensuring compliance with FMVSS</td>
<td>Operator education &amp; training</td>
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<tr>
<td>Investigating &amp; managing recalls</td>
<td>Vehicle registration</td>
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<tr>
<td>Communicating &amp; educating the public on motor vehicle safety issues</td>
<td>Regulate motor vehicle insurance and liability</td>
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<tr>
<td>Issuing guidance for vehicle and equipment manufacturers to follow</td>
<td>Vehicle safety inspection</td>
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<td></td>
<td>Establish &amp; enforce traffic laws*</td>
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<td></td>
<td>Build and operate infrastructure*</td>
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* Municipalities also establish and enforce traffic laws, build and operate infrastructure.
WHY ALLOW TESTING ON VT ROADS?

- Facilitate deployment in VT
- Build public confidence
- Provide clear process for testers
- Provide a publicly transparent process that facilitates safe testing
WHAT WOULD A TEST LOOK LIKE?
AV TESTING ACT APPROVAL PROCESS

<table>
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<tr>
<th>State Roles and Responsibilities</th>
<th>Municipal Roles and Responsibilities</th>
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<tr>
<td>• State can approve testing on all state highways and Class 1 Town Highways</td>
<td>• Municipal approval required if testing involves Class 2, 3 and 4 Town Highways</td>
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<tr>
<td>• VTrans must develop testing application guide by January 2021</td>
<td>• Municipalities will be asked to pre-approve testing</td>
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<tr>
<td>• In consultation with RPCs, VTrans must identify municipalities that have “pre-approved” testing</td>
<td>• Municipalities can withdraw approval at any time</td>
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<tr>
<td>• VTrans must maintain list of municipalities that have pre-approved testing in testing application guide</td>
<td>• Municipal approval of specific testing permits not required</td>
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<tr>
<td>• Any state or local law enforcement officer may stop a specific AV test vehicle due to permit condition violation or if there are safety concerns</td>
<td>• Municipalities can not approve testing on Town Highways without Traffic Committee approval</td>
</tr>
<tr>
<td>• Municipalities are not responsible for modifying roadways or other infrastructure to accommodate a test, or for any costs related to conducting the test.</td>
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ACT 60 AV TESTER REQUIREMENTS

- Human operator required in driver seat and must be able to take physical control of the vehicle
  - Operator must be at least 21 years old
  - Operator must pass a background check
  - Blood alcohol content less 0.02

- $5 Million Liability Insurance

- Vehicle must be able to comply with all state and local traffic laws

- AV Testing Vehicle must be clearly identifiable
TESTING APPLICATION GUIDANCE

Vermont Automated Vehicle Testing Permit

GUIDANCE AND APPLICATION

- Experience with Autonomated Vehicles
- Applicant’s Voluntary Safety Self-Assessment
- Testing Plan
- First Responders Interaction Plan
- Summary of Training and Operations Protocol
- Motor Vehicles in Testing Program
- Drivers in Testing Program
- Insurance Requirement
- Additional Questions
NEXT STEPS

- Recruit AV Testing Municipalities
  - Develop Municipal Approval Form Template
  - Meet with RPC TACs/Commissions to Spread Word
  - Follow-up with Interested Municipalities

- Complete AV Testing Guidance and Permit Application

- In partnership with interested stakeholders, explore AOT Lead AV Pilot

Questions?