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# The Autonomous Vehicle Legislative Survey

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## Acronyms

<i>Abbreviation</i>	<i>Explanation</i>
<i>3.0</i>	Preparing for the Future of Transportation: Automated Vehicles
<i>A&amp;M</i>	Texas A&M University
<i>ACAT</i>	Advisory Committee on Automation Transportation
<i>ACM</i>	American Center for Mobility at Willow Run
<i>ADOT</i>	Arizona Department of Transportation
<i>ADS</i>	Automated Driving System
<i>ADV</i>	Autonomous Delivery Vehicle
<i>ANPRM</i>	Advanced Notice of Proposed Rulemaking
<i>AV</i>	Autonomous Vehicle; Automated Vehicle <sup>1</sup>
<i>AV Policy Task Force</i>	Autonomous Vehicle Policy Task Force
<i>AVGR</i>	Grand Rapids Autonomous Vehicle Initiative
<i>AVL</i>	Autonomous Vehicle Laboratory
<i>CALTRANS</i>	California Department of Transportation
<i>CANVAS</i>	Connected and Autonomous Networked Vehicles for Active Safety
<i>CAT</i>	Connected and Autonomous Technology
<i>CAV</i>	Connected and Automated Vehicle
<i>CAV Plan</i>	Strategic Plan for Connected and Automated Vehicles
<i>CAVS</i>	Center for Advanced Vehicular Systems
<i>CAV Strategic Plan</i>	Joint Statewide Connected and Automated Vehicles Strategic Plan

<sup>1</sup> **Disclaimer:** While the authors of the Survey are aware that the terms Autonomous Vehicle and Automated Vehicle have different connotations, the use of these terms have been unfortunately intermixed and used interchangeably by the public. Therefore, unless specifically designated, the Survey will not make a distinction regarding these terms.

<i>CCTA</i>	Contra Costa Transportation Authority
<i>CDOT</i>	Colorado Department of Transportation
<i>CHAPTA</i>	Collaborative Human-Automated Platooned Truck Alliance
<i>CITR</i>	Control and Intelligent Transportations Research Lab
<i>CV</i>	Connected Vehicle
<i>CMU</i>	Carnegie Mellon University
<i>CMV</i>	Commercial Motor Vehicle
<i>CU-ICAR</i>	Clemson University International Center for Automotive Research
<i>DD</i>	Designated Drivers
<i>DMV</i>	Department of Motor Vehicles
<i>DOL</i>	Department of Licensing
<i>DOMI</i>	Department of Mobility and Infrastructure
<i>DOT</i>	Department of Transportation
<i>FAV</i>	Fully Automated Vehicle
<i>FAVTPP</i>	Fully Autonomous Vehicle Testing Pilot Program
<i>FDOT</i>	Florida Department of Transportation
<i>FHWA</i>	Federal Highway Administration
<i>FMCSA</i>	Federal Motor Carrier Safety Administration
<i>FMCSR</i>	Federal Motor Carrier Safety Regulations
<i>FMVSS</i>	Federal Motor Vehicle Safety Standards
<i>FTC</i>	Following-too-closely
<i>GoMed</i>	Las Vegas Medical District Automated Circulator and Pedestrian Safety Project
<i>HAV</i>	Highly Automated/Autonomous Vehicle
<i>HB</i>	House Bill
<i>HDOT</i>	Hawaii Department of Transportation
<i>I-ACT</i>	Illinois Automated and Connected Track

<i>IAM</i>	Institute of Automated Mobility
<i>iCAVE2</i>	Connected and Autonomous Vehicle Evaluation and Experimentation
<i>i-CAV Team</i>	Interagency Connected and Automated Vehicle Team
<i>ICT</i>	Illinois Center for Transportation
<i>IDOT</i>	Illinois Department of Transportation
<i>ITS</i>	Intelligent Transportation Systems
<i>JTA</i>	Jacksonville Transportation Authority
<i>KDOT</i>	Kansas Department of Transportation
<i>KSTC</i>	Kansas Senate Transportation Committee
<i>LaDOTD</i>	Louisiana Department of Transportation and Development
<i>LTRC</i>	Louisiana Transportation Research Center
<i>MassDOT</i>	Massachusetts Department of Transportation
<i>MDOT</i>	Maryland Department of Transportation
<i>MnDOT</i>	Minnesota Department of Transportation
<i>MOA</i>	Memorandum of Agreement to Test Automated Driving Systems on Public Roadways in Massachusetts
<i>MoDOT</i>	Missouri Department of Transportation
<i>MSU</i>	Michigan State University
<i>MTC</i>	Metropolitan Transportation Commission
<i>NCDOT</i>	North Carolina Department of Transportation
<i>NCAR</i>	The University of Nevada, Reno's Center of Applied Research
<i>NDMV</i>	Nevada Department of Motor Vehicles
<i>NDOT</i>	Nevada Department of Transportation
<i>NHTSA</i>	National Highway Transportation Safety Administration
<i>NMDOT</i>	New Mexico Department of Transportation
<i>Northland</i>	Northland Community and Technical College

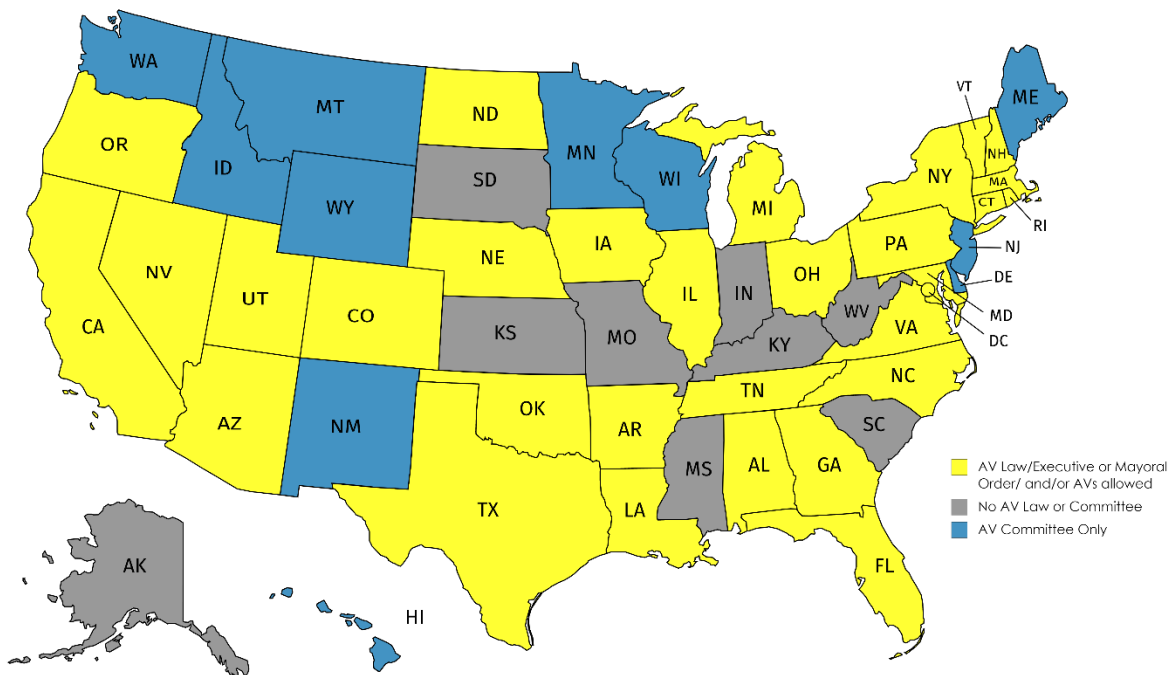
<i>NREL</i>	National Renewable Energy Lab
<i>PSU</i>	The Pennsylvania State University
<i>ODOT</i>	Ohio Department of Transportation
<i>OPM</i>	Office of Policy and Management
<i>PAVE</i>	Princeton Autonomous Vehicle Engineering
<i>PennDOT</i>	Pennsylvania Department of Transportation
<i>RIDOT</i>	Rhode Island Department of Transportation
<i>RPG</i>	Regional Proving Ground
<i>RTC</i>	Commission of Southern Nevada
<i>RTD</i>	Regional Transportation District
<i>SB</i>	Senate Bill
<i>SDV</i>	Self-driving Vehicle
<i>SCDOT</i>	South Carolina Department of Transportation
<i>SJR</i>	Senate Joint Resolution
<i>SMVI</i>	Smart Automated Vehicle Initiative
<i>SOAR</i>	Student Organized Autonomy Research Group
<i>THEA</i>	Tampa Hillsborough Expressway Authority
<i>TPEC</i>	Transportation Policy and Economic Competitiveness Program
<i>TRC</i>	Transportation Research Center, Inc.
<i>TRIP</i>	Rhode Island Transportation Innovation Partnership
<i>TSU</i>	Texas Southern University
<i>TTI</i>	Texas A&M Transportation Institute
<i>TxDOT</i>	Texas Department of Transportation
<i>UB</i>	University at Buffalo
<i>UDOT</i>	Utah Department of Transportation
<i>U-M</i>	University of Michigan



<i>UMTRI</i>	University of Michigan Transportation Research Institute
<i>UNH</i>	The University of New Hampshire
<i>U of I</i>	University of Illinois
<i>USDOT</i>	United States Department of Transportation
<i>UTC</i>	Safety through Disruption University Transportation Center
<i>UW-Madison</i>	University of Wisconsin-Madison
<i>V2I</i>	Vehicle to Infrastructure
<i>V2V</i>	Vehicle to Vehicle
<i>VAC</i>	Virginia Automated Corridor
<i>VDOT</i>	Virginia Department of Transportation
<i>VDRPT</i>	Virginia Department of Rail and Public Transportation
<i>Virginia Tech</i>	Virginia Polytechnic Institute and State University
<i>VTI</i>	Virginia Tech Transportation Institute
<i>WG</i>	Working Group
<i>WisDOT</i>	Wisconsin Department of Transportation
<i>WYDOT</i>	Wyoming Department of Transportation

## Introduction

This legislative survey is an evolving product of the law firm of Eckert Seamans Cherin & Mellott, LLC and is maintained on behalf of PLAC. This legislative survey provides an overview of laws, regulations, and research relating to Autonomous Vehicles (AV). This Survey will be updated on a quarterly basis by its authors.<sup>2</sup>



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All of the highlighted states and the District of Columbia have passed some version of AV laws, pronouncements, including via executive orders, creation of committees to investigate AVs or voluntarily allowed AVs without any further guidance.<sup>3</sup> A wide degree of variance exists among the state laws in terms of the

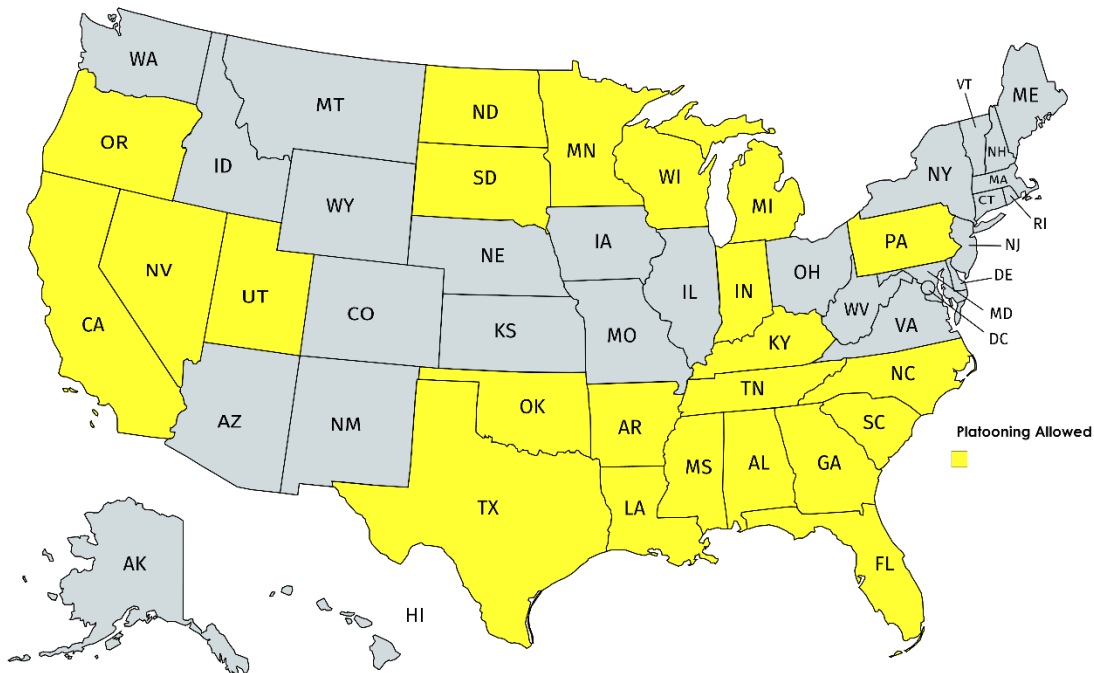
<sup>2</sup> **Disclaimer:** This Survey is made available by the lawyer or law firm publisher for educational purposes only as well as to give you general information and a general understanding of the law, not to provide specific legal advice. By using this Survey, you understand that there is no attorney-client relationship between the Survey publisher and you. The Survey should not be used as a substitute for competent legal advice from a licensed professional attorney in your state.

<sup>3</sup> See Appendix for a complete list of AV laws in the United States.

scope, clarity, and depth of topic coverage. However, one pattern is consistent - states are enacting new AV laws at an accelerating rate. In addition to states, cities are beginning to issue their own regulations and creating their own AV committees for investigation. The transportation industry is rapidly changing and states are eager to develop robust regulatory models to address these new transportation technologies within their borders.

## Vehicle Platooning

Vehicle platooning is an emerging technology in the AV space. Many trucking companies use platoons to automate portions of the driving process. Platooning technology allows a lead car or truck to wirelessly guide and control cars or trucks following behind it, similar to the way in which a locomotive pulls railcars. The map below shows states with legislation relating to vehicle platooning.

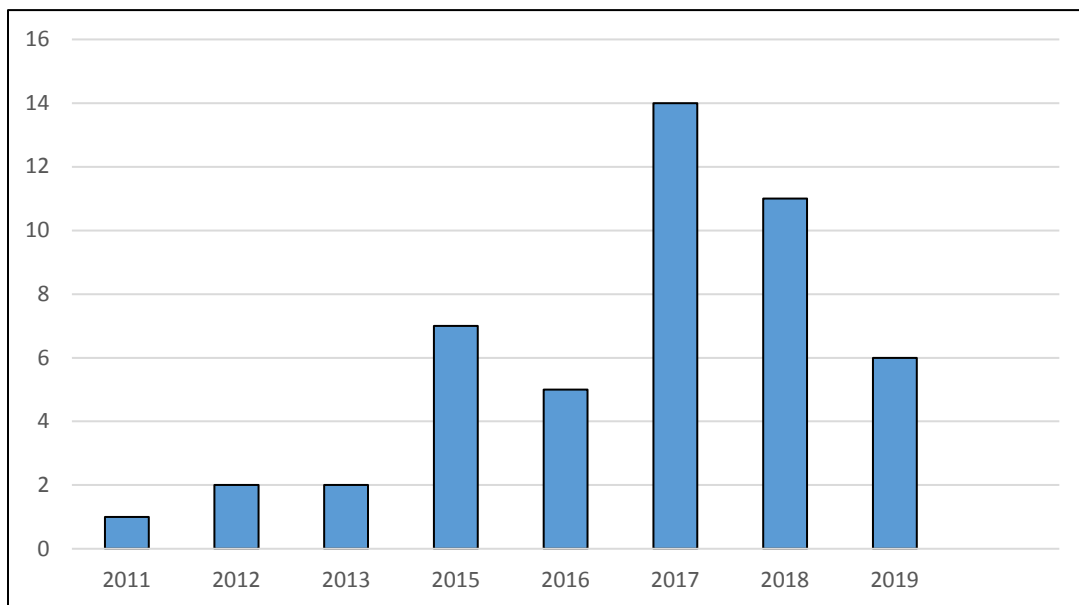


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Generally, state platooning laws provide an exemption from otherwise applicable following-too-closely (FTC) laws. Almost all states have laws that require a minimum distance between vehicles. Thus, states provide an exemption to such laws for platoons, allowing platoon operation in the state.

## By the Numbers

States take a wide array of approaches to AV regulation.<sup>4</sup> The graph below displays the states, by year, when they first began acting with respect to AVs and/or platooning investigation, testing, deployment and/or operation. These actions include, among other actions, creating committees, passing regulations or standards and signing of executive orders.



- 28 states have laws or standards relating to solely to AVs.
  - 13 of these states require a human driver/operator (some depending on the vehicle's level of autonomy) to be present in the AV when it is being operated
  - 24 of these states have laws including insurance requirements for AVs.
- 12 of these states have executive and/or mayoral orders relating to AVs.
- 24 states have laws allowing platooning.
- 29 states have a committee, task force, working group or the like dedicated to investigating AVs.

<sup>4</sup>

States include the District of Columbia for purposes of this analysis.

## Federal Legislative Actions

## United States

### Congress

The United States Government has yet to enact legislation relating to AVs leaving the decision to regulate AVs to respective state governments. Legislation proposed in both the House and Senate relating to AV regulation.

The House passed the SELF Drive Act, [H.R. No. 3388](#) in September 2017. It was received by the Senate and referred to the Committee on Commerce, Science, and Transportation where it stalled.

The Senate thereafter introduced a complimentary bill, the [AV START Act](#) in October 2017. However, in December of 2018, the Senate failed to pass the Act.

In July 2019, the House Energy and Commerce Committee and the Senate Commerce Committee announced they were working together to draft a bipartisan, bicameral self-driving car bill, which has yet to be introduced in either chamber of Congress to date.

On May 9, 2019, Congresswoman Suzan DelBene (D-WA), Senator Maria Cantwell (D-WA), and Congressman Ben Ray Lujan (D-NM) reintroduced the [Smart Cities and](#)

[Communities Act](#). First introduced in 2017, but subsequently stalled in committees, the 2019 bill aims to:

- improve federal coordination of smart city programs, including reporting and showing their value;
- help local governments interested in implementing smart city technologies;
- build the workforce's technology skills to support smart cities;
- improve smart city technology's quality, performance and safety; and
- foster international collaboration and trade of smart city technologies.

The bill would authorize \$200 million for smart city investments over five years.

### U.S. Chambers of Congress

On August 9, 2019, the U.S. Chambers of Congress' Technology Engagement Center released its [Automated Vehicle Policy Principles](#). The Principles are meant to prioritize safety while ensuring that the United States remains a global leader in AV innovation. Representing a whole-of-industry perspective, the principles provide policymakers with an innovation-focused national framework to

safely develop, test, and deploy AVs. Below is a summary of the Principles:

- ensure a safety-first approach to regulating AVs;
- encourage certainty through clearly delineating state, local, and federal regulatory responsibilities;
- promote technology and stakeholder neutrality in testing, deployment, and standards development;
- support a consensus-based and industry-led approach to advance safe AV testing; and
- modernize motor vehicle regulations and strengthen the existing exemption process.

### **United States Department of Transportation**

10 sites across the U.S. were designated by the United States Department of Transportation (USDOT) in January 2017 as pilot AV Proving Grounds to encourage testing and information sharing around automated vehicle technologies. The designations were intended to foster innovations that can safely transform personal and commercial mobility, expand capacity, and open new doors to disadvantaged people and communities. The 10 chosen sites were:

1. [City of Pittsburgh and the Thomas D. Larson Pennsylvania Transportation Institute](#)
2. [Texas AV Proving Grounds Partnership](#)
3. [U.S. Army Aberdeen Test Center](#)
4. [American Center for Mobility at Willow Run](#)
5. [Contra Costa Transportation Authority & GoMentum Station](#)
6. [San Diego Association of Governments](#)
7. [Iowa City Area Development Group](#)
8. [University of Wisconsin-Madison](#)
9. [Central Florida Automated Vehicle Partners](#)
10. [North Carolina Turnpike Authority](#)

In October of 2018 USDOT issued updated Federal AV guidance: [Preparing for the Future of Transportation: Automated Vehicles 3.0](#). (3.0) (Prior guidance was released in 2017. See [Automated Driving Systems: A Vision for Safety 2.0](#)).

3.0 is designed to prioritize safety, encourage a consistent regulatory environment, prepare proactively for automation, and promote the modernization of regulatory frameworks. As part of this framework, USDOT noted it “does not



intend to pick winners and losers or to favor particular AV proving grounds over others” and therefore USDOT would “no longer recognize[] the designations of [the] ten Automated Vehicle Proving Grounds as announced on January 19, 2017.”

USDOT also developed the [Connected Vehicle Pilot Deployment Program](#) which seeks to:

- encourage innovation among early adopters of connected vehicle (CV) application concepts using the best available and emerging intelligent transportation systems (ITS) and communications technologies;
- target improving safety and mobility and environmental impacts and commit to measuring those benefits; and
- resolve issues of various deployments.

USDOT awarded cooperative agreements collectively worth more than \$45 million to three pilot sites in [New York City](#); [Wyoming](#); and [Tampa](#) to implement a group of CV applications and technologies tailored to meet their region’s unique transportation needs.

In April 2019, USDOT released several publications related to CVs and intelligent transportation programs:

- [Connected Vehicle Pilot Phase 2 - Interoperability Test Report](#): Phase 2 of the Connected Vehicle Pilot Deployment Program calls for stakeholder outreach activity that includes an interoperability activity showing successful interaction between the local Connected Vehicle Pilot site and in-vehicle devices from one or more of the other Connected Vehicle Pilot sites. The Report outlines a summary of the test cases, results, and recommendations for future interoperability testing.
- [Connected Vehicle Pilot Deployment Program, Phase 2 Outreach Plan Update -- Tampa](#): The update presents the Outreach Plan for the Tampa Connected Vehicle Pilot site.
- [Connected Vehicle Pilot Deployment Program, Driving Towards Deployment: Lessons Learned from the Design/Build/Test Phase](#): The report covers experiences and lessons learned from the pilot deployment sites during Phase 2 of the Connected Vehicle Pilot Program.
- [V2I Hub Deployment Guide](#): - The guide provides a detailed approach for deploying the Vehicle to Infrastructure (V2I) Hub solution at a signalized intersection. It walks through each phase of the

deployment step-by-step to ensure successful implementation.

- [\*EU-US-Japan International Accomplishments Report\*](#): The European Commission, USDOT, and the Ministry of Land, Infrastructure, Transport, and Tourism of Japan have a long history of collaboration on intelligent transportation systems research and development initiatives. The report provides an overview of the formal collaboration structure and highlights key accomplishments, milestones, and meetings of each working group for 2017 -- the Deployment Working Group; the Architecture and Standards Harmonization Working Group; the Human Factors Working Group; and the Automation in Road Transport Working Group.

In September 2019, USDOT announced [\\$60 million in Federal grant funding to 7 recipients for the Automated Driving Systems \(ADS\) Demonstration Grant](#). Recipients include: [Texas A&M Engineering Experiment Station](#); [University of Iowa](#); [Virginia Tech Transportation Institute](#) (two grants); [Ohio Department of Transportation](#); [Pennsylvania Department of Transportation](#); [City of Detroit](#); and [Contra Costa Transportation Authority \(CCTA\)](#).

### **National Highway Traffic Safety Administration**

In May 2019, the National Highway Traffic Safety Administration (NHTSA) filed an advanced notice of proposed rulemaking (ANPRM) seeking comments on the proposed testing and verification rules for automated driving system-dedicated vehicles with Federal Motor Vehicle Safety Standards (FMVSS). (See [84 FR 24433](#)) The document only addresses the 100-series FMVSS, with a stated intention by NHTSA to release further documentation to address the 200-series FMVSS. The comment period closed on July 29, 2019.

### **Federal Motor Carrier Safety Administration**

In March 2018, the Federal Motor Carrier Safety Administration (FMCSA) asked for comments concerning Federal Motor Carrier Safety Regulations (FMCSR) which may be a barrier to the safe testing and deployment of ADS equipped commercial motor vehicles (CMV) on public roads. (See [FMCSA-2018-0037](#)). It further requested comments on certain FMCSR likely to be affected as ADS-equipped CMV appear on our roadways, including regulations concerning hours of service and driver fatigue, the use of electronic devices, roadside inspection, and Commercial Driver's License requirements. The

comment period ended on May 10, 2018.

Subsequently, FMCSA filed an [ANPRM](#) in May 2019, considering amendments to its rules to account for significant differences between human operators and ADS. FMCSA's preliminary approach is to avoid development of an entirely separate set of rules for ADS equipped CMV and their operation. The comment period for the ANPRM remained open until August 26, 2019.

### **Federal Highway Administration**

The Federal Highway Administration (FHWA) presented awards for a [Phase 1 Truck Platooning Early Deployment Assessment](#) in March 2019. The project is being conducted to understand how truck platoons will operate in a realistic, operational environment. It is hoped that the project will provide insight into actual truck platooning operations that can be used to inform state and local stakeholders that are making decisions related to truck platooning regulations.

The nine-month Phase 1 project awards will perform detailed planning and team building and develop Phase 2 proposals. The Phase 2 project awards will execute the plans, collect data. The Phase 1 awards are summarized below.

- **Team Lead:** Battelle  
**Key Team Members:** Center for Automotive Research, Pennsylvania State University, SAE International, Saia LTL Freight, Volvo Group, University of Michigan Transportation Research Institute  
**Proposed Location:** Indiana; Ohio; Pennsylvania  
**Contract Amount:** \$499,878
- **Team Lead:** California PATH  
**Key Team Members:** California Department of Transportation (Caltrans), California Highway Patrol, Cambridge Systematics, I-10 Corridor Coalition, Volvo Group, Westat  
**Proposed Location:** California; Arizona  
**Contract Amount:** \$499,290
- **Team Lead:** CDM Smith  
**Key Team Members:** Anheuser-Busch, BGM Consulting, Columbus Region Logistics Council, Ohio Department of Transportation, Drive Ohio, Ohio State University, Ohio Turnpike Commission, Robert Bosch, Sutra Research and Analytics  
**Proposed Location:** Indiana; Ohio  
**Contract Amount:** \$497,379

### **Advisory Committee on Automation Transportation**

The creation of the [Advisory Committee on Automation Transportation](#)

(ACAT) was announced in early January 2017 to serve as a critical resource for USDOT in framing federal policy for the development and deployment of automated transportation. ACAT members consisted of executives, professors, and politicians from across (and even outside) the transportation world.

ACAT's sole meeting was held on January 16th, 2017. According to the [Federal Advisory Committee Act's website](#), ACAT is "not active. Based on USDOT's development and publication of AV 3.0 policies and principles, active stakeholder engagement is already underway. Therefore, the USDOT does have the ability to obtain broad stakeholder feedback on AV matters outside of the committee."

### **Non-Traditional and Emerging Transportation Technology Council**

In April 2019, USDOT announced the creation of a new council to help further the advancement of AVs, among other technologies. The [Non-Traditional and Emerging Transportation Technology Council](#) (NETT) will identify and resolve jurisdictional and regulatory gaps that may impede the deployment of new technology, such as tunneling, hyperloop, AVs and other innovations.

The NETT is seen as a step forward for USDOT in reducing regulatory burdens and paving the way for emerging technologies in the transportation industry.

## Territories of the United States

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None of the Territories of the United States (American Samoa, Guam, Northern Mariana Islands, Puerto Rico and United States Virgin Islands) have taken action toward adopting AV related legislation.

### **Puerto Rico**

Puerto Rico announced its plans to collaborate with the [Smart Cities Council](#) to rebuild its infrastructure, following Hurricane Maria, with innovative technologies. Further, Puerto Rico was a 2018 winner of the Smart Cities Council [Humanitarian Grant](#).

### **Guam**

In May 2019, Sony Corporation and NTT DOCOMO, INC. announced the beginning of a joint trial of Sony's conceptual driverless vehicle, the New Concept Cart SC-1, which leverages 5G mobile technologies for various remotely controlled functions. The test will be conducted using the trial network in DOCOMO 5G Open Lab™ GUAM, which will provide test facilities and an outdoor verification environment.

## State Legislative Actions



## Alabama

In 2016, [Senate Joint Resolution \(SJR\) 81](#), established a Joint Legislative Committee to Study Self-Driving Vehicles. (Committee) The Committee was required to report their findings to the Legislature in 2017 and then dissolve. In 2017, a similar resolution ([SJR 55](#)) was enacted regarding the Committee, with the Committee's report being due in 2018. However, no public copy exists of any report submitted by the Committee in either year.

In 2018, [Senate Bill \(SB\) 125](#) was enacted to allow truck platooning for research purposes, in Alabama. A truck platoon is defined as:

*a group of individual commercial trucks traveling in a unified manner at electronically coordinated speeds at following distances that are closer than would be reasonable and prudent without the electronic equipment.*

In 2019, [SJR 21](#) re-established the [Committee](#) "to study all aspects of self-driving vehicles, including specifically, the issues of public safety and state and local economic impact regarding such vehicles." There is no deadline for a report listed for the

current Committee, but it is to automatically dissolve at the end of the Legislative Session in 2022.

The re-established Committee held its first meeting on September 26, 2019. Its members reiterated that the goal of the committee is to look at all aspects of self-driving cars and their impact on the economy. The lawmakers brought up some unanswered questions that need to be investigated, including who would be liable in a crash, whether someone should drink alcohol in the car and whether drivers' licenses are important.

In May 2019, the Alabama Legislature passed [SB 47](#) which authorizes certain autonomous commercial vehicles to be operated by an ADS, defined as:

*the hardware and software that are collectively capable of performing the entire dynamic driving task on a sustained basis, regardless of whether it is limited to a specific operational design domain.*

In order to qualify for usage on Alabama roads, the autonomous commercial vehicle must meet the following criteria:

1. capable of operating in compliance with applicable federal law and the

traffic and motor vehicle laws in Alabama, including applicable laws concerning the capability to safely navigate and negotiate railroad crossings;

2. be registered and titled in accordance with the laws of Alabama;
3. certified in accordance with FMVSS and bears the required certification label or labels, including reference to any exemption granted under applicable federal law;
4. can achieve a minimal risk condition if a failure occurs rendering the vehicle unable to perform the dynamic driving task relevant to its intended operational design domain or if the vehicle exits its operational design domain; and
5. covered by motor vehicle liability coverage in an amount not less than two million dollars (\$2,000,000).

The Legislature specifically noted that the allowance of the autonomous commercial vehicles under this bill shall not be interpreted to abrogate or amend any statutory or regulatory provisions or any aspects of common law pertaining to liability for any harm or injury caused.

It should be noted, a similar House Bill ([HB 160](#)) regarding operation of AVs by the same method (i.e. not just exclusive to autonomous commercial vehicles as in SB 47), was introduced just prior to SB 47, but was not enacted by the Legislature.

### Academic Institutions

Alabama is home to two major research institutions that receive State financial aid to study AV technology. Auburn University maintains a GPS and Vehicle Dynamics Laboratory, which partners with the American Center for Mobility. Additionally, the University of Alabama houses the Center for Advanced Vehicle Technologies, which takes an interdisciplinary approach to developing innovative solutions for the automotive industry.

## Alaska

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Alaska has yet to enact AV legislation. However, in 2016, a State Legislature Joint Meeting was held between the House Transportation Standing Committee and the Senate Transportation Standing Committee. The [Meeting](#) involved discussions relating to the integration of driverless cars in Alaska. Additionally, the Meeting's participants discussed the issue of liability for AVs at a general level, as well as the difficulties



associated with deploying AVs in cold weather environments.

## Arizona

In 2015, Arizona Governor Doug Ducey, signed [Executive Order No. 2015-09](#), directing various agencies to:

*undertake any necessary steps to support the testing and operation of self-driving vehicles on public roads within Arizona.*

In response to the Executive Order, the Arizona Department of Transportation (ADOT) formed the [Arizona Self-Driving Oversight Committee](#) which is designed to support Arizona in research and development of self-driving technology.

In March 2018, Governor Ducey signed [Executive Order No. 2018-04](#), which served as a general update to the 2015 Executive Order. Notably, Executive Order 2018-04 requires any entity wishing to test an AV with or without a driver to first submit a written statement to ADOT. An AV without a driver must certify:

- compliance with all federal laws and FMVSS;

- achievement of a reasonably safe state, such as bringing the vehicle to a complete stop, upon experiencing a failure of the vehicle's ADS;
- compliance with all Arizona traffic and safety laws; and
- compliance with all applicable certificate, title registration, and licensing and insurance requirements.

In October of 2018, Governor Ducey also signed [Executive Order No. 2018-09](#), creating the [Institute of Automated Mobility](#) (IAM). The IAM seeks to unite global companies and Arizona Universities with partners from the public and private sectors by providing AV testing facilities and resources.

ADOT issued the [Law Enforcement Protocol for Fully Autonomous Vehicles](#). The directive is intended to provide procedural guidance and information as officers have more contact with AVs. Officers are instructed to follow the procedures outlined in the policy when investigating a collision, traffic or criminal violation, or incident involving a fully AV with no operator present.

The House introduced [HB 2684](#) in 2019, in relation to the duties of the Director of ADOT with respect to

AVs. The bill is currently being held in committee.

### Phoenix

Waymo, in December 2018, launched the nation's first commercial self-driving taxi service in Phoenix. Waymo's taxi services have since expanded to the city of Mesa. Waymo also begun to test self-driving tractor-trailers in Phoenix in May 2019.

### Academic Institutions

In June 2019, Pima Community College and self-driving truck company TuSimple announced the launch of the first autonomous driving certificate program for truck drivers, the [Autonomous Vehicle Driver & Operations Specialist Certificate](#).

## Arkansas

In 2017 Arkansas enacted [Act 797](#), which allows for the use of driver-assistive vehicle platooning. The law defines a driver-assistance truck platooning system as:

*technology that integrates sensor array, wireless communication, vehicle controls, and specialized software to synchronize acceleration and braking between two or more*

*vehicles while leaving each vehicle's steering control and systems monitoring and intervention in the control of its human operator.*

To operate a truck platooning system the operator must first file a plan for general platoon operations with the State Highway Commission.

In 2019, Arkansas Legislature enacted [Act 468](#) authorizing the operation of AVs under an AV pilot program. After submission and approval of safety plans to the State Highway Commission, an organization may test fully operational AVs on state roads. The safety plans must include the following information, which will be found in the newly proposed Arkansas Code 27-51-1410:

- a statement of the commercial purpose of the AV pilot program;
- identification of any additional requirements for proof of insurance under the Motor Vehicle Safety Responsibility Act; and
- statement acknowledging that:
  - the AV or fully AV is capable of complying with all applicable traffic and motor vehicle safety laws of the state and rules

adopted by the Office of Motor Vehicle;

- the fully AV is capable of achieving a reasonably safe state if a failure of the ADS occurs that renders the ADS unable to perform the entire dynamic driving task; and
- a fully AV involved in a motor vehicle accident is capable of meeting the requirements of §§ 27-53-101, 27-53-102, 29 and 27-53-105.

A fully AV that is not equipped with seat belts; steering wheel; or rearview mirror is allowed to operate on Arkansas roadways if it complies with the above. However, the legislature placed a limit of three (3) AVs or fully AVs simultaneously on the streets and highways of the state by any one person or entity.

Also enacted in 2019, [Act 1052](#) governs the operation of AVs at railroad crossings. All AVs must be capable of following all laws and rules concerning the capability to safely negotiate railroad crossings.

Following the passage of Act 468, Walmart announced that, working with Gatik, a self-driving car startup, it would begin an AV pilot project in Arkansas. The pilot project will be conducted on a two-mile route in

Bentonville, between two of Walmart's stores using an AV.

## California

California passed [SB No. 1298](#) in 2012 authorizing AV testing on public roads if a certificate is filed which provides that the AV complies with the following:

1. the autonomous technology satisfies all of the following requirements:
  - a. a mechanism to engage and disengage the autonomous technology that is easily accessible to the operator;
  - b. a visual indicator inside the cabin to indicate when the autonomous technology is engaged;
  - c. a system to safely alert the operator if an autonomous technology failure is detected while the autonomous technology is engaged, and the system shall:
    - i. Require the operator to take control; or
    - ii. If the operator does not take control, the AV shall

be capable of coming to a complete stop.

- d. allow the operator to take control in multiple manners, and tells the operator that the autonomous technology has been disengaged;
- e. meets FMVSS for the vehicle's model year and all other applicable safety standards;
- f. the autonomous technology does not make inoperative any FMVSS and performance requirements set forth in state and federal law and the regulations promulgated pursuant to those laws; and
- g. has a separate mechanism, to capture and store the autonomous technology sensor data for at least 30 seconds before a collision occurs while the vehicle is operating in autonomous mode.

California passed [SB 719](#) (in 2015) and an almost identical [Assembly Bill No. 669](#) (in 2017) to allow vehicle platoon testing in the State. The law provides that Caltrans, in coordination with the Department of the California Highway Patrol:

*... may conduct testing on technologies that enable drivers to safely operate motor vehicles with less than 100 feet between each vehicle or combination of those vehicles.*

Caltrans is instructed to [report](#) its findings from the testing conducted to the Legislature on or before July 1, 2017 and submit an updated report to the Legislature on or before July 1, 2019 (via an amendment in Assembly Bill 669). The Assembly Bill amendment to the Government Code to allow for this testing will remain in effect until January 1, 2020, at which time it will be automatically repealed.

The Governor released the [Automated Vehicle Principles for Healthy and Sustainable Communities](#) in 2018 in an effort to summarize key principles for maximizing alignment between California's AV policy and goals for climate, air quality, health, environment, land use, quality of life and equity.

The California Department of Motor Vehicles (DMV) passed [Driverless Testing Regulations](#) as required by SB 1298. The regulations provide, among other things, specific requirements in order to gain a permit for testing an AV [with](#) and [without](#) a human driver. Currently, 62 companies have valid [permits to test](#)

[AVs](#) with a safety driver on California public roadways. One company has a [permit for driverless testing](#).

California also passed [Assembly Bill No. 87](#) in 2018, to direct peace officers in their interaction with AVs regarding traffic or parking violations.

Currently pending in the Senate are the following AV related bills proposed in the 2019:

- [SB 59](#): creation of an AV advisory committee known as the California Council on the Future of Transportation; and
- [SB 336](#): requires fully-automated transit vehicles be staffed by at least one employee who has had specified training, while the vehicle is in service.

On April 12, 2019, the California DMV published [proposed AV regulations](#) that allow the testing and deployment of autonomous motor trucks (delivery vehicles) weighing less than 10,001 pounds on California's public roads. The California DMV held a public hearing on May 30, 2019, at its headquarters in Sacramento to gather input and discuss the regulations. The proposed regulations continue to exclude the autonomous testing or deployment of vehicles weighing more than 10,001

pounds. The California DMV is following the same approach the department used while developing past AV regulations and is targeting to complete this new rulemaking by the end of 2019.

In August 2019, the California Public Utilities Commission (CPUC) granted approval to Waymo's application to not just test self-driving vehicles on public roads, but to also be able to transport passengers in them. A list of all current permits granted by the CPUC can be found [here](#).

### **Rancho Cordova**

Local Motors is debuting its new [Olli](#) self-driving shuttle at a business park in Rancho Cordova. The 12-passenger shuttle is available to the general public and the White Rock Corporate Campus' 1,600 workers during a three-month pilot program that ends on November 7, 2019. The pilot is being funded by the Sacramento Area Council of Governments through a \$90,000 grant, with an additional \$10,000 in funding assistance from the City of Rancho Cordova.

### **Los Angeles**

Los Angeles was named one of 10 cities worldwide to the [Bloomberg Aspen Initiative on Cities and Autonomous Vehicles](#), a group of



global cities that have [produced a set of principles](#) and tools to plan for driverless technologies. The Initiative not only directly advanced work in its chosen cities, but it also supported cities worldwide, which are increasing the number of proving grounds as the pace for AV innovation picks up.

Los Angeles' Department of Transportation released its [2018 Strategic Implantation Plan](#) (a plan to realize the visions outlined in the Urban Mobility for a Digital Age and Blueprint for Autonomous Urbanism documents) and the Mayor subsequently released a [Sustainability Report 2019](#) for the City. Both reports take AVs into consideration in the City's future.

### **Beverly Hills**

Beverly Hills' Mayor has gone on record stating the city is hoping to work out a pilot program with a manufacturer of AVs. The City has also created an [AV Committee](#) to further this goal.

### **Contra Costa County**

Contra Costa Transportation Authority (CCTA), a public agency formed by Contra Costa voters to manage the county's transportation sales tax program and oversee countywide transportation planning efforts, worked to transform a former

Navy base near the Bay Area city of Concord into the nation's largest [USDOT AV proving ground](#) across 2,100 acres. The facility, [GoMentum Station](#), is run by the AAA of Northern California, Nevada and Utah.

CCTA was also awarded a \$7.5 million grant from the [USDOT ADS Demonstration Grant](#). CCTA will use the [grant](#) to demonstrate Level 3 and Level 4 vehicles using shared on-demand, wheelchair accessible ADS equipped vehicles.

### **San Francisco**

The City of San Francisco's local governments have been busy preparing for AVs, including releasing the [Guiding Principles for Emerging Mobility Services and Technologies](#) and the [Autonomous Vehicle Perspective Paper](#).

In 2018, California's General Assembly passed [Assembly Bill No. 1184](#), authorizing the City, by voter approval, to tax trips that occur in AVs that originate in the City.

In March 2019, the San Francisco Metropolitan Transportation Commission (MTC) selected intelligent transportation systems technology company, Iteris, to prepare five cities in the San Francisco Bay Area for future connected and automated vehicle (CAV) technologies.

The three-year project supports the San Francisco MTC's [Innovative Deployments to Enhance Arterials](#) program, which seeks to enhance and upgrade the intelligent transportation systems and enable the continuous improvement of arterial operations.

In August 2019, Bosch and Daimler announced they have chosen a city located in the San Francisco Bay in Silicon Valley as the pilot location for a test fleet developing fully-automated and driverless capabilities. They will offer customers a shuttle service with AVs on selected routes.

### **San Diego**

In 2017, USDOT selected the San Diego region as one of ten [AV Proving Ground](#) sites in the nation. District 11 of the Caltrans, the San Diego Association of Governments, and the City of Chula Vista make up the [San Diego Regional Proving Ground \(RPG\)](#). The San Diego RPG has its own [permit process](#) which must be followed in order for companies to test at the proving ground.

### **Academic Institutions**

UC Davis developed the [3 Revolutions Future Mobility Program](#) (Shared, Automated and Electric), made up of a two-part strategy to build

strong capabilities in rigorous research and policy outreach and engagement.

UC San Diego is home to [the Autonomous Vehicle Laboratory \(AVL\)](#). AVL's research focuses on exploring and developing robust autonomous car systems and architectures. From this, AVL aims to develop self-driving cars for mail-delivery and micro-transit applications on campus while collaborating with its network of industry experts.

## **Colorado**

In 2017 Colorado enacted [SB No. 17-213](#), allowing AVs to operate in the State. The law provides:

*A person may use an automated driving system to drive a motor vehicle ... if the system is capable of complying with every state and federal law that applies to the function that the system is operating.*

The law designated the Colorado State Patrol and Colorado Department of Transportation (CDOT) to oversee a process for approving the operation of ADS which cannot meet all applicable state and federal law. The process requires submission of a request to the [Autonomous Mobility Task Force](#),

which is a joint body between the Colorado State Patrol, Colorado Department of Revenue, and CDOT.

CDOT has also created the [Connected and Autonomous Technology \(CAT\) Program](#). CAT's [mission](#) is to “improve the movement of goods and services throughout Colorado by leveraging the benefits of connected and autonomous mobility technologies while mitigating potential risks.”

Additionally, CDOT initiated the [RoadX](#) plan. RoadX is a collaborative enterprise focusing on building partnerships between CDOT and businesses delivering innovative transportation solutions.

On May 31, 2019, Colorado's Governor signed [SB 19-239](#) into law. The act requires CDOT to convene and engage in robust consultation with a stakeholder group comprised of representatives of specified industries, workers, governmental entities, planning organizations, and interest groups that will potentially be affected by the adoption of new and emerging transportation technologies and business models, including AVs. A report of policy recommendations is to be provided no later than November 1, 2019.

## Denver

The Regional Transportation District (RTD) of Denver and its partners began the [61AV](#) project on January 29, 2019, a pilot AV program, that was Colorado's first on-road AV shuttle operating between RTD's 61st and Peña Park-n-Ride to the offices of Panasonic and EasyMile. The program concluded August 2, 2019 and findings will be presented to the RTD Board of Directors in mid-September 2019, with the intent of exploring other opportunities to test self-driving shuttles as an option for moving RTD passengers.

## Golden

The AV shuttle EZ10 is being introduced into circulator service during peak demand hours at the federal [National Renewable Energy Lab](#) (NREL) campus in Golden, and will travel on a one-mile loop connecting multiple buildings and remote parking on the campus. The shuttle can carry up to 12 passengers and is designed to travel along a pre-programmed route and is equipped with a sensor and intelligent vehicle system to detect obstacles and avoid collisions. During the first year of operation, NREL will collect and analyze vehicle and charging system operational data from the shuttle to help researchers better understand associated energy usage, charging and



energy storage needs and autonomous system operation and control.

## Connecticut

Connecticut enacted [Public Act No. 17-69](#) in 2017 (subsequently amended in July 2019 by [Public Act 19-119](#)), which established a Task Force to study AVs and make recommendations related to AV regulation in the state. The Task Force is charged with preparing interim and final reports, which are due, by amendments in Public Act 19-119, no later than July 1, 2020 and January 1, 2021 respectively. The Task Force will dissolve when the final report is submitted, or by January 1, 2021, whichever is later.

Public Act 17-69 also provided for the [Fully Autonomous Vehicle Testing Pilot Program \(FAVTPP\)](#), which was officially launched on April 17, 2018, allowing up to four municipalities to test AVs. The Office of Policy and Management (OPM) was tasked with oversight of the Pilot Program in conjunction with State's DMV, DOT and other relevant agencies. The Act requires the following in order for a tester to conduct AV testing:

1. A tester must have an operator who:

a) is physically inside the AV;

b) monitors the operation of the AV;

c) capable of taking immediate manual control of the AV;

d) designated and trained by the AV tester; and

e) a holder of an operator's license;

2. The tester must also:

a) register each AV to be tested; and

b) submit to the commissioner, proof of liability insurance, self-insurance or a surety bond of at least five million dollars;

3. The operator and AV tester finally must:

a) comply with any provision of the general statutes or any ordinance of a municipality concerning the operation of motor vehicles;

b) comply with standards established by NHTSA for AVs; and

c) satisfy any other requirement as determined by the secretary of the OPM.

The OPM also released the [Required Minimum Framework for Agreements between Municipalities and Autonomous Vehicle Testers](#) which have been approved for participating in the FAVTPP. A copy of the application can be found [here](#). Windsor Locks, Stamford and New Haven have applied for the FAVTPP. Manchester and Bridgeport, have indicated they will also be vying for a spot in the program.

## Delaware

Delaware Governor John C. Carney signed [Executive Order No. 14](#), in September 2017. The Executive Order established an [Advisory Council on CAVs](#) to make recommendations, at a minimum, regarding:

- A. promoting economic development;
- B. technology, security and privacy;
- C. transportation network infrastructure; and
- D. impacts on public and highway safety.

Delaware's DOT (DelDOT) released its [Vision for Connected and Automated Vehicles](#) in 2017 as well.

## Academic Institutions

In 2017, the University of Delaware's Institute for Public Administration released the [Autonomous Vehicles in Delaware: Analyzing the Impact and Readiness for the First State](#) Report, which was funded by DelDOT. The Report discusses the issue of liability for AVs and various cybersecurity and data privacy concerns. The Report provides that citizens need clear and plain language to describe data collection, storage, and protection policies.

## District of Columbia

The District of Columbia (D.C.) enacted [L 19-0278 \(D.C. Act 19-643\)](#) (AV Act of 2012) in 2013, which permits AVs to operate on public roads under three conditions: 1) the AV has a manual override, 2) a driver is in the control seat, and 3) the AV is capable of operating in compliance with traffic laws. Further, the law expressly insulates manufacturers from liability if a conventional vehicle is converted to an AV and causes an accident. The only exception to this law is if the alleged defect was present in the vehicle when it was originally manufactured. The law defines an AV as:

*a vehicle capable of navigating District roadways and interpreting traffic-control devices without a driver actively operating any of the vehicle's control systems.*

In January 2017, D.C. became a member of the [Bloomberg Aspen Initiative on Cities and Autonomous Vehicles](#), a group of global cities that have [produced a set of principles](#) and tools to plan for driverless technologies.

Subsequently, in 2018, the Mayor signed [Mayor's Order 2018-018](#) (amending the AV Act via [D.C. Act 22-434](#)) creating the [Interagency Working Group on Autonomous Vehicles](#) (Working Group) to conduct a comprehensive study on AV technology, policy, and law. The Working Group has developed the [Autonomous Vehicles Principles Statement](#) specific to the needs and opportunities of D.C.

The Working Group also developed an [Agency Impact Matrix](#) that shows which D.C. agencies will be involved in the various components of the AV landscape in D.C. Further, in partnership with the Working Group, the Southwest Business Improvement District has released a [Request for Information](#) for an AV pilot program on 10<sup>th</sup> St SW.

[Bill 22-1010](#) was introduced in October 2018. It seeks to empower D.C.'s Mayor to approve motor vehicles involved in AV pilot projects that do not meet NHTSA Standards but have qualified for a waiver from NHTSA. Bill 22-1010 was referred to Committee and a Notice of intent to Act on the bill as published, however it has not been enacted to date.

## Florida

The first legislation regarding AVs in Florida was [HB No. 1207](#), enacted in 2012 allowing for the testing of AVs on Florida roadways.

In 2014, the Florida Department of Transportation (FDOT) created the [Florida Automated Vehicles](#) program to educate the public by engaging stakeholders, developing research and pilot programs, and creating awareness of AV technologies. FDOT has also created the [Florida Connected Vehicle Initiative](#). The Initiative uses leading edge technologies to quickly identify roadway hazards and alert drivers.

The Florida Department of Highway Safety and Motor Vehicles issued an [Autonomous Vehicle Report](#) in 2014, which discusses the impact of AV technology in Florida.

The Legislature subsequently enacted [HB No. 7027](#) and companion [HB No. 7061](#) in 2016, allowing for AVs to be driven on roadways for purposes other than just testing. It also directed FDOT to study the operation of driver-assistive truck platooning technology; authorized FDOT to conduct a pilot project to test such operation ([Driver Assisted Truck Platooning Pilot](#)); and required a report from FDOT to the Governor and Legislature regarding same.

The Florida Legislature passed numerous bills pertaining to AVs in 2019. In June, with passage of [HB No. 311](#), Florida became one of the few states to allow a fully AV to operate without a person present in the vehicle. The Bill provides that the automated driving system, rather than a person, is deemed the operator of an AV when operating with the ADS engaged. Starsky Robotics was the first company to test its fully unmanned autonomous truck in Florida on June 16, 2019.

HB No. 311 also authorized the Florida Turnpike Enterprise to fund, construct, and operate facilities for the advancement of autonomous and connected innovative transportation technologies.

Effective October 1, 2022, [HB No. 385](#) (which was signed by the Governor in April 2019) revises the

authorized uses of the Charter County and Regional Transportation [Surtax](#) in Miami-Dade County, to include, “the planning, design, engineering, or construction of, or the acquisition of rights-of-way for fixed guideway rapid transit systems, rail systems, and bus systems, and for the development of dedicated facilities for autonomous vehicles.”

[HB No. 107](#), relating to wireless communications while driving, was also enacted in 2019 and provides an exception for AVs from the statutory ban on texting while driving.

Two separate bills were introduced to the House to fund AV projects, but neither were enacted. ([HB No. 4043](#), proposed to create a smart corridor with an autonomous shuttle in Altamonte Springs, was vetoed by the governor; and [HB No. 3923](#), regarding an Autonomous Vehicle Research Program and Elite Transportation at Jacksonville University died in committee).

FDOT has selected [HDR](#) to help ensure Florida remains a leader in the integration of CAVs. As general engineering consultant, HDR will develop, implement, deploy and evaluate a statewide investment in CAV technology that’s touted as being among the most robust in the nation.

Several AV developers are taking advantage of Florida's favorable AV laws and conducting testing within the state.

- Voyage Auto, a California-based company, is testing its second-generation cars, two Chrysler Pacifica Hybrid minivans, in [The Village](#) of Virginia Trace, Florida. The company is receiving feedback from four residents chosen as test passengers.
- On September 4, 2019 Beep hosted a launch event to debut its public transit service in southeast Orlando's [Lake Nona](#) neighborhood. The shuttles, which can carry 10 passengers and an attendant, will travel at a maximum speed of 15 miles per hour between the Lake Nona Town Center at the Pixon apartments and Laureate Park Village Center on Tavistock Lakes Boulevard.
- Waymo announced it plans to begin testing in Florida in 2019. Waymo is especially interested in testing its vehicles in the rain during Florida's hurricane season.

The [Central Florida AV Partnership](#) (Partnership) includes regional agencies and entities that have demonstrated leadership and significant contributions towards mobility

challenges. The Partnership was named one of 10 [USDOT AV Proving Grounds](#) in 2017. The Partnership works closing with numerous entities, including [SunTrax](#), located between Orlando and Tampa, the only dedicated high-speed AV and tolling testing center in the southeastern United States.

In April 2019, Iteris was selected by the [Lee Board of County Commissioners](#) to assess new technology and enhance intelligent transportation systems in the County.

### **Jacksonville**

The Jacksonville Transportation Authority (JTA) established an [AV Test and Learn Track](#) in 2017. Since then, the JTA has worked with AV manufacturers like NAVYA to test, develop and prepare the technology for public use. JTA also has an agreement with Florida Polytechnic University's [Advanced Mobility Institute](#), a public state university startup, to enhance the development of AV technology in the area.

In effort to work with the community along with the expansion of AVs, JTA (which was previously issued a \$25 million BUILD Grant by USDOT to implement an AV program), Beep, Jacksonville First Transit, and NAVYA, hosted a day-long training session in July, 2019 at



the North Florida Transportation Planning Organization campus, focusing on the latest AV technology and how first responders should address emergency situations.

## Tampa

The [Tampa Hillsborough Expressway Authority \(THEA\)'s Connected Vehicle Pilot](#), which was part of the [USDOT Connected Vehicle Pilot Deployment Program](#), is deploying a multimodal project using connected vehicle technology, using both V2I and vehicle-to-vehicle (V2V) and communication. THEA has equipped 10 buses, 8 streetcars and the cars of 1000+ individual volunteers with this new technology. (See [Connected Vehicle Pilot Deployment Program Phase 2.](#))

## Academic Institutions

Florida Poly and Tallinn University of Technology signed a memorandum of agreement in Washington, D.C., to collaborate on ways to develop AV technology for public transportation in 2019.

## Georgia

[House Resolution 1265](#) created the House Study Committee on Autonomous Vehicle Technology in 2013. The five-member study

committee was tasked with undertaking a study of the issues surrounding AVs. The Committee issued a [Report](#) in 2014 and identified privacy, cybersecurity and radio frequency concerns as the most pressing issues related to AV deployment.

Georgia enacted [HB 472](#) in 2017 which made an allowance for platooning within the state, exempting such vehicles from the following requirements for vehicles following in a procession when speed of the non-leading, participating vehicles are coordinated automatically. The Bill defined “coordinated platoon” as “group of motor vehicles traveling in the same lane utilizing vehicle-to-vehicle communication technology to automatically coordinate the movement of such vehicles.”

The Governor signed [SB No. 219](#) in May 2018, which allows a person to operate an AV on public roads. A requirement to operate an AV in Georgia is that the vehicle is capable of achieving a “minimal risk” condition in the event of a failure. The Law defines minimal risk condition as:

*a low-risk operating mode in which a fully autonomous vehicle operating without a human driver achieves a reasonably safe state, such as bringing the vehicle to a*

*complete stop, upon experiencing a failure of the vehicle's automated driving system that renders the vehicle unable to perform the entire dynamic driving task.*

Georgia law does not require the operator of an AV to have a valid driver's license.

In 2019, the Senate adopted [Senate Resolution 133](#), which urges the Atlanta-region Transit Link Authority to prioritize and encourage the use of technological innovation and the development of intelligent transportation systems, including AV technology.

In March 2019, Waymo announced it will begin a pilot program in Atlanta where the company's autonomous technology will power Peterbilt Class 8 trucks to carry cargo bound for Google's data centers.

The City of Chamblee released its [Automated Shuttle Detailed Design Plan](#) in May 2019. The report sets forth operational details, risks, and the conditional improvements needed for the plan.

Gwinnett City's funded research project, headed by [Curiosity Lab](#), has begun testing two AV Olli shuttles

manufactured by Local Motors on a self-driving test track. The \$2 million test track is 1.5 miles in length and runs along both sides of Technology Parkway.

## Hawaii

Hawaii Governor, David Y. Ige, signed [Executive Order No. 17-07](#), directing the Hawaii DOT (HDOT) to develop testing mechanisms for AVs in 2017. Further, the Executive Order establishes the position of Administrative Director in the Office of the Governor to serve as the AV contact for companies seeking to test self-driving vehicles in Hawaii.

[House Concurrent Resolution 220](#) (along with companion resolution [House Resolution No. 195](#)) was adopted in 2019, requesting that the Attorney General convene an AV Legal Preparation Task Force (Task Force) to prepare Hawaii with laws and regulations required for AVs. The Task Force will examine the adaptation and testing of AVs, existing laws relating to legal and insurance regulation of AVs, and make recommendations for AVs in Hawaii. The Task Force will submit a preliminary report of its findings and recommendations to the Legislature by December 1, 2019. The final report, including proposed legislation, is due by December 1, 2020. Numerous

interest groups, including the HDOT submitted statements to the Legislature supporting the Task Force. (see [March 22, 2019 Statements to House Committee on Transportation](#); [April 16, 2019 Statements to House Committee on Judiciary](#))

Still pending is [HB 1183](#), which was introduced in January 2019. If enacted, it would authorize, for testing purposes, the operation of AVs in the State of Hawaii. It would also require HDOT to establish an application and approval process and report annually to the legislature.

Additionally, the [Hawaii AV Institute](#) was created as a collaborative effort with the University of Hawaii's Manoa iLab to study and address all aspects of AVs including: technology, social impacts, economic impacts, law, and policy.

## Idaho

In 2018 Idaho Governor, C.L. "Butch" Otter, signed [Executive Order No. 2018-01](#), which called for the creation of an [Autonomous and Connected Vehicle and Deployment Committee](#) devoted to AV testing. The Committee's stated mission includes:

- identifying pertinent agencies to support the testing and deployment of AV technology;

- coordinating agencies to develop strategies for law and policy development;
- reviewing existing State law to identify laws that impede AV progress; and
- identifying partnerships to leverage the social, economic, and environmental benefits of AV technology.

Further, the Committee has four central focus areas: state and federal activity, safety and infrastructure, security and privacy, and testing and deployment.

The [Committee's First Report](#) to the Governor, dated November 2018, included the following recommendations (among others):

- encourage legislation to allow AV testing and deployment;
- consider establishing regulatory or policy actions as a separate chapter of Idaho Code;
- remain technology-neutral during testing and deployment;
- monitor national trends and adopt those most conducive to deploying AV in Idaho while ensuring public safety;



- coordinate regulatory and policy decisions across state lines to improve regional harmonization; and
- facilitate a business-friendly environment that encourages industry partners to choose Idaho for developing and testing CAV technology.

## Illinois

In May 2017, a [HB No. 4050](#) was introduced to exempt platooning vehicles from Illinois following-to-closely rules provided the operators' general plan is not rejected by the Illinois DOT or State Police within 30 days of filing. The Bill was referred to and remains with the Committee on Rules.

Illinois enacted [HB No. 0791](#) in 2017, defining Automated Driving System Equipped Vehicle as:

*any vehicle equipped with an Automated Driving System of hardware and software that are collectively capable of performing the entire dynamic driving task on a sustained basis, regardless of whether it is limited to a specific operational domain.*

HB 0791 provides that local government cannot prohibit the use of AVs on roadways within the State.

In October 2018, Governor Bruce Rauner signed [Executive Order No. 2018-13](#), establishing the [Autonomous Illinois Initiative](#). The Illinois DOT (IDOT) was charged with leading the Initiative. The Initiative released its [Vision Plan](#), stating: "Illinois will foster a safe, innovative environment for the seamless deployment of connected and automated transportation technologies." The Executive Order also established the Autonomous Illinois Testing Program to facilitate legal testing of AVs in Illinois and sets forth the requirements in order for an AV to be tested.

The [Illinois Center for Transportation](#) (ICT) is a transportation research center that involves a collaborative effort between IDOT and several universities in Illinois. The ICT is developing the [Illinois Automated and Connected Track](#) (I-ACT). The I-ACT is a proposed test track facility to allow the State, universities, and the private sector to engage in a collaborative effort to research, test, and develop AV technology.

Several versions of an "Autonomous Vehicle Act" have been proposed in the Illinois Legislature since 2017. The most recent, which

remains pending, is [HB 2575](#). It was last referred to the Rule Committee in March 2019.

### Academic Institution

The University of Illinois (U of I) announced in October 2019 that it has partnered with global electronics manufacturer, Foxconn, on a \$100 million smart technology research center headquartered on the Urbana-Champaign campus. The company's Foxconn Interconnect Technology subsidiary will contribute \$50 million over 10 years toward the effort, while the U of I system's statewide initiatives, including the Discovery Partners Institute and Illinois Innovation Network, will invest another \$50 million. The [Center for Networked Intelligent Components or C-NICE](#) will focus on the development of technology for smart devices, including those used in manufacturing, medical environments, as well as homes and self-driving vehicles.

## Indiana

In 2018 Indiana enacted [HB No. 1290](#), which defines and allows for vehicle platooning. The law defines vehicle platoon as:

*a group of motor vehicles that are traveling in a*

*unified manner under electronic coordination at speeds and following distances that are faster and closer than would be reasonable and prudent without electronic coordination.*

Additionally, the law specifies the filing requirements to obtain a platoon permit.

The Legislature's only bill regarding AVs was introduced in 2018, but failed to be enacted. (See [HB 1341](#))

Representative Ed Soliday, Chair of the Indiana House of Representatives Roads and Transportation Committee, published a brief [Report](#) of an overview of AV technology, law and policy. The Report suggests the two main objectives for AV legislation should be to ensure public safety and develop structure to encourage AV innovation, research and development.

The [Joint Transportation Research Program](#) is a collaboration between the Indiana DOT, higher education institutions and industry to implement innovations that result in continuous improvement in the planning, design, construction, operation, management and economic

efficiency of the Indiana transportation infrastructure.

The Indianapolis Motor Speedway and Energy Systems Network hosted some of the world's leading AV technology researchers at the Speedway on May 23, 2019 to explore the potential for a global AV competition in Indianapolis.

### Academic Institutions

Indiana is home to the University of Notre Dame's [Interdisciplinary Studies in Intelligent Systems Group](#), a pioneer in AV research and development.

Purdue University has developed [Discovery Park](#) to oversee CAV program by providing integrated, world-class engineering, data science, policy, economic and social science problem solving capabilities and solutions.

## Iowa

The Iowa DOT, Iowa State University and the University of Iowa authored a comprehensive plan for accelerating AV progress in Iowa. The [Plan](#) explains the key benefits of AV technology lie in its ability to enhance mobility, safety and freight movement.

In 2019, [Senate File 302](#) was signed into law by the Governor and outlines the parameters for operation of AVs in Iowa. An AV may operate without a human present in the vehicle if it meets the following:

- a. is capable of achieving a minimal risk condition if a malfunction of the ADS occurs that renders the system unable to perform the entire dynamic driving task within the system's intended operational design domain, if any;
- b. is capable of operating in compliance with the applicable traffic and motor vehicle safety laws and regulations of the state; and
- c. is certified by the vehicle's manufacturer to be in compliance with all applicable FMVSS.

In 2017, [House File 465](#) was introduced to allow platooning within the state but failed to pass.

Though platooning remains illegal in Iowa, the Governor signed into law [House File 387](#) which repealed the prohibition of a motor truck or motor vehicle drawing another vehicle from following within 300 feet of another motor truck or motor vehicle drawing another vehicle. It also strikes a provision requiring a person pulling or towing by motor

vehicle another motor vehicle in a convoy or caravan to maintain a distance of at least 500 feet between the units of the convoy or caravan.

### Academic Institutions

In January 2017, USDOT named Iowa City and the University of Iowa's National Advanced Driving Simulator as one of ten designated AV proving [ground](#) sites. As a result, the [Iowa Automated Vehicle Proving Ground](#) was created.

The University of Iowa was awarded a [\\$7 million grant from USDOT](#) in 2019 for AV research. The [project](#) will connect rural, transportation-challenged populations using a mobility-friendly ADS built on a commercially available platform.

## Kansas

Mike Floberg, Director of Innovative Technologies for the Kansas DOT (KDOT), provided [testimony](#) to the Kansas Senate Transportation Committee (KSTC) in January 2018 regarding AVs. According to Floberg's Testimony:

*KDOT is developing the Division of Innovative Technologies, which will provide guidance on the*

*rapidly evolving world of technology in transportation.*

Further, Captain Christopher Turner of the Kansas Highway Patrol provided [testimony](#) to the KSTC in 2018. Captain Turner testified:

*As this Committee moves forward with legislation setting a state framework to guide the deployment of autonomous vehicles ... consideration must be given to the commercial motor vehicle industry.*

In February 2018, [HB 2605](#) was introduced to exempt platooning vehicles from FTC rules, provided the platoon operates on a four-lane divided highway. However, the Bill failed to pass by session adjournment in May 2018.

In September 2018, KDOT issued a request for proposals to prepare a statewide AV project report. Topics include vision and goals, industry timelines, stakeholders, possible investments, public/private partnership concepts, high level direction on what the agencies should do to prepare for the future and input on a draft executive order and legislative bill for testing AVs. A representative from KDOT informed the authors of this Survey that KDOT has chosen HNDT to prepare this

report, which was to be published in July 2019, but as of date of this Survey, it appears the report has yet to be released.

The Joint Legislative Transportation Vision Task Force (created to, among other things, to make recommendations regarding the needs of the transportation system in Kansas over the next ten years and beyond – See [House Substitute for SB No. 391](#)), released its [Report](#) in January 2019.

The Task Force recommended, among other things, that the 2019 Legislature study possible statutory changes to authorize testing of AVs, connected vehicles such as trucks operating in platoons, or both in Kansas and also review in-vehicle technology and traffic management systems. Related to implementation of these new technologies is broadband infrastructure across the state, and the Task Force recommended the Senate Committee on Utilities and the House Committee on Energy, Utilities and Telecommunications also review transportation needs related to broadband.

[HB 2373](#) was introduced on February 18, 2019 to create a transportation planning program, which provides for studies of emerging technologies, including AV. After a hearing on March 19, 2019, the House Committee on Transportation

recommended on March 22, 2019 that the bill be passed as [amended](#). The Bill was not passed before the Legislature recessed for the 2019 Session. The Legislature remains in recess until January 13, 2020.

In August 2019, KDOT released [the Long Range Transportation Plan 2045](#), as an amendment to the State's previously release Long Range Transportation Plan. A component of the amended plan included the need for CAV preparedness.

## Kentucky

In 2018 Kentucky passed [SB No. 116 \(Act No. 33\)](#), which allows vehicle platooning subject to specific requirements. For example, a platoon operator must provide notification and a general plan to the Kentucky State Police prior to operation. Further, vehicles in a platoon are required to display warnings for other motorists and law enforcement. Platoon was defined in the Act as a:

*group of two (2) individual commercial motor vehicles traveling in a unified manner at electronically coordinated speeds at following distances that are closer than would ordinarily be allowed under subsection (8)(b) of Section 3 of this Act.*



The Louisville Metro Government has produced a draft [Autonomous Vehicle Playbook](#). The Playbook provides for strategy on infrastructure, partnerships, parking, transit and intelligent transportation technology.

### Academic Institutions

The University of Kentucky's Kentucky Transportation Center issued a comprehensive Report on AV technology, law and policy in 2017: [Analysis of Autonomous Vehicle Policies](#). The Report provides a review of all Kentucky laws and regulations relating to automobiles and how they can apply to AVs. The Report found an apparent need for future changes automobile laws in the following areas: licensing, registration, cell phone usage and traffic enforcement. Additionally, the Report expresses a need for the legislature to develop a definition of operator, in the context of AVs. The Report also explains that liability allocation is a major concern for manufacturers and the way in which liability is allocated could slow development and implementation of AVs in Kentucky.

## Louisiana

In August 2016, Louisiana enacted into law [HB No. 1143 \(Act](#)

[318\)](#), which defined autonomous technology for use in highway regulatory provisions as:

*technology installed on a motor vehicle that has the capability to drive the vehicle on which the technology is installed in high-or full-automation mode, without any supervision by a human operator... including the ability to automatically bring the motor vehicle into a minimal-risk condition in the event of a critical vehicle or system failure.*

In response to a request of the State Legislature, Louisiana State University's [Louisiana Transportation Research Center](#) (LTRC) developed a comprehensive Report on AV technology, policy and law. LTRC's 2016 [Report](#) made several recommendations to the legislature, including:

- AVs should be allowed on public roads for testing only;
- operators of AVs should be required to obtain an AV license; and
- AVs should be required to have an Event Data Recorder capable of

storing and recording data prior to a collision.

The Governor signed [HB 308 \(Act No. 310\)](#) in 2018 authorizing platoon operations upon approval of a plan by the Department of Public Safety and Corrections and the Louisiana Department of Transportation and Development (LaDOTD). Platooning was defined in the Act as

*a group of individual motor vehicles, including any truck, truck-tractor, trailer, semitrailer, or any combination of these vehicles, utilizing vehicle-to-vehicle communication technology to travel in a unified manner at close following distances.*

On June 11, 2019, the Governor of Louisiana signed [HB 455 \(Act 232\)](#) authorizing autonomous commercial vehicles, which are those used for the purposes of compensation, employment or trade, to operate in the state without a conventional driver physically present in the vehicle, if the vehicle meets all of the requisite criteria relating to safety and insurance. The law also sets forth standards that must be followed when remote drivers are used.

LaDOTD has created a [Connected and Automated Vehicle Technology Team](#) to help in the

development and deployment of CAVs in the state.

LaDOTD also signed a \$2 million contract with Arcadis, Iteris, Inc. and Alliance Transportation Group Inc. to provide technical support services and facilitate planning activities related to CAVs and their impact on highway infrastructure.

## Maine

Maine Governor Paul R. LePage had issued [Executive Order No. 2018-001](#) establishing the Maine Highly Automated Vehicles Advisory Committee in January 2018. The Committee was designed to act as the State's official review and advisory board for AV testing, deployment, operation and related infrastructure.

Subsequently, in April 2018, the Maine Legislature passed [H.P. 1204 – L.D. 1724](#), which created the Commission on AVs. The [Commission](#) was established to develop a process to allow AV testing and deployment in Maine. The Commission was also charged with reviewing current State laws, recommending new legislation and monitoring State compliance with Federal regulations.

On August 1, 2018, the Commission released a set of [by-laws](#) for itself. The Commissioner of



Transportation is required to submit an initial report to the legislature by January 15, 2020 on the Commission's progress and to submit a final report with recommendations by January 15, 2022.

In January 2019, [House Paper No. 135](#) was introduced to authorize general fund bond issues in the amount of \$15 million to invest in Smart City Technology, including AV projects. The Paper was held over to the Legislature's next session.

### **Portland**

In July 2018, [INRIX](#) announced that Portland, Maine would be one of seven cities chosen to test a pilot program for self-driving vehicles called [INRIX AV Road Rules](#). Portland will work with INRIX to map the city as part of the pilot's first phase, with a focus on managing an increase in traffic congestion on Franklin and Commercial streets.

### **Academic Institutions**

University of Maine's [VEMI Lab](#) received a National Science Foundation \$500,000 grant to research fully self-driving vehicles which started in the Fall 2019 semester. The aim of the research is to improve the public's trust in AVs.

## **Maryland**

In 2015, the Maryland Department of Transportation's (MDOT) Secretary Pete Rahn established the [Connected and Automated Vehicles Working Group](#) (Group) as the central point of coordination for the development and deployment of emerging CAV technologies in Maryland. The Group evaluates the latest research, tracks federal and state laws, policies and programs and coordinates with other agencies, organizations and businesses to set the course for the future of CAVs in Maryland.

In 2017, the Group released its [Connected and Automated Vehicle Strategic Plan](#), to prepare Maryland's infrastructure, policy and operations for the future and to ensure MDOT is prepared and engaged in CAV implementation.

At the Group's August 2019 meeting, it presented [Planning for Connected Automated Vehicles](#) in Maryland. The Group set forth the following recommendations for the state:

- participation in [National Household Travel Survey](#) to include CAV in future surveys;

- further involvement with partners to perform behavioral surveys;
- invite companies to survey Maryland drivers and bring in the new behavioral piece to how users wish to use the system;
- put forward public workshops to investigate scenarios for Maryland; and
- perform more model sensitivity runs to attempt better representation of impacts that leads to data driven decision making.

MDOT has indicated that businesses wishing to collaborate on AV testing should complete an [Expression of Interest](#) with Maryland's Motor Vehicles Administration.

MDOT has further established a number of MDOT owned [Locations to Enable Testing Sites](#) for AV technologies and created a [HAV permit](#) process for entities wishing to test such vehicles within the state.

In November 2018, MDOT released its own [Strategic Plan for Connected and Automated Vehicles](#) (CAV PLAN). The CAV PLAN is focused on near-term actions appropriate in the five-year period from 2019-2024, while setting the

stage for future CAV based advances in transportation.

In January 2019, Local Motors was the first company to receive a permit to test self-driving shuttles in Maryland. The following month, Local Motors began private test runs of its self-driving shuttle Olli on a 1.5-mile loop on the outskirts of National Harbor.

Maryland is home to the [U.S. Army Aberdeen Test Center](#) which was named one of [USDOT's AV proving grounds](#) in 2017.

### **Academic Institutions**

The University of Maryland is home to the [Autonomous Vehicle Laboratory](#), whose goals are to:

- educate students studying for degrees in the multi-disciplinary area of biologically inspired autonomous robotics;
- pursue basic research in, among other areas, theoretical formulation and hardware implementation of fundamental biological principles in artificial systems; and
- to pursue applied research, especially in the prototype development of biologically

inspired AVs for civilian and military applications.

## Massachusetts

Massachusetts Governor Charlie Baker executed [Executive Order No. 572](#) in 2016, to promote AV testing and deployment. The Executive Order called for the establishment of a special working group on AVs (AV Working Group), which was tasked with consulting with AV experts and developing guidance to allow for the safe testing of AVs and proposing any necessary legislation.

During 2017, several bills to address AVs were introduced in the Legislature but none were passed.

In May 2018, the Massachusetts Department of Transportation (MassDOT) released the [Strategic Planning for Connected and Automated Vehicles in Massachusetts](#) report, which was undertaken as part of a MassDOT Research Program. The objectives of the study were to provide MassDOT with:

- an understanding of the current state of practice and a vision of the future state of CAV technologies;
- an assessment of the potential future impacts of CAV on transportation across the Commonwealth;

- identification of potential public and private partnerships that could help MassDOT leverage additional support for the development and employment of infrastructure based CAV technologies; and
- a planning roadmap to address forthcoming developments in CAV industries, such as the introduction of new technologies, advances in private sector CAV products and services and proposed new policies and regulations.

In 2018, Governor Baker issued [Executive Order No. 579](#), establishing the [Commission on the Future of Transportation](#) (Commission) to provide advice on how to ensure that transportation planning, forecasting, operations and investments for the period from 2020 through 2040 can best account for changes in transportation needs and options. A specific focus of Executive Order No. 579 was on AV deployment.

In June 2018, MassDOT signed a [regional agreement](#) with fourteen municipalities and the Department of Conservation and Recreation to participate in testing AVs.

Any company or other entity which would like to operate an ADS on public roads in the Commonwealth must [submit](#) the following to MassDOT:

1. an application to test;
2. a testing plan; and
3. a memorandum of agreement.

The [Memorandum of Agreement to Test Automated Driving Systems on Public Roadways in Massachusetts](#) (MOA) sets forth the definitions, application and approval process, and terms and conditions for testing. The MOA also outlines crash protocols, reporting requirements, terms of approval, and additional details for testing.

In December 2018, the Commission issued its report: Choices for Stewardship in [Volume 1](#) and [Volume 2](#), as well as an [Executive Summary](#). A key recommendation of the Commission is the development of a long-term strategy for supporting AVs. The Report recommended that MassDOT continue to develop AV testing protocols and dedicate resources to the management of a committee that would provide regulatory oversight of such emerging technologies. The Commission also recommended that legislation should be passed to establish statutory and regulatory structures that enable the safe and reliable deployment of AVs.

In January 2019, the legislature introduced several bills related to AVs.

- [Senate No. 2115](#) and [House No. 3013](#) establish a framework to promote the safe integration of AVs into the Commonwealth's transportation system.
- [House No. 3417](#) (introduced in 2017) and [House No. 2991](#) (introduced in 2019): limiting autonomous driving capabilities to zero emission and electric vehicles.
- [Senate No. 2056](#): addressing the cybersecurity of internet connected devices and AVs.
- [House No. 3089](#): regarding requirement that all AVs operating within the Commonwealth remain in compliance with all federal regulations.
- [House No. 3143](#): regarding procedures for testing, insurance and liability for AVs.
- [House No. 3672](#): addressing data event recorders for AVs.

All the above Bills were referred to and have remained with the Joint Committee on Transportation since January 22, 2019.

The AV Working Group released its [Report](#) in February 2019, which included the following recommendations:

- establishment of a CAV Committee;
- engagement of first responders and law enforcement in CAV development;
- movement from an Executive Order to regulations; and
- establishment of legislation.

### **Boston**

In October 2016, Boston Mayor Walsh issued an [Executive Order](#) establishing a policy for AVs in the City. As part of a long-term transportation plan called [Go Boston 2030](#), the Executive Order recognized that AVs could help meet the City's goals for safer, more reliable and more accessible transportation options. The Mayor directed the Boston Transportation Commissioner to lead the oversight of AVs and ordered the Boston Transportation Department to publish guidelines for the testing of AVs and develop recommendations for regulation.

Companies wishing to test AVs in Boston are required to enter into a [Memorandum of Understanding](#) with the City and MassDOT, which includes the filing of an application detailing AV experience, a safety assessment, an initial driving plan, identification of vehicles,

identification of operators, summary of training and insurance. The City also established [Vehicle Testing Standards](#) and [Safety Protocols](#).

Boston and Cambridge have been selected to test [INRIX AV Road Rules](#) platform. The INRIX platform enables cities and road authorities to assign, validate and manage traffic rules and restrictions for AVs operating on public roads. The platform also leverages information from HAVs to report infrastructure improvement needs.

A consortium of four Australian Universities have been awarded \$3 million in funding from the Australian [Next Generation Technologies fund](#) to collaborate with Boston University and Massachusetts Institute of Technology to develop the next generation of AVs. The autonomous capabilities of these next generation vehicles will be bio-inspired to mimic human or animal movement.

### **Michigan**

In 2016 Michigan was one of the first states to pass comprehensive AV legislation including, [SB No. 997](#) (Act 334) and [SB No. 998](#) (Act 335). Michigan law sets forth requirements for AVs to operate in the state, allows AVs to operate without a driver present and sets forth a structure for



liability should an accident occur. [SB No. 996](#) (Act 333) creates the SAVE project, an initiative that authorizes eligible motor vehicle manufacturers to make available to the public on-demand AV networks.

[SB No. 995](#) (Act 322) created the [Michigan Council on Future Mobility](#) within the Michigan DOT, to provide annual recommendations on AV technology. The Council's [2019 Report](#) was published on March 15, 2019. The Report provided a list of issues the Council would review throughout 2019 in order to provide future recommendations including:

- mobility on demand;
- electric vehicle charging infrastructure development;
- automobile insurance;
- transportation infrastructure funding;
- talent attraction, retention and education;
- public acceptance of HAVs;
- state law revision; and
- cross-border mobility.

Michigan law also allows for the operation of vehicle platoons. By [HB No. 5749 \(Act 377\)](#) enacted in December 2018, vehicle platooning operations are exempt from the requirement that trucks and truck tractors leave sufficient space between themselves and other trucks.

In June 2019, [SB 378](#) was introduced into the Senate proposing a tax credit to encourage automated driving. The Bill has been referred to the Senate Committee on Economic and Small Business Development.

In April 2018, the [American Center for Mobility](#) opened a [highway testing division](#) at its facility in Michigan. The test facility focuses on the research, testing, and development of AVs.

### **Grand Rapids**

Grand Rapids has created the [Grand Rapids Autonomous Vehicle Initiative](#) (AVGR). AVGR brings four electric shuttles to downtown Grand Rapids streets in 2019 for a yearlong pilot program through the summer of 2020. AVGR partnered with May Mobility and launched its pilot on July 26, 2019. The goal of the program is to understand how AVs work in a variety of weather conditions, as well as define accessibility standards for these types of vehicles.

## Detroit

In June 2018, Mobility Inc. deployed its fleet of AVs in Michigan when it began transporting Bedrock LLC employees to and from a parking garage and their downtown Detroit office.

USDOT Awarded the City of Detroit a [\\$7.5 million grant](#) in September 2019 for AV study. The [study](#) will implement the Cooperative Automation Research Mobility Applications Level 3 software platform for demonstration testing focused on mobility, safety and endurance.

## Willow Run

Michigan is also home to the [American Center for Mobility at Willow Run \(ACM\)](#), with more than 500-acres and multiple test environments adjacent to the historic Willow Run Airport. ACM operates as a global center for testing and validation, education, product and standards development related to CAVs and was named one of [USDOT's AV proving grounds](#).

## Academic Institutions

In 2014, the University of Michigan (U-M) announced plans to launch an advanced mobility research

center. U-M created [Mcity](#) to cultivate the diverse expertise and resources required to realize the potential of emerging mobility technologies, and their commercial and economic viability.

Mcity's one-of-a-kind proving ground for safe, controlled testing, plus on-road test capabilities are a good combination for evaluating new technologies driving the future of mobility. In June 2018, Mcity deployed [two fully-automated, 11-seat, all-electric shuttles](#) manufactured by French firm NAVYA. For more information about the extensive activities going on at Mcity, see its [2017-2018 Progress Report](#).

U-M also maintains the [Transportation Research Institute \(UMTRI\)](#) which is dedicated to achieving safe and sustainable transportation for a global society. One of UMTRI's focus is [CAVs](#), performing research to facilitate the development and integration of CAVs and systems onto roadways around the world.

Michigan State University (MSU)'s CANVAS—[Connected and Autonomous Networked Vehicles for Active Safety](#)—program promises solutions and benefits to real-life driving problems, including preventing accidents and improving traffic flow. CANVAS' goal is to



improve mobility safety and efficiency.

The Student Organized Autonomy Research Group, or [SOAR](#), is a student-organized research group under the CANVAS umbrella focused on building a highly autonomous Chevrolet Bolt capable of traversing an urban scenario by 2020 as part of the [SAE/GM AutoDrive Challenge Competition](#).

A multidisciplinary research team from [MSU will use a \\$2.49 million grant from the National Science Foundation](#) to conduct a four-year study looking at the impacts of AVs on the future workforce.

The team will look at:

- driving jobs and how they will change in response to automation of vehicles and what new skills will be required;
- how willing and able workers are to adapt to the changing nature of driving jobs, and whether the changing nature of jobs will disadvantage some groups of workers more so than others; and
- the anticipated downstream impacts on drivers (i.e., employment trends and income

inequality) in the transportation industry, organizations and society.

General Motors has partnered with Kettering University to create the [Kettering University GM Mobility Research Center](#). The Center is a vehicle and mobility systems development proving ground and outdoor research facility on Kettering University's campus in Flint, Michigan. The unique facility – which is touted as the only one of its kind on a college campus in the country – puts Kettering and Flint at the forefront of AV research/development, safety and technology.

Oakland University, following a \$103,600 [PlanetM Mobility grant](#) from the Michigan Economic Development Corporation, will begin an [AV shuttle in Fall 2019](#). Continental, in partnership with AV technology company EasyMile and the city of Auburn Hills, will launch the pilot at the University to be run by students while data gathered during the pilot program will be used in autonomous engineering courses.

[Western Michigan University](#) began research involving an autonomous electric shuttle on September 21, 2019. The \$2.1 million project, funded through the [Michigan Mobility Challenge](#), announced by former Governor Rick Snyder last year and administered by MDOT,

focuses on improving transportation options for people with disabilities.

## Minnesota

Minnesota Governor Mark Dayton issued [Executive Order No. 18-04](#) in March of 2018, establishing a [Governor's Advisory Council](#) on AVs. The Advisory Council provides advice and support to the Governor, the Minnesota DOT (MnDOT), the Department of Public Safety, and other governmental entities to support AV testing and deployment. Additionally, the Executive Order directed the Advisory Council to submit a comprehensive report related to AV technology, policy, economics and law.

The Advisory Council's [Executive Report](#), released in December 2018, includes recommendations in the following key areas:

- safe AV testing;
- truck platooning;
- leadership
- collaboration;
- infrastructure;
- vehicle registration;
- driver training and licensing;
- accessibility and equity;
- revenue;
- traffic regulations and safety;
- economic development;

- insurance and liability;
- cyber security;
- data privacy; and
- land use and planning.

Recognizing that many states have already passed AV legislation, the Advisory Council warned that if Minnesota does not take action to anticipate AV technology, it will miss a critical opportunity to use technology for the benefit of its residents and businesses.

The 2018 Executive Order also called for the formation of the [Interagency Connected and Automated Vehicle Team](#) (I-CAV Team). The I-CAV Team is responsible for implementing the Executive Order, ensuring interagency coordination and providing operational support to the Advisory Council.

In January 2019, [House File No. 242](#) was introduced to establish a micro transit rideshare pilot program. One facet of the pilot would explore the use of AVs to deliver mass transit to the people of Minnesota. A companion bill was introduced to the Senate in March 2019, [Senate File 2020](#). Both bills have since been referred to the House/Senate Transportation Finance and Policy Committees.

2019 saw several other bills introduced to the legislature regarding AVs:

- [Senate File 674](#): seeking a prohibition on the use of AV systems.
- Companion Bills- [House File 1996](#) and [Senate File 2173](#): setting regulations for AV testing.
- Companion Bills: [House File 1995](#) and [Senate File 2177](#): relating to vehicle platooning.

All of the above were referred to and remained with House/Senate Transportation Finance and Policy Committees.

On April 1, 2019, Governor Tim Walz signed [Executive Order 19-18](#), rescinding Governor Dayton's AV Executive Order 18-04, and establishing a [Governor's Council on Connected and Automated Vehicles](#). The Council is directed to study, assess and prepare for the opportunities and challenges associated with widespread adoption of AVs. An annual report must be submitted to the Governor by February 1, 2020 and each year thereafter, including an update on actions that are needed to ensure that Minnesota is advancing CAVs, as well as other intelligent transportation and emerging technologies.

In May 2019, MnDOT released a report entitled [Preparing Local Agencies for the Future of Connected and Autonomous Vehicles](#). The main goal of the report is to assist local agencies in preparing for CAVs in the short term—5 to 10 years. The report lists descriptions and recommendations for addressing infrastructure needs by local agencies, including:

- pavement markings;
- signing;
- traffic signals;
- maintenance;
- consistency and standardization;
- data capture and information sharing and inventory;
- communications infrastructure; and
- high-resolution mapping.

MnDOT's Office of Connected and Automated Vehicles released its [Connected and Automated Vehicle Strategic Plan](#) in July 2019. The Plan addressed 9 areas of interest regarding AVs in Minnesota:

1. [Capital Investment](#): What projects and capital investments should MnDOT be making or stop investing in?
2. [Research and Development](#): What should MnDOT research and develop to address Minnesota's challenges and help advance CAVs statewide and nationally?

3. Partnerships: How can MnDOT partner with public and private entities to develop a statewide vision for CAVs?
4. Regulation and Policy. What law and policy changes are needed to safely test CAVs in Minnesota?
5. Operations and Maintenance. How do CAVs impact MnDOT operations and how does it plan for these changes?
6. Strategic Staffing: How does MnDOT's workforce need to change to support CAV technological advancements?
7. Multimodal: How does MnDOT engage cyclists, pedestrians, transit, rail and other modal partners to prepare for CAVs?
8. Communications: How does MnDOT engage the public, legislators, employees, and state and local agencies about CAVs?
9. Long Range Planning. How should MnDOT's long range plans address CAVs?

[H.F. No. 6](#) was passed in 2019 to allow for platooning of commercial vehicles. Sec. 31. Minnesota Statutes 2018, section 169.011, was also amended to add the definition of vehicle platoon as:

*a group of commercial vehicles traveling in a unified manner through use of a platooning system or systems. A vehicle platoon consists of a lead vehicle and following vehicles. A vehicle platoon is not a combination vehicle under this chapter.*

A vehicle platoon is limited to three (3) commercial vehicles. A person wishing to use a vehicle platoon, must first submit a vehicle platoon plan for approval by MnDOT.

### **Academic Institutions**

The University of Minnesota's [Transportation Policy and Economic Competitiveness \(TPEC\) Program](#) has been publishing research on AV policy issues in Minnesota since 2004. TPEC receives funding from MnDOT.

TPEC researchers formed a self-driving vehicle (SDV) task force in the Spring of 2017 to identify how various SDV deployment strategies could improve mobility and access for transportation dependent residents, including seniors, people with disabilities and others who are not able to drive themselves. The task force constructed a [Matrix of Users](#) to cross-compare geography, barriers to participation and the potential forms of self-driving transportation that may be implemented in Minnesota.

In July 2019, Minnesota's Northland Community and Technical College (Northland), along with five other partner agencies, was awarded a \$7 million National Science Foundation grant from the [National Center for Autonomous Technologies](#) which will be located on Northland's Aerospace site in Thief River Falls, MN.

Northland will partner with St. Cloud State University, Marine Advanced Technology Education Inspiration for Innovation, Center for Advanced Automotive Technology, National Geospatial Technology Center of Excellence, and the Minnesota State Transportation Center of Excellence to educate and promote autonomous technologies throughout the United States.

## Mississippi

Mississippi passed [HB No. 1343](#) in 2018, which allows vehicle platoons to operate in the State. The Bill defines platoon as

*a group of individual motor vehicles traveling in a unified manner at electronically coordinated speeds at following distances that are closer than would be reasonable and prudent without such coordination.*

The operation of vehicle platoons is conditional upon approval of a platoon application from the Mississippi DOT. Further, the law calls for the Motor Carrier Division of the Department of Public Safety to develop the acceptable standards required for each portion of platoon plans.

### Academic Institutions

Mississippi State University's [Center for Advanced Vehicular Systems](#) (CAVS), is an interdisciplinary research center with a focus on off-road AVs, pedestrian-vehicle interactions, and developing autonomous systems for industrial purposes. With a group of over 300 staff and researchers working with government and industry partners, CAVS works to develop solutions to enhance transportation safety, improve vehicle efficiency, increase the productivity of the workforce and enable a brighter future. CAVS released its [2018 Annual Report](#) to highlight the diverse range of initiatives from the past year.

## Missouri

Although bills regarding AVs have been introduced to the state legislature, none have been signed into law to date. For example, in 2018, under [SB No. 811](#) AVs would have



been permitted to operate without a human driver in Missouri, as well as for ridesharing services.

In January 2019, [SB No. 186](#) (identical to [HB No. 748](#)) was introduced to permit vehicle platooning on Missouri roads. This bill would exempt non-lead vehicles, in a group of motor vehicles using V2V communications to travel in a unified manner at electronically coordinated speeds from certain requirements relating to minimum following distance.

[HB No. 1192](#) was also introduced in January 2019, which would allow businesses that employ more than 50 people to use driverless vehicles. The vehicles would be required to be of minimal risk if it malfunctions, be compliant with Missouri's vehicle laws and regulations and adhere to federal vehicle safety standards.

Both of the 2019 Bills were referred to and remain with the Transportation, Infrastructure and Public Safety Committee.

The Missouri Department of Transportation ("MoDOT") released its [2018 Long Range Transportation Plan](#) which included analysis of emerging technologies, including AVs and the potential impact of this technology within the State. MoDOT

has also identified the assessment of infrastructure standards to interface with AVs as a [2019 Project of Priority](#).

## Montana

In 2019, [House Joint Resolution 34](#) was passed requiring an interim study on ways to improve passenger transportation within the state. The study involves the creation of an interim commission to look at ways to improve passenger transportation and review laws that may need changing to allow use of AVs and provide for public safety. The study, including presentation and review requirements, is to be concluded prior to September 15, 2020.

The [Transportation Interim Committee](#) was established in response to House Joint Resolution 34. At its first meeting in July 2019, [Meeting Minutes](#) provide that members determined that the Committee should start with gathering information on the laws currently passed by other states. As a result of its review, the Committee published a report entitled the Automated Driving Systems (ADS) A Snapshot of State

and Federal Policies<sup>5</sup> which was discussed at its September 2019.

### **Academic Institutions**

Montana State University collaborates on research with the Western Transportation Institute to conduct research in the field of AVs through the [Mobility and Public Transportation](#) program. The Mobility and Public Transportation program is a collaborative effort focusing on rural AV and transportation research. The program facilitates mobility improvements in Montana for individuals of all ages and abilities by focusing on innovative transportation solutions.

The Western Transportation Institute also maintains the [Collaborative Human-Automated Platooned Truck Alliance](#) (CHAPTA). CHAPTA seeks to unite stakeholders to cooperatively and intelligently introduce driverless technology to long-haul truck fleets.

## **Nebraska**

Nebraska approved [Legislative Bill No. 989](#) in April of 2018 to allow AVs to operate in the state. The law allows for AVs to operate on public

roads without a driver subject to certain conditions:

1. the vehicle is capable of achieving a minimal risk condition if a malfunction of the ADS occurs; and
2. while in driverless operation, the vehicle is capable of operating in compliance with the applicable traffic and motor vehicle safety laws and regulations of the state that govern the performance of the dynamic driving task.

The Nebraska law also specifies AV operators must demonstrate satisfactory financial stability and compliance with state insurance requirements before operating the vehicle. In the event of an accident involving an AV, the owner of the AV is required to report the accident. Further, the law states that no additional liability will be imposed on the manufacturers, developers, or AV owners beyond what the State already allows.

Also, in 2018, [Legislative Bill 1122](#) was introduced to allow platooning within the State. The Bill was ‘indefinitely postponed’ by the Legislature in April 2018.

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<sup>5</sup> The actual report could not be linked in the Survey, but can be founded under the [AV Background Report tab](#).



In January 2019, [Legislative Bill No. 521](#) was introduced to repeal certain portions of Legislative Bill No. 989, and require a human driver to be physically present in an AV and able to take control of the vehicle at all times. The Bill remains with the Transportation/Telecommunications Committee.

[Legislative Bill 142](#) was also introduced in 2019. The Bill seeks to, among other goals:

- a) update the old Society of Engineers (SAE) definitions to match the SAE June 2018 definitions;
- b) establish proof of financial responsibility requirements for manufacturers of at least five million dollars, with minimum coverage of one million dollars per vehicle, per occurrence;
- c) clarify liability between driver and manufacturer in the event of a crash or collision, based on whether the automation system is engaged; and
- d) authorize the Department of Motor Vehicles to issue guidance on the operation of driving automation-system-equipped vehicles and, to adopt and promulgate rules and regulations to carry out this act.

[Amendments](#) to the Bill were filed in February 2019 and remain pending in the Legislature.

### **Lincoln**

Lincoln commissioned an AV study and released the [Lincoln Multimodal Technology Vision](#) report in February 2018. The study found that:

- Lincoln has state-of-the-art broadband and traffic management infrastructure to support “smart-vehicle” technologies;
- downtown traffic was ripe for a shuttle system;
- only minor infrastructure improvements would be warranted to support AVs; and
- a supportive and guiding regulatory framework was needed for a municipality to pursue an AV pilot project.

Lincoln also launched its [Autonomous Shuttle Project](#) in 2018. It received \$100,000 in innovation funds for its project from [Bloomberg Philanthropies’ 2018 Mayors Challenge](#), as one of [35 Champion City finalists](#), to refine and test its AV vision. This funding provided for the testing of one driverless shuttle

prototype in Lincoln in the summer of 2018.

## Nevada

In 2011, Nevada passed [Assembly Bill No. 511](#), regarding AV testing on public roads. Bill 511 requires the Nevada Department of Transportation (NDOT) to adopt regulations regarding AVs to include:

- requirements that an AV must meet before it may be operated;
- requirements for insurance that is required to test or operate an AV;
- minimum safety standards for AVs and their operation;
- provide for the testing of AVs; and
- restrict the testing of AVs to specified geographic areas.

In 2013 Nevada passed [SB No. 313](#), which provides the requirements for testing AVs in the state, which include:

- proof of insurance or a cash deposit in the amount of \$5,000,000; and
- a human operator must be:

- seated in a position which allows the operator to take immediate manual control;
- monitoring the safe operation of the AV; and
- capable of taking over immediate manual control of the AV in the event of a failure of the technology or other emergency.

NDOT has been coordinating with state and federal legislators to develop and deploy CAV test policies with the [Nevada Smart & Connected initiative](#). NDOT has also been coordinating with other state transportation departments and national transportation agencies to bring best practices to Nevada.

In 2017, Nevada enacted [Assembly Bill No. 69](#), which revised the previous testing directives from 2011 by allowing manufacturers and developers to self-certify compliance with current testing requirements to the [Nevada Department of Motor Vehicles](#) (NDMV) by submitting an [Autonomous Vehicle Testing Registry Application](#). Prior to registering an AV in Nevada, the manufacturer or developer must self-certify with the NDMV that they are in compliance with the requirements of [Chapter 482A of the Nevada Revised Statutes](#) by submitting their completed [Autonomous Vehicle Certification](#)

[Registry - Operation & Registration \(OBL 326A\)](#). Once the application is approved, the NDMV will issue a certificate of compliance for testing along with license plates designated for AVs.

Assembly Bill 69 also addressed vehicle platooning, allowing “[d]river-assistive platooning technology”, defined as

*technology which enables two or more trucks or other motor vehicles to travel on a highway at electronically coordinated speeds in a unified manner at a following distance that is closer than would be reasonable and prudent without the use of the technology,*

to operate upon Nevada highways. The Bill provides that the term does not include an AV system.

### **Las Vegas**

Las Vegas became the first region in Nevada to connect its traffic signal network to vehicles when Audi launched its [V2I technology](#). The launch was the first step in connecting vehicles to intelligent traffic signal infrastructure and is the first step for an autonomous future. The two-way communication with traffic lights and traffic cameras will help identify better routes and traffic incidents on valley roadways.

Between November 2017 and November 2018, the Regional Transportation Commission of Southern Nevada (RTC) partnered with Las Vegas, Keolis North America and AAA to operate a one-mile loop in downtown Las Vegas. The project transported more than 32,000 individuals on nearly 5,000 trips.

RTC was also chosen by INRIX to test its new [AV Road Rules](#) platform. The Platform enables cities and road authorities to quickly and easily digitize local restrictions such as speed limits, crosswalks, school zones and stop signs, allowing automakers and HAV operators to ensure vehicles comply with local guidelines.

In December 2018, RTC and Las Vegas were the recipients of a \$5.3 million grant from USDOT for the Las Vegas Medical District Automated Circulator and Pedestrian Safety Project (GoMed) that will connect downtown Las Vegas with the Las Vegas Medical District via four autonomous shuttles. GoMed is a four-year project with the first and second years expected to focus on planning, design and procurements respectively. The autonomous shuttles are not expected to be on the roadways until the end of the second year, at the earliest.

Partnerships exist between Las Vegas and Lyft and Aptiv, allowing

both companies to operate AVs within Las Vegas. Both companies recently revealed in 2019 they have tested over 50,000 miles each within the City over the past year.

Zoox received permission from the Nevada DMV in early 2019 to drive autonomously on state roads. The permit also allows Zoox to transport passengers, although that is not happening at this time. The company is currently mapping and test-driving new routes in the greater Las Vegas region.

### **Academic Institutions**

The University of Nevada, Reno's Center of Applied Research (NCAR) maintains an [Intelligent Mobility](#) initiative which brings together researchers, citizens, ideas, projects and resources to contribute to smart communities of the future.

In April 2019, the University of Nevada announced its new partnership with Filament and NCAR for the development of a blockchain AV research project. The project will attempt to develop new standards for blockchain-powered AVs. The University will begin simulated testing of Filament's Blocklet® technology, with plans to soon integrate the technology into both an AV and the sensor infrastructure placed along defined routes to deliver a trustworthy

record of events, enabling attested data exchange via blockchain transactions.

## **New Hampshire**

In 2018, although [HB No. 314](#), which addressed AVs, was passed by both the House and Senate, Governor Chris Sununu vetoed the Bill. The [Governor's Veto Message](#) cited a lack of account for public safety in the Bill as the main reason for the veto. The Governor warned, that as written, the Bill may attract less responsible actors to the State to develop AVs. Governor Sununu however expressed his desire for the House and Senate to continue to work together to pass a safe bill encouraging the development of AV technologies within the State.

In August 2019, [Act No. 2019-310](#) was enacted to establish an AV testing pilot program. The Act provides that a testing entity seeking to test ADS-equipped vehicles must provide notice to the New Hampshire DMV, upon forms furnished by the department and accompanied by the following information:

1. name and business address of the testing entity;
2. name, phone number, email address, and physical address in state, if present, of lead staff contact

- for the testing entity with oversight of the testing project;
3. identification information about the vehicles to be used in testing, including the make, model, and license plate numbers;
  4. description of the operating design domain in which the ADS-equipped vehicle has been designed to operate, including limitations on the types of roadways, weather, time of day, or geographic locations, if any;
  5. the geographic areas within the state in which the entity plans to test ADS-equipped vehicles;
  6. copy of the testing entity's Voluntary Safety Self-Assessment as defined by the USDOT's Federal Automated Vehicles Policy or a detailed summary of the types of safety training given to test drivers, including copies of any documentation or illustration provided;
  7. proof of the testing entity's financial ability to satisfy judgment for damages for personal injury or property damage of at least \$5 million; and
  8. acknowledgment, via official form furnished by the department, that:
    - a. the ADS-equipped vehicle is in compliance with all applicable federal laws and regulations, or has an exemption under federal law;
    - b. the ADS-equipped vehicle is designed to comply with all traffic and motor vehicle safety laws and regulations of this state that govern the performance of the dynamic driving task, unless an exemption has been granted by the department;
    - c. the ADS has been tested in controlled conditions and has demonstrated functionality ready to test on public roads;
    - d. the ADS-equipped vehicle shall only be operated or monitored by trained employees, or other authorized persons as agents of the testing entity who have received instruction on the safe operation of vehicle systems; and
    - e. the ADS-equipped vehicle test driver holds a valid driver's license that is recognized by the state.

The Act also creates the Autonomous Vehicle Advisory Commission. The AV Advisory Commission is responsible to:



- advise relevant state agencies and the general court on AV administration;
- develop training curriculum for law enforcement and first responders;
- review National Transportation Safety Board reports on AV incidents and action recommendations;
- propose modifications to the AV testing and development pilot program when necessary; and
- maintain up-to-date information on AV technology, statutes, and regulations and exchange information regarding unique challenges posed by roads in New Hampshire through interaction with USDOT and NHTSA.

The AV Advisory Commission's reports are due by November 1 of each year.

In July 2019, [House Bill No. 522](#) was enacted into law to establish a Commission to Study Environmental and Health Effects of Evolving 5G Technology. Recognizing that wireless technology is intended to greatly increase device capability and connectivity, the law sets forth concerns about the risks that it may pose for humans, animals and the environment. The law requires the

commission to receive testimony from businesses working on the development of AV vehicles which will rely on 5G technology.

### Academic Institutions

In November 2018, The University of New Hampshire (UNH) received a \$2 million grant from the National Science Foundation to study AVs. UNH will lead the four-year project, collaborating with Harvard University, Wellesley College and the universities of Washington and Wisconsin. Researchers will develop and test a new multi-interface in-vehicle environment in driving simulators and real vehicles. The project will integrate three types of user interfaces — voice, augmented reality and tangible interfaces — and will generate design guidelines for researchers, practitioners and policy makers.

## New Jersey

In 2018, numerous bills were proposed regarding AVs in New Jersey (ex: [SB No. 2149](#), [Assembly Bill 1893](#), [SB No. 3165](#)), but none were enacted into law. To further the AV discussion however, on [October 22, 2018](#), the Assembly Science, Innovation and Technology Committee and the Transportation and Independent Authorities



Committee held a joint hearing to consider whether AVs should be operated and tested in the state. The combined committee recommended that the Legislature create a task force to further consider the issue.

In March 2019, [Assembly Joint Resolution 164](#) was signed by the Governor to establish the New Jersey Advanced Autonomous Vehicle Task Force, the purpose of which would be to conduct a study of AVs and make recommendations on laws that New Jersey may enact to safely integrate AVs on the State's roads. The NJ Advanced Autonomous Task Force would be required to meet within 90 days after its creation and issue a report to the Governor within 180 days after the initial meeting.

Several other bills relating to AVs were also introduced, referred to and remain with committees in 2019:

- [Assembly Joint Resolution No. 188](#): to establish the New Jersey Advanced Autonomous Vehicle Insurance Task Force to investigate automobile issues that may arise from the use of AVs;
- [SB 3367](#): to establish a fully AV pilot program; and
- [Assembly Bill 4977](#): regarding an AV training program for law enforcement.

## Academic Institutions

[Princeton Autonomous Vehicle Engineering](#) (PAVE) is an undergraduate student-led research group at Princeton dedicated to advancing and promoting the field of robotics through competitive challenges, self-guided research and community outreach while providing extracurricular learning and leadership opportunities to student members.

[Prospect 12](#) is PAVE's ongoing fully-autonomous vehicle project that started as an entry in the [2007 DARPA Urban Challenge](#). The vehicle is a 2005 Ford Escape Hybrid, equipped with several sensors and modified to allow computer-controlled driving while still comfortably seating five and allowing a human driver to take control with the flip of a switch. The team is currently working on improving its vision and navigation software as well as augmenting the system's robustness.

[The New Jersey Center for Autonomous Vehicle Research and Development](#) pioneers research in AV technology as part of a collaborative effort between Princeton University and the Fort Monmouth Economic Revitalization Authority. The vision for the center includes creation of a public-private partnership to bring together the talent and technical expertise of New Jersey's universities

and research centers to meet the needs of transportation companies and vehicle manufacturers.

## New Mexico

[Chapter 18, Section G](#) of MVD New Mexico's Vehicle Procedures Manual was revised in 2017 to include information on AVs, including defining AV per the definition provided on Wikipedia. However, Chapter G specifically provides that "there is no statutory authority at this time to title or register autonomous vehicles for use on New Mexico roads or highways."

In February 2018, New Mexico's Legislature adopted a [Joint Memorial](#) (SJM-3) requesting the New Mexico Department of Transportation (NMDOT) to create a committee that includes relevant state agencies and private entities to review the current and developing state of AV technology and develop a proposal to allow AV use in New Mexico. NMDOT held a summit to discuss AVs in 2018 in response to the Memorial. The Joint Memorial called for the submission of a report to the Legislature by the end of 2018, but the committee has not made a report available to the public.

The [Intelligent Transportation Systems](#) program is run under the direction of NMDOT. The ITS program seeks to

improve transportation safety and mobility through the use of advanced communications technologies and data collection.

In January 2019, [SB No. 332](#) was introduced to authorize the use of AVs and platooning vehicles using AV technology within New Mexico. Although the [Corporation and Transportation Committee](#) recommended the Bill be passed, the Bill is listed as being "postponed indefinitely."

## New York

In 2017, New York enacted [SB No. 2005 \(Act No. 55\)](#), which, among other things, allows for the State Commissioner of Motor Vehicles to approve AV testing. The law also specifies certain AV application requirements needed for approval for testing, including compliance with federal and state safety standards, have a person with a valid driver's license seated in the driver's seat and have at least \$5 million in insurance coverage. Further, the law specifies that tests and demonstrations must be conducted under the supervision of the New York State Police. The New York Department of Motor Vehicles accepts the [Applications for Testing](#) of AV technology.

In 2019, numerous bills related to AVs were introduced into the

Assembly and Senate, all of which have been referred to and remain with Committees.

- [Assembly Bill No. 1554](#): establishes the New York State Autonomous Vehicle Task Force to study AV usage on the roads located within the State;
- [Assembly Bill No. 7980](#): (similar – [SB No. 6014-A](#)): creates the New York task force on automated vehicle technology to study and assess the future of AV technology;
- [SB No. 1159](#): creates an AV committee to guide the enactment of a study to assess the future of AV technology;
- [Assembly Bill No. 301](#): requires the Department of Labor to conduct a study on the potential impact of driverless vehicles on occupations and employment;
- [SB No. 1779](#), defines autonomous technology and sets forth the drivers' license requirements for operating an AV upon a public highway;
- [Assembly Bill No. 1808](#): authorizes the Commissioner of the DOT to enroll New York State in any federal pilot program for the collection of transportation data, including AV projects;

- [Assembly Bill No. 8460](#) (companion - [SB No. 6052-B](#)): authorizes the DOT Commissioner to conduct a comprehensive study on designation of private roads on the University at Buffalo North Campus and public roads in the town of Amherst for the purposes of AV technology testing; and
- [Assembly Bill No. 2643](#): regulates the operation and testing of motor vehicles with autonomous technology.

In June 2019, The New York State Bar Association (NYSBA), announced the creation of the [Task Force on Autonomous Vehicles and the Law](#) to study and understand the impact that AVs will have on the legal system and society. The study will also make recommendations on how New York State and its legal institutions can prepare for this change. The topics to be studied include:

- potential impact AVs may have on lawyers, their clients, courts and the civil justice system;
- what laws and regulations may need to be enacted;
- potential privacy and data protection issues;
- safety concerns; and

- potential impact on injury and insurance law and licensing.

### New York City

The [New York City Department of Transportation's Connected Vehicle Project](#) was chosen as one of three [Connected Vehicle pilot deployment sites](#) selected by USDOT to demonstrate the benefits of new CV technology. The NYC deployment is primarily focused on safety applications – which rely on V2V, V2I and infrastructure-to-pedestrian communications.

Optimus Ride announced in August 2019 that it has brought the first public AVs to New York. The vehicles are called “Neighborhood Electric Vehicles” and will help shuttle 10,000 plus workers through the 300-acre [Brooklyn Navy Yard](#), an industrial complex and shipyard located in northwest Brooklyn, along the East River.

### Academic Institutions

University at Buffalo (UB) professors were awarded a 3-year National Science Foundation grant to define a framework to model and evaluate potential household-level use of AVs. The research is aimed at helping to understand potential issues and negative external effects as well as

to provide strategies to mitigate these effects.

UB also maintains the [CAV Application and Systems](#) project. The project developed an integrated 5-in-1 instrument for Connected and Autonomous Vehicle Evaluation and Experimentation (iCAVE2), along with instrumented vehicles, including a self-driving shuttle (the Olli bus) and UB's Lincoln MKZ's AV platform with sensor packages supporting both open source software called Autoware and Apollo. iCAVE2 bridges the gap between existing simulators and road testing facilities by providing a flexible, scalable, safe and realistic platform for comprehensive evaluation and experiments of CAV technologies and their applications.

UB unveiled a new AV on September 24, 2019. Several organizations partnered with UB to equip a Lincoln MKZ with self-driving technology. The \$250,000 car was made possible through several donations including one from Monro Muffler Brake and West Herr Auto Group. The car is what's called ‘drive by wire’, meaning it can be controlled by a computer, but the computer is self-contained in the trunk. The vehicle will be used for hands-on training of students from high school students through graduate students.

## North Carolina

In 2017, North Carolina passed [HB No. 469](#), establishing the AV Committee within the North Carolina DOT (NCDOT) to provide insight, analysis and recommendations related to AV deployment.

The Bill further authorized AVs to operate in North Carolina if they satisfy the following requirements:

- compliance with state and federal motor vehicle standards;
- the vehicle is capable of stopping at the scene if involved in an accident;
- the vehicle is capable of stopping if the automated system fails;
- the vehicle is covered by a vehicle liability policy; and
- the vehicle is lawfully registered.

The operator of a fully AV is not required to be licensed to drive a non-automated vehicle. Further, the owner of an AV is responsible if an AV commits any traffic violations.

NCDOT thereafter created the [Fully Automated Vehicle \(FAV\)](#)

[Committee](#) to undertake a study to understand what actions, activities and processes are required to prepare the State for AVs. FAV plans on addressing the following issues, among others:

1. measures necessary to successfully implement AV technology;
2. complications or liabilities that could arise by allowing AV technology; and
3. how AV technology can promote research and development.

North Carolina also enacted [HB No. 716](#) in 2017, allowing vehicle platooning in the State. The Bill defines platooning as “a group of individual commercial motor vehicles traveling in a unified manner through the use of an electronically interconnected braking system.”

The North Carolina Turnpike Authority was named an [AV Proving Ground](#) by USDOT in 2017. In May 2019, the North Carolina Turnpike Authority was chosen among over 60 different applicants to be a test site for self-driving cars under the [Automated Driving System Demonstration Grants](#). Goals of the grant is to test for:

- [Safety](#): Test the safe integration of ADS into the nation’s on-road transportation system;



- Data for Safety Analysis and Rulemaking: Ensure significant data gathering and sharing of project data with USDOT and the public throughout the project in near real time; and
- Collaboration: Work with innovative state and local governments and private partners to create collaborative environments that harness the collective expertise, ingenuity, and knowledge of multiple stakeholders.

It is still to be determined which roads will test the self-driving cars and when the testing might begin within the State.

The Centralia Council of Governments (located in the Central Piedmont area of North Carolina and encompasses nine counties and 74 municipalities, representing almost two million people and headquartered in the City of Charlotte) has created a [CAV Regional Task Force](#) to address CAVs within this region. The Task Force released a report entitled [Preparing the Greater Charlotte Region for Connected and Autonomous Vehicles](#) in the spring of 2019.

### Academic Institutions

The North Carolina State University created [EcoPRT, Inc.](#)

(ecological personal rapid transit) in an effort to develop an economical transportation solution for campus settings. EcoPRT is an ultra-light and low-cost transit system featuring autonomous two-person cars that would drive on a guideway railing system.

## North Dakota

In 2015 North Dakota enacted [HB No. 1065](#), which called for a legislative management study to analyze whether laws needed to be put in place for AV deployment. It was also enacted to allow for the review of current laws dealing with licensing, registration, insurance, data ownership and inspections and how they relate to AVs. The law defines Automated Motor Vehicle as:

*a vehicle capable of operating in a full automation mode where full automation mode is defined... as the unconditional, full-time performance by an automated driving system of all aspects of the dynamic driving task.*

In 2017 North Dakota passed [HB No. 1202](#), which called for the DOT to conduct a study in conjunction with the AV industry. The purpose of the proposed study is to analyze AV



technology and report findings with legislative proposals to the State legislature. No reports have been issued for public review to date.

[HB No. 1394](#) was also introduced in 2017 to address AV data ownership, but failed to pass.

[HB No. 1418](#) was enacted in 2019 to create and enact chapter 8-12 and section 39-01-01.2 of the North Dakota Century Code relating to AV network companies and AV operations in the state. The enacted bill will allow AVs to operate in the state without a human driver present.

[HB No. 1199](#) was also enacted in 2019 to create an exception to the FTC law for platooning vehicles. Platoon is defined as “a group of motor vehicles using vehicle - to - vehicle communications to travel in a unified manner at close following distances on a multilane, limited-access, divided highway.”

In an attempt to readdress the data ownership issue from 2017, [HB No. 1197](#) was introduced for the 2019 legislative session, but again failed to pass.

[HB No. 1543](#), also introduced but failed to pass in 2019, to address requirements of having insurance, surety bond, a human driver and ability to engage and disengage the

autonomous mode required to test AVs. It would have also addressed the liability of a manufacturer of a vehicle modified by a third party.

## Ohio

In 2018, Ohio Governor John Kasich signed Executive Order No. 2018-01K, which established the DriveOhio plan. [DriveOhio](#) is designed to allow for intelligent technologies to be incorporated in Ohio transportation vehicles and infrastructure.

The DriveOhio program calls for the creation of an [Expert Advisory Board](#) to review progress in technological advancements in smart mobility, data analytics, data security, workforce development, funding and research opportunities and regulatory developments.

Governor Kasich also signed Executive Order 2018-04K, which authorizes testing and pilot programs for AVs on any public road in Ohio. Companies need to provide the Ohio DOT (ODOT) with the following information: business name and address, vehicle make, model, and license plate number, contact information for the operator, proof of insurance, the municipalities where the vehicle will be tested and safety certification to operate an AV in Ohio.

Companies may also enter into the DriveOhio Pilot Program, to test AVs to meet State requirements. DriveOhio has created an online [registration policy](#) for interested companies.

In December 2018, the Ohio House Transportation and Public Safety Committee released a report on CAVs. [The Report](#) consists of the chairman's findings during the committee's 14-month study, which completed earlier in the year. During the committee hearings and stakeholder meetings, more than 50 industry leaders, policy think tanks and other stakeholders from around the country participated to inform this report.

The key recommendations of the report include:

- oppose a patchwork of state and local laws regarding this vehicle technology;
- make basic transportation infrastructure maintenance a top priority;
- establish a Joint House-Senate Commission on transportation infrastructure funding;
- establish a CAV Task Force that is comprised of a broad range of disciplines and organizations; and

- identify occupations most at risk of labor displacement from ADS technology.

Ohio announced in September 2019, that it has been awarded a [USDOT \\$7.5 million grant to study](#) the use of [AVs on rural roads](#). The four-year project will focus on running AVs on roads in 32 counties in the state's Appalachian region, including on unpaved roads. The testing will occur in all seasons, day or night and in challenging conditions like work zones. The project will be led by DriveOhio, ODOT, and partners including The Ohio State University, Ohio University and the University of Cincinnati. Combined with funding from state and academic partners, total funding for the project will be \$17.8 million.

The [33 Smart Mobility Corridor](#) is a 35-mile highway corridor just northwest of Columbus. The Corridor crosses three counties (Franklin, Union, and Logan), and connects the cities of Marysville and Dublin to Honda's North America Campus and points beyond.

The 33 Smart Mobility Corridor is equipped by ODOT with high-capacity fiber optic cable to instantaneously link researchers and traffic monitors with data from embedded and wireless sensors along the roadway. These links will allow

automotive testing, research and manufacturing facilities to test smart transportation technologies on a highway that carries up to 50,000 vehicles per day through rural and urban settings in a full range of weather conditions. This data will also provide more frequent and accurate traffic counts, weather and surface condition monitoring and incident management improvements.

### **East Liberty**

East Liberty is the site of the [Transportation Research Center, Inc.](#) (TRC), the largest independent automotive proving ground in North America. TRC constructed the [SMARTCenter](#) designed to test advanced automotive and mobility technologies. The SMARTCenter opened in July 2019, consisting of:

- the longest (1.2 miles) and widest (six lanes) connected, signalized intersection in the industry;
- an urban network consisting of movable intersections, roundabouts and oblique intersection scenarios; and
- access to Dedicated Short-Range Communications and high-speed wireless communication.

### **Columbus**

Columbus was the winner of [USDOT's first-ever Smart City Challenge](#), and awarded [\\$50 million in grant funding](#) to be used for the reinvention of transportation to accelerate human progress.

Ohio's first self-driving shuttles arrived in downtown Columbus ([Smart Columbus](#)) in December 2018, starting the first phase of a project designed to test, operate and evaluate self-driving vehicles, while providing residents and visitors first-hand experience with intelligent transportation operated by May Mobility.

As of now, it has been reported that 15,000 people have taken a ride on self-driving shuttles along the Scioto Mile "[Smart Circuit](#)", all while Smart Columbus collected data to fine tune this new technology. The shuttle's service concluded on September 27, 2019.

### **Linden**

After completion of the AV shuttle program in Columbus, two new, larger shuttles holding about a dozen people will launch on a free-of-charge route through Linden in November 2019. The goal is to close any gaps that residents might encounter when getting around on public transit and to better connect

people in Linden with jobs and services throughout the community.

### Academic Institutions

The University of Cincinnati will soon have its own AV, equipped with cameras to capture visual data and radar to detect speed and lidar. The focus of the research will be getting AVs to work in harmony with technology on local roadways.

The Ohio State University is home to the [Control and Intelligent Transportations Research Lab](#) (CITR). CITR's research and development includes:

- autonomous and cooperative ground vehicles;
- ground transportation safety and safety with AVs;
- advanced driver assistance systems; and
- vehicle networking and wireless communications.

## Oklahoma

The Oklahoma DOT published two reports regarding transportation "Moving Forward" within the State.

1. The [Oklahoma Long Range Transportation Plan 2015-2040](#),

published in 2015, listed investigation in the use of emerging technologies, such as AVs, and the exploration of their impact on operational and safety performance on highways as a new goal for Oklahoma DOT.

2. [Freight Transportation Plan 2018-2022](#), published in December 2017, seeks to provide a framework for a safe, reliable, and productive freight transportation system. The Glossary of the plan defines AV technology as a:

*Robotic vehicle that is designed to travel between destinations without a human operator. To qualify as fully autonomous, a vehicle must be able to navigate without human intervention to a predetermined destination over roads that have not been adapted for its use.*

The plan discusses the importance of incorporating both AVs and vehicle platoon systems in the future of freight transportation.

In September 2018, Esperanza Real Estate Investments announced that it had signed a landmark deal with Udely, an autonomous delivery vehicle (ADV) company, to bring ADVs to the Oklahoma City metro

area. The ADVs will provide Oklahoma City's largest local chain of independent grocery stores with self-driving delivery vans in 2019.

ODOT announced in October 2018 the updated involvement of the [Driving Oklahoma Working Group](#) with AVs. The Working Group involves industries and companies in transportation, AAA, cities, counties, state agencies, the trucking association, universities and municipal planning agencies to explore policies and safety of AVs.

In 2019, for the first time, Oklahoma's lawmakers passed legislation regarding AVs with [SB 365](#). The Bill created the Oklahoma Driving Automation System Uniformity Act, which preempts local laws and asserts that only the State may enact laws or regulations regarding the use of motor vehicles equipped with driving automation systems in Oklahoma.

[SB 189](#) was also enacted in 2019, exempting platoons, defined as a group of individual motor vehicles traveling in a unified manner at electronically coordinated speeds, from spacing requirements on state highways.

[The Office of Mobility and Public Transit](#) was created in 2019 via [HB 1365](#). The new Office is

responsible for, among other things, promulgating rules and procedures to implement innovative pilot programs in microtransit and AVs in the following systems:

- EMBARK;
- Tulsa Transit;
- Little Dixie Transit; and
- other transit systems as determined by the Oklahoma DOT.

### Academic Institutions

A team at the [University of Oklahoma Advanced Radar Research Center](#) is working to develop new technology for the future of driverless cars. The team is collaborating with Metawave to develop a newly-designed radar that could serve as an important sensor for the automotive industry.

## Oregon

In 2018, Oregon enacted [HB No. 4063](#), which established a [Task Force](#) dedicated to the coordination of AV programs and policies. In September of 2018, the Task Force issued a comprehensive [Report](#) which recommended, among other things, a permitting process for testing AVs in Oregon. The proposed permitting process would:



- collect information about vehicles and drivers involved in testing;
- set minimum insurance requirements;
- require safety assurances; and
- direct testing entities to engage with law enforcement.

The Task Force recently released its [2019 Report](#) on September 12, 2019. The Task Force prepared materials and recommendations on six topics related to AVs:

1. vehicle code amendments and public safety;
2. cybersecurity, privacy and data;
3. road and infrastructure design;
4. land use;
5. public transit; and
6. workforce changes.

The Task Force work was informed by national guidance, studies and recommendations by national organizations and research institutions, best practices in other jurisdictions and presentations by experts.

Oregon has a [Voluntary Testing Notification Process](#) for AV testing. Oregon DOT encourages companies to fill out the [Voluntary Notification of Automated Vehicle testing form](#), which requests information similar to that gathered by other states. Oregon DOT provides that the form is neither an application nor a permitting process, but instead a notification of planned testing activities. While the testing process is voluntary, it allows companies to work with Oregon DOT to provide feedback and establish working relationships with the State.

Oregon enacted [HB No. 4059](#) in 2018, which, among other things, allowed vehicle platooning in the State. The Bill provides that the FTC rule of the State “does not apply to a person operating a vehicle that is part of a connected automated braking system.” “Connected automated braking system” is defined as

*a system that uses vehicle-to-vehicle communication to electronically coordinate the braking of a lead vehicle with the braking of one or more following vehicles.*

In 2019, [HB 2770](#) was introduced to permit testing of highly AVs on highways. If passed, it would require manufacturers to obtain additional umbrella liability insurance policies prior to testing and direct



Oregon DOT to adopt rules for testing of highly AVs on highways of the state. The Bill currently remains in Committee.

## **Portland**

Although Portland did not win the [Smart City Challenge](#), it decided to apply the principals of the program to the city regardless. As part of [Smart City PDX](#), it created its own [AV testing procedures](#). In April 2017, Portland's Mayor signed a [Smart Automated Vehicle Initiative \(SMVI\)](#) for the City. The goals of the SMVI is to:

- spur innovation and guide emerging transportation technology;
- show how AVs can advance the Vision Zero goal to eliminate all traffic deaths and serious injuries by 2025;
- prioritize fleet AVs that are electric and shared;
- establish a clear permitting process to apply to Portland Board of Transportation to test AVs in the City; and
- encourage testing of new technologies to benefit low and moderate income Portlanders and

high value trips like public transit and freight.

The City's [Automated Vehicle Policies](#) were adopted by the City Counsel in June 2018. The City also adopted [administrative rules](#) for the permit process to test AVs within the city.

## **Academic Institutions**

Oregon State University announced in October 2019 it will begin [research to build infrastructure for the safety, performance and security of driverless cars](#), supported by a \$1.5 million grant from the National Science Foundation. The project, a collaborative effort with the University of Pennsylvania and Clemson University, will put one-tenth-scale autonomous cars, which are less expensive and safer to test new technology with, into the hands of researchers nationwide.

Over the next three years, investigators will develop a fleet of about 80 cars; a simulator for autonomous driving supporting multiple cars, environments and configurations to test the cars; a comprehensive manual; a community Q&A site; lecture notes and videos for a course based on the scaled-down cars; and a demonstration kit for community-building events such as talks, tutorials and short courses. The

main product of the grant project is not the cars themselves, which will ultimately be donated to high schools and other groups, but the infrastructure that allows researchers to buy parts, download code and documentation, and build their own research or teaching platforms.

## Pennsylvania

Pennsylvania passed [SB No. 1267](#) in 2016 allowing for the allocation of up to \$40 million in state funds to local governments for upgrading and implementing intelligent transportation system applications.

Pennsylvania created an [Autonomous Vehicle Policy Task Force](#) (AV Policy Task Force) which issued a Report in 2016 on an AV Policy. The [Report](#) makes recommendations including:

- testers of HAVs must submit testing proposals to the Pennsylvania DOT (PennDOT) and enter contracts attesting that the vehicles meet all federal and state safety standards and meet the policies adopted by PennDOT;
- PennDOT and the Pennsylvania Turnpike Commission may temporarily restrict HAVs from certain routes;

- platooning of HAVs will be restricted to two commercial or three passenger vehicles;
- the HAVs must be able to record data that can be used to investigate crashes involving the HAVs and PennDOT will have access to the data;
- testers must certify that [cybersecurity protections](#) are in place for the HAVs; and
- PennDOT and State Police will make annual reports on HAV testing to the Legislature.

In July 2018, after discussions with the AV Policy Task Force and a dozen AV technology companies, PennDOT issued [Automated Vehicle Testing Guidance](#). Taking the Guidance into consideration, in order for an entity to test a HAV in Pennsylvania, the entity must complete a [Notice of Testing Form](#) and if necessary, a [Notice of Testing Supplement](#). Testers are also required to supply PennDOT with [semi-annual collections](#) of data gathered during the testing.

PennDOT also released the [Joint Statewide Connected and Automated Vehicles Strategic Plan](#) (CAV Strategic Plan) in 2018. The CAV Strategic Plan serves as a road

map for organizational change as CAV technology advances.

In 2018, Pennsylvania passed [HB No. 1958, \(Act 117\)](#), which establishes a number of guidelines and practices for the use of AV in work zones and allowing certain vehicle platoons to operate in the Commonwealth. The Act defines platoon as

*A group of buses, military vehicles or motor carrier vehicles traveling in a unified manner at electronically coordinated speeds at following distances that are closer than would be reasonable and prudent without the coordination. The term does not include a school bus or a school vehicle.*

In 2019, [HB 1078](#) was introduced regarding the operation of an AV shuttle on an approved route. The Bill was referred to the Transportation Committee in April.

The AV Policy Task Force has organized a yearly [PA Automated Vehicle Summit](#) within the Commonwealth since 2017. The most recent Summit was held in September 2019 in Pocono Manor, PA.

PennDOT received an \$8.4 million [federal grant](#) in September 2019, that it will use over four years to develop a system to allow self-driving vehicles to [navigate safely through work zones](#). The grant was the largest of eight awards worth nearly \$60 million announced by USDOT to study various safety factors for self-driving vehicles. PennDOT, the Pennsylvania Turnpike Commission, Carnegie Mellon University (CMU), Pennsylvania State University (PSU) and several other partners will work together on this four-year project, slated to begin in 2020.

### **Pittsburgh**

In 2016, Pittsburgh applied for a \$50 million grant through the [Smart City Challenge](#) for future-minded transportation infrastructure research, but the grant was awarded to Columbus, Ohio. As a result of the application, Pittsburgh created [SmartPGH](#), with the goal of making Pittsburgh a leader in “transportation and innovation to address Pittsburgh’s challenges and make all residents’ lives better.” One of the programs created by SmartPGH includes launching an autonomous shuttle network in the city.

Pittsburgh also is home to Uber's AV development center. In 2016, the Mayor of Pittsburgh, William Peduto, agreed to allow Uber to test its AVs within the city. Since that time, several other AV companies have been testing their vehicles within the city, including, Aurora and Argo.

In March 2019, Mayor Peduto issued an [Executive Order](#) (Pittsburgh Principles) outlining the objectives and expectations from the city for testing AVs.

The Pittsburgh Principles include:

- instituting transparent lines of communication between the City and partners testing AVs, and annual reports on the implementation of AV policies;
- promoting ADS that encourage high vehicle occupancy with lower or no emissions, and lower cost and equitable transportation options; and
- engaging industry leaders and community stakeholders to collaboratively facilitate the further development and deployment of self-driving technology.

The [Department of Mobility and Infrastructure](#) (DOMI) will be in

charge of the oversight of AV testing and charged with, among other things, to publish guidelines for the testing of self-driving technology on public streets, which, at a minimum:

- complement the AV testing guidance adopted by PennDOT, Legislature or Office of the Governor;
- identify the testers and the anticipated time, place, and manner testing is to occur;
- increase public transparency and knowledge of the testing occurring on public streets;
- ensure reliable communication between testers and city authorities in the event of emergency; and
- identify the data reasonably necessary to be collected from testers in order for public agencies to understand the impact and opportunity of testing on public safety.

DOMI is also charged with publishing recommendations with regard to HAV use of city managed and controlled assets and facilities. DOMI must regularly report to the public, at least annually, regarding the development of and compliance with guidelines and policies, results of data analysis and recommendations for

continued public advancement of these technologies.

The Knight Foundation awarded [DOMI a \\$400,000 grant](#) in 2019. The grant is to be used to increase public engagement and outreach on the testing and deployment of AVs.

Mayor Peduto also released [Pittsburgh's Shared and Autonomous Mobility Principles](#) and the [City of Pittsburgh Autonomous Testing Guidelines and Submission Process](#).

The City released its [Self-Driving Vehicle Testing in Pittsburgh Summary of Findings](#) in April 2019 based upon surveys sent to testers by DOMI in response to Mayor Peduto's Executive Order. The Summary includes information regarding issues such as impact on local employment and safety.

### **South Fayette Township**

Developers have announced plans to construct a track for an AV testing site at the former Campbells Airport site between Cecil-Sturgeon and Mohawk roads in South Fayette Township. The developers pitched the idea on behalf of Uber to township Planning Commissioners at a public hearing on August 21, 2019 as part of the process to obtain a conditional use for 429 of the 537 acres at the site. The South Fayette Board of Commissioners

unanimously voted in favor of the testing ground the following month.

### **Academic Institutions**

CMU is considered the birthplace of AV technology. The CMU Robotics Institute is home to the General Motors-Carnegie Mellon Autonomous Driving Collaborative Research Lab.

In 2019, CMU and Argo AI announced a five-year, \$15 million sponsored research partnership. Argo AI and CMU will establish the [Carnegie Mellon University Argo AI Center for Autonomous Vehicle Research](#), which will pursue advanced research projects to help overcome hurdles to enabling self-driving vehicles to operate in a wide variety of real-world conditions, such as winter weather or construction zones.

PSU's researchers aim to develop a [driver-in-the-loop vehicle simulator tool](#) in order to better understand the effects that CAV technology has on commuting behavior, by utilizing a \$60,000 Multidisciplinary Research Seed Grant. The one-year project will conclude in January 2020.

The [Thomas D. Larson Pennsylvania Transportation Institute](#) at PSU was designated as an AV [Proving Ground by USDOT](#), one of 10



selected sites across the country. The one-mile oval track features a vehicle handling area and a durability-testing course.

University of Pennsylvania's PRECISE (Penn Research In Embedded Computing and Integrated Systems Engineering) was established in 2008 to bring together experts to study the way machines interact with the physical world through their computing systems, aka Cyber-Physical Systems and the Internet of Things. The [Automotive division](#) focuses on designing next generation programmable automobiles that will enable remote diagnostics, remote software updates, and traffic congestion management. Projects include, among others, the [Driver's License Test for Safe AVs](#).

## Rhode Island

[SB No. 2514](#), which was introduced in 2016, would have allowed AVs to operate in the state, however it stalled in Committee.

The Rhode Island Department of Transportation (RIDOT) recently released a request for proposals to test AVs. RIDOT's efforts are part of the [Rhode Island Transportation Innovation Partnership](#) (TRIP) program. TRIP will engage the community, researchers, policy-makers, and other stakeholders as it

explores solutions to address transportation needs for communities using CAVs. TRIP also includes a research component, with the goal of studying autonomous mobility solutions, ridership, workforce impacts, environmental impacts and technology adoption, among others.

RIDOT also announced at the end of 2018 that it has chosen May Mobility's self-driving bus to run a one-year AV pilot program, [Little Roady](#). May Mobility began testing its six-passenger driverless shuttle buses in May 2019 offering rides along a fixed route in the Woonasquatucket River Corridor of Providence, expanding transit within the surrounding neighborhoods.

## South Carolina

South Carolina passed [HB No. 3289](#) in 2017, allowing vehicle platooning systems on public roads. The Bill provides that the FTC of the state

*does not apply to the operator of any nonleading commercial motor vehicle subject to Federal Motor Carrier Safety Regulations and traveling in a series of commercial vehicles using cooperative adaptive cruise control or any other automated driving technology.*



The South Carolina DOT (SCDOT) issued a [Structural Efficiencies Study](#) in which SCDOT defined AVs as:

*Vehicles in which operation occurs without direct driver input to control the steering, acceleration, and braking and are designed so that the driver is not expected to constantly monitor the roadway while operating in the self-driving mode.*

The Report also discusses AVs and other innovative technologies as part of a South Carolina's strategic plan to rebuild its transportation infrastructure and provide adequate, safe and efficient transportation services to the people of the State.

Additionally, in 2017 South Carolina received a \$4 million grant from the Federal Highway Administration. The [Award](#) was made to Greenville County to deploy an automated taxi system. County Officials allocated funds to deploy a system of taxi-shuttles called A-Taxis providing shuttle services starting at the [Clemson University International Center for Automotive Research](#) (CU-ICAR) and then spreading into two test communities.

### Academic Institutions

Clemson University's CU-ICAR, is an advanced technology research campus where education, research and economic development collaborate to create a global venue for the automotive industry. Deep Orange is a vehicle prototype program within CU-ICAR that immerses graduate automotive engineering students into the world of an OEM. In the eighth generation of the Deep Orange program, graduate automotive engineering students were tasked with developing, engineering and realizing a smart, autonomous, highly integrative [Motionboard](#). The modular platform enabled design flexibility for purpose-built future mobility concepts for the year 2025. The Motionboard's functions include traction, braking, steering, energy storage, charging and autonomous driving.

In July 2019, Clemson announced new research led by Yunyi Jia, an assistant professor of automotive engineering and the director of [Collaborative Robotics and Automation Lab](#). Professor Jia received a \$500,000 CAREER award from the National Science Foundation to study what it will take to make people more comfortable with robots, including AVs that drive themselves and collaborative robots involved in advanced manufacturing.

## South Dakota

South Dakota has yet to pass laws relating to AVs. [SB No. 139](#) was introduced in 2014 to authorize the testing of AVs on highways within the State but was tabled in Committee.

[HB 1068](#) was signed by the Governor in March 2019 regarding platooning. The Bill provides that the Transportation Commission shall promulgate rules to authorize the testing and operation of groups of individual motor vehicles traveling in a unified manner at electronically coordinated speeds and distance intervals that are closer than otherwise allowed under State law.

## Tennessee

In 2015, Tennessee passed [SB No. 598](#), which specifies that no political subdivision may prohibit the use of a motor vehicle within jurisdictional boundaries of the political subdivision solely on the basis of being equipped with autonomous technology if the motor vehicle otherwise complies with all safety regulations of the political subdivision. Autonomous technology is defined as:

*technology installed on a motor vehicle that has the*

*capability to drive the motor vehicle without the active physical control or monitoring by a human operator.*

In 2017 Tennessee enacted [SB No. 151](#), entitled the Automated Vehicles Act (AV Act). The AV Act defines ADS as:

*Technology installed on a motor vehicle that has the capability to drive the vehicle on which the technology is installed in high or full automation mode, without any supervision by a human operator... including the ability to automatically bring the motor vehicle into a minimal risk condition in the event of a critical vehicle or system failure or other emergency event.*

The AV Act allows an ADS to operate on the streets and highways of Tennessee without a human driver physically present in the vehicle. However, to operate without a driver present the vehicle must meet certain requirements:

- the vehicle is capable of compliance with Federal and State law;

- the vehicle is capable of achieving a minimal risk condition in the event of ADS failure;
- the vehicle is registered; and
- the vehicle has insurance coverage.

Tennessee also adopted [SB 676](#) in 2017, authorizing a person to operate a platoon on the streets and highways of the state after the person provides notification to the Tennessee DOT and the Department of Safety. Platoon is defined as “a group of individual motor vehicles that are traveling in a unified manner at electronically coordinated speeds.”

### Memphis

In 2019, Memphis partnered with Extreme Networks, Inc. to roll out autonomous trucks and an intelligent routing system transporting both citizens and goods to enhance transit and the city’s network infrastructure. The AV roll-out is part of a larger partnership between the city and Extreme Networks to give Memphis a Smart City advantage. The company will be providing the city with switching, management and analytics technology as well as a simplified network management, meeting the city’s growing bandwidth demands

and supporting new technologies as they come online.

### Nashville

Nashville is one of ten cities worldwide in 2016 chosen for an AV initiative launched by Bloomberg Philanthropies and the Aspen Institute. The program, called [the Bloomberg Aspen Initiative on Cities and Autonomous Vehicles](#), supplies Nashville access to data and coaching from urban planners and other experts in order to help prepare the city for self-driving cars and how to use those cars to address transit issues.

In April 2018 the City released [Connected Nashville: A Vision for a Smarter City](#). One of the City’s strategic actions is to continue work with state-level agencies and policymakers, as well as the automotive industry, to establish safety and registration policies for the testing and operation of CAVs.

### Academic Institutions

In 2016, as part of the University of Memphis’ push to develop strong research competencies in robotics, AVs and drones, the FedEx Institute of Technology granted [research awards](#) totaling \$182,000 for 13 innovative research proposals. The awards address the challenges of

application of robotics, AVs and drones across a variety of disciplines, including but not limited to:

- considering the potential impact of AVs on transportation planning and equity in Memphis;
- secure information sharing among AVs;
- restoring damaged metallic parts of robots, AVs and drones by additive manufacturing; and
- integrated platforms and algorithms of multisensory data capture and
- decision support for AVs.

DENSO, recently presented a check for \$45,000 to Tennessee Tech's College of Engineering to support the University's [new autonomous electric vehicle platform](#) and competitive Baja SAE and Formula SAE teams.

## Texas

Toward the end of 2016, cities and regions across Texas partnered with the Texas A&M Transportation Institute (TTI), the University of Texas at Austin's Center for Transportation Research and the Southwest Research Institute to form the [Texas Automated Vehicle Proving Ground Partnership](#). The statewide partnership aims to

create a platform for innovation to address community challenges. In 2017, the Partnership was named a national [Automated Vehicle Proving Ground](#) for the testing of CAV technologies by USDOT.

Texas passed [SB No. 2205](#) in 2017, which allows for AV operation in the State. The Texas law concisely defines automated motor vehicle as:

*a motor vehicle on which an automated driving system is installed.*

The Law allows an AV to operate on roadways, regardless of whether someone is present in the vehicle. However, an unmanned AV must:

- be in compliance with traffic laws;
- include a recording device for vehicle data;
- be registered and titled in the state; and
- be covered by liability insurance.

The bill also prohibits a political subdivision or a state agency from imposing a franchise or other regulation related to the operation of such a vehicle or system.

Texas also enacted [HB No. 1791](#) in 2017, which allows for vehicle platooning. The Bill authorizes a vehicle equipped with a connected braking system following another vehicle equipped with that system to be assisted by the braking system to maintain the required assured clear distance or sufficient space. It should be noted however, that the Bill does not explicitly exempt platooning vehicles from the “assured clear distance” or “sufficient space” FTC rules within the state.

Several bills were introduced at the beginning of the 2019 legislative session to address Texas' self-driving car laws, none of which were enacted into law:

- [HB 119](#): increased liability of manufacturers in the event of a crash involving an AV;
- [HB 113](#): requires providers to equip vehicles with a failure alert system and the latest software;
- [HB 568](#): relating to the regulation of automated neighborhood electric vehicles; and
- [HB 2219/SB 1135](#): relating to the operation of public transit vehicles equipped with connected braking systems.

In January 2019, the Texas DOT (TxDOT) announced the formation of the [Connected And Automated Vehicle Task Force](#). The task force is designed to be a one-stop resource for information and coordination on all ongoing CAV projects, investments and initiatives in Texas. In addition to documenting public and private entity efforts and facilitating partnerships, the CAV Task Force will host industry forums and report lessons learned to facilitate progress and encourage greater collaboration.

### [Austin](#)

In 2016, Austin was chosen to participate in a program for leading global mayors who will work together to prepare their cities for the emergence of AVs through the [Bloomberg Aspen Initiative on Cities and Autonomous Vehicles](#).

Austin additionally joined select cities and transportation agencies around the world to pilot a new AV deployment platform called [INRIX AV Road Rules](#). The INRIX platform can be used as a foundation for cities and road authorities to communicate with operators for the safe and effective deployment of HAVs on public roads. It enables cities and road authorities to assign, validate and manage traffic rules and restrictions for AVs operating on public roads. The platform also



leverages HAV data from roads to report infrastructure improvement needs, making the roads safer for users.

Austin has also formed a [Smart Mobility Program](#). The Program seeks to foster creative, mutually beneficial partnerships to carry out real-world testing of smart mobility technology, such as shared, autonomous, connected and electric vehicles.

Google began testing its AVs in Austin in 2016, which included the first-ever trip where someone took a ride on public roads without a legal driver in an AV.

In the fall of 2018, Austin began allowing autonomous shuttles to operate within the city, launching the nation's largest autonomous bus pilot program. In the beginning phase, the city and its partners, Capital Metro and RATP Dev USA, evaluated the performance of six 15-passenger buses for up to 60 days. Meanwhile, the city accepted proposals from AV makers to lease driverless buses for a year while it monitors for safety and reliability.

In August 2019, [Austin-Bergstrom International Airport](#) announced that the electric AV called [Easy Mile EZ10](#) will be tested for six months in an environmental and people-moving project. An airport attendant will be present to help travelers and for safety

purposes. The shuttle, with seating for six and room for other passengers to stand, has a pre-programmed route between the Barbara Jordan Terminal and the rental car/ground transportation sites. The shuttle also complies with the Americans with Disabilities Act and has wheelchair accessibility.

Ford announced in September 2019 that would bring a fleet of self-driving cars to Austin to make the city a proving ground for their attempt to develop the budding technology. Ford will begin deploying the prototypes sometime between mid-November and the end of 2019. The cars will first be deployed in East Austin and downtown as Ford develops technology that could ultimately lead to its first full-purpose, self-driving model. Every car will have a safety driver ready during the testing. Ford also announced it plans to launch newly designed commercial AVs in Austin by 2021. The vehicle won't have a steering wheel or pedals.

### **San Antonio**

In July 2018, San Antonio sought a [Request for Information](#) to develop an AV Pilot Program. Although San Antonio's Fredericksburg Road-Medical Drive corridor is formally listed as part of the [Texas Automated Vehicle Proving Ground](#)



[Partnership](#), self-driving cars have not been seen driving along city streets.

In 2019, the city [partnered with Brooks and VIA Metropolitan Transit](#) on plans to use two autonomous shuttles in a pilot program centered around the Brooks Transit Center, located in the former U.S. Air Force base turned mixed-use development. The intent is to get the six- to eight-person passenger shuttles into action by the end of 2019.

The Texas-based supermarket chain, [H-E-B, has teamed up with Udelv to launch their first pilot program together later in 2019](#). To begin with, the pilot program will have a single AV and run out of one of H-E-B's grocery stores in San Antonio delivering to residents in Olmos Park. When the pilot program launches, there will be a driver in the car, for “safety and technical purposes.”

### **Houston**

In Spring 2019, grocery store Kroger's autonomous delivery pilot transfers its collaboration with tech firm Nuro to Houston. The grocer will offer delivery from two stores, reaching customers across four zip codes in the metropolitan market. By the end of 2019, the next generation of AVs for Nuro, the bot called the R1 will begin operation in Houston.

In addition, Nuro has partnered with Dominos to begin pizza delivery in Houston in the fall of 2019. This would be the first major brand time-sensitive delivery testing Nuro is undertaking.

Kodiak Robotics announced in August 2019 it began using its self-driving technology to operate semi-trucks on the more than 200 mile stretch of I-45 between Dallas and Houston. The trucks are hauling freight for commercial clients. The self-driving trucks are operating with a “safety driver” at the wheel. The safety driver is also responsible for more complicated city driving and navigating shipping facilities.

### **Frisco**

In 2018, as part of its [Transportation Strategic Plan](#), the City of Frisco noted that preparation was needed for emerging areas, such as fixed routes and on-demand ride services that include electric, shared and autonomous vehicles.

Drive.ai operated a small fleet of autonomous Nissan NV200s shuttles on a single route between an office park and a high-end shopping complex in Frisco beginning in the summer of 2018. The program ended in March 2019.

## Arlington

In 2017, Arlington became the first city in the United States to offer continuous autonomous shuttle service to the public, with the [Milo pilot program](#). Using EasyMile AVs, this program operated off-street in the Entertainment District, connecting passengers from parking areas to Arlington's entertainment venues.

In October 2018, Arlington also [became the first Texas city to offer an on-street driverless transportation](#) option to the general public with partner Drive.ai. The company's vehicles operated on streets within Arlington's Entertainment District, using an on-demand system to connect passengers with employment centers, restaurants, entertainment venues and public recreational spaces. At the completion of the program in Frisco in March 2019, four additional shuttles joined the three already deployed in Arlington.

## Dallas

Uber announced it will bring its self-driving vehicle operation to Dallas in November 2019, starting with manual driving to collect data on the city's roads. For now, the vehicles will not operate in full autonomous mode. Instead, each car will be driven by a human who will maintain control at all times to allow the cars' systems to map

city streets and help ready the vehicles for the open road.

## Academic Institutions

Texas Southern University (TSU) is home to Houston's first autonomous shuttle — a tiny 12-passenger vehicle that transports students and staff along TSU's Tiger Walk. [METRO](#) is operating the [campus shuttle](#) as part of a six-month pilot program to learn how AVs could be used in other parts of the region. TSU's Center for Transportation Training and Research will also help provide data on ridership.

In October 2018 Texas A&M University (A&M) launched a self-driving shuttle system in downtown Bryan, giving the community an opportunity to experience the emerging technology. The six-person vehicles were assembled by Srikanth Saripalli, associate professor in A&M's Department of Mechanical Engineering and associate research scientist at TTI.

This fall, [A&M is adding Designated Drivers](#) (DD) remote-control technology to its autonomous shuttle fleet, the first commercial deployment on public roads for a teleoperation system. In the first phase of the deployment, DD's Remote Assistance will be integrated into the A&M shuttle to authorize the shuttle to

proceed at four-way intersections and stops. The DD system will remotely provide guidance and way points to A&M shuttles operating in the downtown district in Bryan, Texas.

[A&M Transportation Services and TTI will lead an AV demonstration](#) on campus through Nov. 15, 2019. The eleven passenger shuttle route circles the Corps Quad along Lubbock, Bizzell, Lewis and Coke streets. The purpose of the demonstration is to introduce new mobility options to the campus community and gauge interest and use by students, faculty, staff and visitors.

A&M was also awarded a \$7 million [USDOT Automated Driving Systems Demonstration Grant](#) in September 2019 for its [Engineering Experiment Station](#) proposal. Researchers from A&M, George Washington University and the University of California Davis will use the grant for an extensive data collection effort using Level 4 AVs in Texas, Washington D.C. and Northern Virginia. The proposal team will also partner with General Motors, NVIDIA, National Instruments, and Washington D.C. DOT to conduct the tests.

These tests are targeting the challenges of the current deployment efforts, most of which have focused on large cities, overlooking the

multimodal interactions. This project will develop and test ADS for rural roads without high-definition maps and with no or low-quality road signs or markings.

## Utah

Utah passed [HB No. 373](#), in 2015 authorizing the Utah DOT (UDOT) to conduct a CV testing program outside of an urbanized boundary.

The following year, the Legislature passed [HB No. 280](#) requiring the Department of Public Safety, in consultation with other state agencies, including the DMV and the UDOT, to prepare a report, and make recommendations regarding the best practices for regulation of AV technology on Utah highways.

A [Report](#) was issued in response in October 2016 recommending the best practices for AV regulation. The Report suggests that implementing new policies or legislation at the current time would be premature and instead the State should continue to study the issues surrounding the technology. The Report also noted that a committee or council with issue-specific subcommittees may be an effective approach for research and ongoing dialogue.

In 2018 Utah enacted [SB No. 56](#), which allows for exemption to a minimum following distance requirement for the operator of a vehicle that is part of a connected platooning system. The Bill defines connected platooning system as “a system that uses vehicle-to-vehicle communication to electronically coordinate the speed and braking of a lead vehicle with the speed and braking of one or more following vehicles.”<sup>6</sup>

[HB 101](#) was enacted in 2019 amending provisions regarding traffic laws, licensing, and titling requirements to add provision regarding the operation of AVs. The Bill, among other things, allows the operation of AVs within the State; exempts AVs from licensure; provides a protocol in case of an accident involving an AV; and preempts political subdivisions from regulating AVs in addition to regulation provided in state statute.

UDOT and the Utah Transit Authority joined forces for a one-year pilot test of an autonomous shuttle bus service. The two agencies jointly manage a [one-year autonomous shuttle bus pilot program](#) that started in May 2019. The shuttle operates up to 15 miles per hour, follows a predetermined route, and reacts to

other vehicles, pedestrians, and any obstacles that intervene in its path.

In June 2019, UDOT announced a \$50 million contract with Panasonic to design and implement the next phase of the state’s CAV infrastructure. The agreement builds on the state’s existing intelligent transportation system, which includes a statewide fiber network connected to 127 intersections equipped with sensors that can communicate with some of its buses and snowplows. Under the new contract, Utah and Panasonic will search for the geographic areas and software applications imagined to hold the greatest potential for gains in roadway safety.

## Vermont

In 2017 Vermont enacted [HB No. 494](#), which calls for the Secretary of Transportation to convene a meeting of public and private stakeholders with AV expertise. The meeting would discuss, among other issues: licensing of AVs and AV operators; the registration of AVs; AV operator education and training; enforcement of laws governing AV operation; and testing of AVs in Vermont.

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<sup>6</sup> Previously Utah only allowed an exemption from the FTC law for connected platooning testing.

In January 2018 Vermont's Agency of Transportation released [Preparing for Automated Vehicles in Vermont a Report to the Vermont General Assembly](#) report regarding policy and planning for AV development. The Report recommended a focus on facilitating the transition to AVs for Vermonters in a safe and efficient way by:

- providing the statutory authority for a permit process that allows and regulates AV testing in Vermont; and
- providing authority to explicitly accommodate and regulate automated driving on public roads in Vermont by the general public.

The Legislature passed [SB No. 149](#) in 2019, adding a new chapter to codified law providing the Traffic Committee with the responsibility of approving testing of AVs on public highways, directs the Agency of Transportation to identify the municipalities that want to preapprove AV testing and for the Agency to prepare an AV Testing Guide by January 1, 2021.

## Virginia

In 2015, Governor Terry McAuliffe announced the opening of the Virginia Automated Corridors

(VACs), a 70-mile network of highways and arterial roads in Northern Virginia. The VACs are outfitted with high-definition mapping and data acquisition systems to support AV testing. The VACs are operated and maintained by the Virginia DOT (VDOT), DMV and Virginia Tech.

In 2016, [HB 1372](#) was proposed relating to AVs, defining such vehicles as

*a vehicle, as defined by Levels 4 and 5 of SAE J3016 that utilizes an automated driving system that handles all aspects of the dynamic driving task, and does not require the involvement of a driver at any time for its safe operation.*

The bill was referred to and remained in the Committee on Transportation.

VDOT established the [Connected and Autonomous Vehicle Program](#) to guide the Department in the deployment of AV technologies. In 2017, the Program released the [CAV Program Plan](#) to capitalize on the safety and operational benefits of CAV technologies to meet its goals and objectives. The goals and objectives of VDOT's participation in the CAV program are focused on:



- reduction of crashes and fatalities on Virginia roadways by improving safety measures;
- improvement of mobility to reduce delay, increase system reliability and provide more efficient use of physical infrastructure;
- reduction of infrastructure investment through efficiencies enabled by the conversion to CAVS; and
- enhancement of traveler information.

VDOT also operates [SmarterRoads](#) which provides raw and processed data from VDOT and participating third parties. Available data includes signal data accessible to support the CAV industry, third-party enterprises and the public.

[The Virginia Unmanned Systems Center at CIT](#), was launched on May 11, 2017, to serve as a unified voice and central source for information and assistance related to the unmanned systems landscape in Virginia. The Center is responsible for instilling an entrepreneurial culture regarding autonomous systems across Virginia, encourage economic growth across the Commonwealth via autonomous emergent business activities and continue and increase the Commonwealth's position as a leader of the autonomous systems community.

Joint Base Myer-Henderson Hall in Arlington has been selected to test pilot an AV shuttle service starting next month. “Olli” will start circling the base from Henderson Hall Gate to Wright Gate and will be open for service members and their guests in 2019. The vehicles are 3D-printed, electronic and seat eight people, according to manufacturer Local Motors. The pilot will assist the U.S. Army and U.S. Marine Corps collect data about AVs on military installations.

In September 2019, Daimler Trucks, along with Torc Robotics, announced it began [testing its SAE level 4 self-driving trucks](#), which it is planning to launch commercially in Virginia. Daimler tested the truck on public roads near Torc’s base in southwest Virginia. Engineers and safety drivers are present during test runs and the vehicles are placed on test runs on public roads only after it performs safety checks and tests on closed-loop tracks.

### **Fairfax County**

Fairfax County and Dominion Energy are partnering on an [autonomous electric shuttle pilot](#) tentatively planned for the Merrifield area in Fairfax County. The Project was awarded a grant in June 2019 from the Virginia Department of Rail and Public Transportation (VDRPT) for



the execution of the pilot, making this pilot the first state-funded autonomous public transportation demonstration project in Virginia. Fairfax County will provide a \$50,000 local match to the VDRPT grant.

### **Crozet**

Crozet launched the first AV to operate on public streets in Virginia. The vehicle was created by Perrone Robotics, a company founded in Crozet. The pilot program will allow people to ride the shuttle for free to various points around Crozet. The shuttle, nicknamed [AVNU](#), for Autonomous Vehicle Neighborhood Use, will initially operate only in the Old Trail neighborhood, before branching out to downtown Crozet and Crozet Park. The project is a partnership with Albemarle County, JAUNT, Perrone and Smart Mobility.

### **Academic Institutions**

[The Virginia Tech Transportation Institute \(VTTI\)](#), the transportation research and innovation arm of Virginia Polytechnic Institute and State University (Virginia Tech), has been awarded two [grants from USDOT](#), totaling \$15 million to conduct research on the advancement of AV in the U.S. The funding, with additional support from VDOT, will support two programs: [Automated](#)

[Driving Systems](#) and [Public Safety and Automated Trucks and Mixed Fleets](#).

VTTI is also a founding member of the [Safety through Disruption University Transportation Center \(UTC\)](#). The UTC endeavors to maximize the potential safety benefits of disruptive technologies through targeted research that addresses the most pressing transportation safety questions. Two of UTC's areas of research include CAVs.

## **Washington**

In 2017, Washington Governor Jay Inslee enacted [Executive Order 17-02](#) calling for the establishment of an AV Work Group to advance AV technology and policy within the State. According to the Executive Order, entities conducting AV testing with a human present in the vehicle must [self-certify compliance](#) to the Department of Licensing (DOL) with testing requirements, including:

- possessing a valid driver's license;
- proof of financial responsibility; and
- the operator's ability to direct the vehicle.

Entities conducting AV testing without a human present in the vehicle must self-certify compliance to the DOL with additional testing requirements.

Subsequent to the Executive Order, in 2018 Washington enacted [HB No. 2970](#), establishing an AV Work Group. The [AV Work Group](#) has three primary responsibilities:

- serves as the central clearing house for all AV related issues;
- tasked with following developments in AV technology, law, and policy and identifying potential improvements; and
- tasked with making recommendations to Washington State Transportation Commission.

The Working Group released its [Annual Report](#) at the end of 2018 with recommendations for the 2019 Legislature. The Working Groups also created a two-year work plan for 2019-2021, which includes, among other things:

- development of goals and guiding principles that will support the assessment of legal and regulatory needs;
- development of a communications strategy; and

- collection of information on AVs from experts and industry leaders within Washington State and nationwide.

## West Virginia

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[HB 2910](#) and [HB 2881](#) were introduced in 2017 setting AV standards and allowing AV operation, but both failed to pass. No other legislation regarding AVs has been introduced.

## Wisconsin

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Governor Scott Walker signed [Executive Order No. 245](#) in May 2017, which created the Governor's Steering Committee on AVs. The Committee is tasked with advising the Governor on how to best advance AV testing and operation in Wisconsin. In response to the Executive Order, the Governor's Steering Committee (which is deemed disbanded upon issuance of its report, per the Executive Order) issued a comprehensive AV [Report](#) on June 29, 2018, which makes two primary recommendations.

First, the Report recommends the removal or modification of all Wisconsin laws that are barriers to safe AV testing and deployment. The Report stresses the importance of

writing clear laws allowing Wisconsin residents and businesses to realize the potential and advantages of AV technology.

Second, the Report recommends the State continue to monitor AV technologies by establishing an AV working group.

Wisconsin enacted [SB No. 695](#) in 2018, which allows vehicle platoons to operate in the State. The Bill defines vehicle platoon as:

*a group of individual motor vehicles traveling in a unified manner at electronically coordinated speeds.*

[Wisconsin Department of Transportation](#) (WisDOT) has committed to the development of [Smart Corridors](#) within the State for the use of CAVs to enhance Wisconsin's transportation system. WisDOT plans to submit a future request for the federal Infrastructure for Rebuilding America grant program funds to enable CAV functionality along the I-94 North/South corridor and adjacent roads.

### **Academic Institutions**

Wisconsin is home to one of ten [USDOT Automated Vehicle Proving Grounds](#) at the University of

Wisconsin-Madison (UW-Madison). The mission of the [Wisconsin AV Proving Grounds](#) is to provide a path to public road evaluation by contributing to the safe and rapid advancement of AV development and deployment, and providing a full set of test environments, coupled with research, open data and stakeholder communication.

In 2018, UW-Madison launched the Autonom Shuttle, an 11-seat AV made by Navya. While the Navya shuttle has a top speed of about 28 mph, it traveled around 10 or 11 mph on a route that took it clockwise on Linden Drive, to Elm Drive, to Observatory Drive, to Babcock.

## **Wyoming**

In March of 2018, the Wyoming DOT (WYDOT) issued a [Report](#), which includes a discussion of AV technology, policy and law. The WYDOT indicated in the Report that it would recommend focusing on infrastructure before adding any laws.

Additionally, WYDOT has a [Connected Vehicle Pilot Program](#) through [USDOT Connected Vehicle Pilot Deployment](#) dedicated to advancing CV technology. The Pilot Program seeks to improve WYDOT's monitoring and reporting of road conditions to vehicles with V2V,

V2I, and infrastructure-to-vehicle communications.

In 2019, [HB 226](#), which would allow the operation of AVs within the State, was received by the House, but the House did not consider the Bill for introduction.

## Appendix

## Laws/Orders/Standards by State

State	Law	Year
Alabama	<a href="#">SJR 81</a>	2016
	<a href="#">SJR 55</a>	2017
	<a href="#">SB 125</a>	2018
	<a href="#">SB 47</a>	2019
	<a href="#">SJR 21</a>	2019
Alaska	None	
Arizona	<a href="#">Executive Order No. 2015-09</a>	2015
	<a href="#">Executive Order No. 2018-04</a>	2018
	<a href="#">Executive Order No. 2018-09</a>	2018
	<a href="#">Law Enforcement Protocol for Fully Autonomous Vehicles</a>	2018
Arkansas	<a href="#">Act 797</a>	2017
	<a href="#">Act 468</a>	2019
	<a href="#">Act 1052</a>	2019
California	<a href="#">SB No. 1298</a>	2012
	<a href="#">SB 719</a>	2015
	<a href="#">Assembly Bill No. 669</a>	2017
	<a href="#">Assembly Bill No. 87</a>	2018
	<a href="#">Automated Vehicle Principles for Healthy and Sustainable Communities</a>	2018
	<a href="#">Driverless Testing Regulations</a>	2018



Colorado	<a href="#">SB No. 17-213</a>	2017
	<a href="#">SB 19-239</a>	2019
Connecticut	<a href="#">Public Act No. 17-69</a>	2017
	<a href="#">Public Act 19-119</a>	2019
Delaware	<a href="#">Executive Order No. 14</a>	2017
District of Columbia	<a href="#">L 19-0278 (D.C. Act 19-643)</a>	2012
	<a href="#">Mayor's Order 2018-018</a>	2018
	<a href="#">D.C. Act 22-434</a>	2018
Florida	<a href="#">HB No. 1207</a>	2012
	<a href="#">HB No. 7027</a>	2016
	<a href="#">HB No. 7061</a>	2016
	<a href="#">HB No. 311</a>	2019
	<a href="#">HB No. 385</a>	2019
	<a href="#">HB No. 107</a>	2019
Georgia	<a href="#">House Resolution 1265</a>	2013
	<a href="#">SB No. 219</a>	2017
	<a href="#">HB 472</a>	2017
	<a href="#">Senate Resolution 133</a>	2019
Hawaii	<a href="#">Executive Order No. 17-07</a>	2017
	<a href="#">House Concurrent Resolution 220</a>	2019
	<a href="#">House Resolution No. 195</a>	2019

Idaho	<a href="#">Executive Order No. 2018-01</a>	2018
Illinois	<a href="#">HB No. 0791</a>	2017
	<a href="#">Executive Order No. 2018-13</a>	2018
Indiana	<a href="#">HB No. 1290</a>	2018
Iowa	<a href="#">Senate File 302</a>	2019
	<a href="#">House File 387</a>	2019
Kansas	<a href="#">House Substitute for SB No. 391</a>	2018
Kentucky	<a href="#">SB No. 116 (Act No. 33)</a>	2018
Louisiana	<a href="#">HB No. 1143 (Act 318)</a>	2016
	<a href="#">HB 308 (Act No. 310)</a>	2018
	<a href="#">HB 455 (Act 232)</a>	2019
Maine	<a href="#">Executive Order No. 2018-001</a>	2018
	<a href="#">H.P. 1204 – L.D. 1724</a>	2018
Maryland	<a href="#">Connected and Automated Vehicle Strategic Plan</a>	2017
	Process for <a href="#">HAV permit</a>	2018
Massachusetts	<a href="#">Executive Order No. 572</a>	2016
	<a href="#">Executive Order No. 579</a>	2018
	<a href="#">Memorandum of Agreement to Test Automated Driving Systems on Public Roadways in Massachusetts</a>	2018
	<a href="#">Executive Order</a>	2016
Boston		

Michigan	<a href="#">SB No. 995</a>  <a href="#">SB No. 996</a> <a href="#">SB No. 997</a>  <a href="#">SB No. 998</a>  <a href="#">HB No. 5749 (Act 377)</a>	2016  2016 2016  2016  2018
Minnesota	<a href="#">Executive Order No. 18-04</a>  <a href="#">H.F. No. 6</a>  <a href="#">Executive Order 19-18</a>	2018  2019  2019
Mississippi	<a href="#">HB No. 1343</a>	2018
Missouri	None	
Montana	<a href="#">House Joint Resolution 34</a>	2019
Nebraska	<a href="#">Legislative Bill No. 989</a>	2018
Nevada	<a href="#">Assembly Bill No. 511</a>  <a href="#">SB No. 313</a>  <a href="#">Assembly Bill No. 69</a>	2011  2013  2017
New Hampshire	<a href="#">Act No. 2019-310</a>  <a href="#">House Bill No. 522</a>	2019  2019
New Jersey	<a href="#">Assembly Joint Resolution 164</a>	2019
New Mexico	<a href="#">Joint Memorial</a> (SJM-3)	2019
New York	<a href="#">SB No. 2005 (Act No. 55)</a>	2017

North Carolina	<a href="#">HB No. 469</a>	2017
	<a href="#">HB No. 716</a>	2017
North Dakota	<a href="#">HB No. 1065</a>	2015
	<a href="#">HB No. 1202</a>	2017
	<a href="#">HB No. 1418</a>	2019
	<a href="#">HB No. 1199</a>	2019
Ohio	Executive Order No. 2018-01K	2018
	Executive Order No. 2018-04K	2018
Oklahoma	<a href="#">SB 365</a>	2019
	<a href="#">SB 189</a>	2019
	<a href="#">HB 1365</a>	2019
Oregon	<a href="#">HB No. 4059</a>	2018
	<a href="#">HB No. 4063</a>	2018
Pennsylvania	<a href="#">SB No. 1267</a>	2016
	<a href="#">HB No. 1958, (Act 117)</a>	2018
Rhode Island	<a href="#">Rhode Island Transportation Innovation Partnership (TRIP)</a>	2017
South Carolina	<a href="#">HB No. 3289</a>	2017
South Dakota	<a href="#">HB 1068</a>	2019
Tennessee	<a href="#">SB No. 598</a>	2015
	<a href="#">SB No. 151</a>	2017
	<a href="#">SB 676</a>	2017

Texas	<a href="#">HB No. 1791</a>	2017
	<a href="#">SB No. 2205</a>	2017
Utah	<a href="#">HB No. 373</a>	2015
	<a href="#">HB No. 280</a>	2016
	<a href="#">SB No. 56</a>	2018
	<a href="#">HB 101</a>	2019
Vermont	<a href="#">HB No. 494</a>	2017
	<a href="#">SB No. 149</a>	2019
Virginia	<a href="#">CAV Program Plan</a>	2017
Washington	<a href="#">Executive Order 17-02</a>	2017
	<a href="#">HB No. 2970</a>	2018
Wisconsin	<a href="#">Executive Order No. 245</a>	2017
	<a href="#">Senate Bill No. 695</a>	2018
West Virginia	None	
Wyoming	<a href="#">Connected Vehicle Pilot Program</a>	2015

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Year	State	Law
2011	Nevada	<a href="#">Assembly Bill No. 511</a>
2012	California	<a href="#">SB No. 1298</a>
	District of Columbia	<a href="#">L 19-0278 (D.C. Act 19-643)</a>
	Florida	<a href="#">HB No. 1207</a>
2013	Georgia	<a href="#">House Resolution 1265</a>
	Nevada	<a href="#">SB No. 313</a>
2014	N/A	N/A
2015	Arizona	<a href="#">Executive Order No. 2015-09</a>
	California	<a href="#">SB 719</a>
	North Dakota	<a href="#">HB No. 1065</a>
	Tennessee	<a href="#">SB No. 598</a>
	Utah	<a href="#">HB No. 373</a>
	Wyoming	<a href="#">Connected Vehicle Pilot Program</a>
2016	Alabama	<a href="#">SJR 81</a>
	<i>Boston</i>	<a href="#">Executive Order</a>
	Florida	<a href="#">HB No. 7027</a>
		<a href="#">HB No. 7061</a>
	Louisiana	<a href="#">HB No. 1143 (Act 318)</a>
	Massachusetts	<a href="#">Executive Order No. 572</a>



2016	Michigan	<a href="#">SB No. 995</a>
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		<a href="#">SB No. 997</a>
		<a href="#">SB No. 998</a>
	Pennsylvania	<a href="#">SB No. 1267</a>
	Utah	<a href="#">HB No. 280</a>
2017	Arkansas	<a href="#">Act 797</a>
	California	<a href="#">Assembly Bill No. 669</a>
	Colorado	<a href="#">SB No. 17-213</a>
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		<a href="#">HB 472</a>
	Hawaii	<a href="#">Executive Order No. 17-07</a>
	Illinois	<a href="#">HB No. 0791</a>
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	Nevada	<a href="#">Assembly Bill No. 69</a>
	New York	<a href="#">SB No. 2005 (Act No. 55)</a>
	North Carolina	<a href="#">HB No. 469</a>
		<a href="#">HB No. 716</a>
	North Dakota	<a href="#">HB No. 1202</a>
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2018	<p>Alabama</p> <p>Arizona</p> <p>California</p> <p>District of Columbia</p> <p>Idaho</p> <p>Illinois</p> <p>Indiana</p>	<p><a href="#"><u>SJR 55</u></a></p> <p><a href="#"><u>Executive Order No. 2018-04</u></a></p> <p><a href="#"><u>Executive Order No. 2018-09</u></a></p> <p><a href="#"><u>Law Enforcement Protocol for Fully Autonomous Vehicles</u></a></p> <p><a href="#"><u>Assembly Bill No. 87</u></a></p> <p><a href="#"><u>Automated Vehicle Principles for Healthy and Sustainable Communities</u></a></p> <p><a href="#"><u>Driverless Testing Regulations</u></a></p> <p><a href="#"><u>Mayor's Order 2018-018</u></a></p> <p><a href="#"><u>D.C. Act 22-434</u></a></p> <p><a href="#"><u>Executive Order No. 2018-01</u></a></p> <p><a href="#"><u>Executive Order No. 2018-13</u></a></p> <p><a href="#"><u>HB No. 1290</u></a></p>

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	Pennsylvania	<a href="#"><u>HB No. 1958, (Act 117)</u></a>
	Utah	<a href="#"><u>SB No. 56</u></a>
	Washington	<a href="#"><u>HB No. 2970</u></a>
	Wisconsin	<a href="#"><u>Senate Bill No. 695</u></a>

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		<a href="#"><u>SJR 21</u></a>
	Arkansas	<a href="#"><u>Act 468</u></a>
		<a href="#"><u>Act 1052</u></a>
	Colorado	<a href="#"><u>SB 19-239</u></a>
	Connecticut	<a href="#"><u>Public Act 19-119</u></a>
	Florida	<a href="#"><u>HB No. 311</u></a>
		<a href="#"><u>HB No. 385</u></a>
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	Georgia	<a href="#"><u>Senate Resolution 133</u></a>
	Hawaii	<a href="#"><u>House Concurrent Resolution 220</u></a>
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	Montana	<a href="#"><u>House Joint Resolution 34</u></a>
	New Hampshire	<a href="#"><u>Act No. 2019-310</u></a>
		<a href="#"><u>House Bill No. 522</u></a>
	New Jersey	<a href="#"><u>Assembly Joint Resolution 164</u></a>
	New Mexico	<a href="#"><u>Joint Memorial</u></a> (SJM-3)

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