



The Nelson A. Rockefeller Center at Dartmouth College

The Center for Public Policy and the Social Sciences

The Class of 1964 Policy Research Shop
—Celebrating 10 Years of Service to New Hampshire and Vermont—

**DEVELOPING AUTONOMOUS VEHICLE POLICY IN
NEW HAMPSHIRE**

Evaluating Policy Options across the United States

Presented to the New Hampshire House Transportation Committee

PRS Policy Brief 1617-02

March 1, 2017

Prepared By:

Sam Libby '17

Neil Kamath '17

Paulomi Rao '19

This report was written by undergraduate students at Dartmouth College under the direction of professors in the Rockefeller Center. Policy Research Shop (PRS) students produce non-partisan policy analyses and present their findings in a non-advocacy manner. The PRS is fully endowed by the Dartmouth Class of 1964 through a class gift in celebration of its 50th Anniversary given to the Center. This endowment ensures that the Policy Research Shop will continue to produce high-quality, non-partisan policy research for policymakers in New Hampshire and Vermont. The PRS was previously funded by major grants from the U.S. Department of Education, Fund for the Improvement of Post-Secondary Education (FIPSE) and from the Ford Foundation and by initial seed grants from the Surdna Foundation and the Lintilhac Foundation. Since its inception in 2005, PRS students have invested more than 50,000 hours to produce more than 150 policy briefs for policymakers in New Hampshire and Vermont.



Contact:

Nelson A. Rockefeller Center, 6082 Rockefeller Hall, Dartmouth College, Hanover, NH 03755

<http://rockefeller.dartmouth.edu/shop/> • Email: Ronald.G.Shaiko@Dartmouth.edu



TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION	1
2. METHODOLOGY	4
3. REGULATORY DIMENSIONS AND LANGUAGE OF LEGISLATION	5
3.1 DEFINITIONS	5
3.2 REGISTRATION REQUIREMENTS	6
3.3 OPERATOR REQUIREMENTS	7
3.4 DRIVER'S LICENSE REQUIREMENTS	8
3.5 INSURANCE REQUIREMENTS	9
3.6 VEHICLE REQUIREMENTS	11
3.7 LIABILITY REGULATIONS	12
4. EXPERT INTERVIEW FINDINGS FROM STATES WITH EXISTING REGULATIONS	13
4.1 SUBJECT MATTER EXPERTS	13
4.2 PROPER CATEGORIZATION OF AUTONOMOUS VEHICLE LEGISLATION COMPONENTS	13
4.3 REGULATORY GOALS AND CHALLENGES	14
4.4 SPECIAL DRIVER'S LICENSE ENDORSEMENTS	14
4.5 PHYSICAL PRESENCE OF OPERATOR	15
4.6 VEHICLE REGISTRATION	15
4.7 CONSIDERATIONS FOR NEW HAMPSHIRE	15
5. CONCLUSION	16
APPENDICES: EXTENDED EXAMPLES OF REGULATORY LANGUAGE	17
APPENDIX A. DEFINITIONS LANGUAGE	17
APPENDIX B. REGISTRATION REQUIREMENTS LANGUAGE	18
APPENDIX C. OPERATOR REQUIREMENTS LANGUAGE	19
APPENDIX D. DRIVER'S LICENSE REQUIREMENTS LANGUAGE	21
APPENDIX E. INSURANCE REQUIREMENTS LANGUAGE	22
APPENDIX F. VEHICLE REQUIREMENTS LANGUAGE	23
APPENDIX G. LIABILITY REGULATIONS LANGUAGE	26
REFERENCES	28



EXECUTIVE SUMMARY

This report examines the various policy options that are available to New Hampshire policymakers relating to the regulation of autonomous vehicles, or self-driving cars. In this report, we explore autonomous vehicles legislation across the United States, breaking bills down into specific categories of regulatory interest. We analyze the variation in bills across states to gauge any substantive differences in approaches before presenting possible model language options for New Hampshire. We examine dimensions related to definitions, testing, registration, operators, vehicles, licensing, insurance, and liability. We also present the results of interviews with experts and committee staffs in states that have already passed legislation. We conclude by explaining some of the challenges facing New Hampshire as autonomous technology become more prominent. As technology improves and autonomous vehicles take to the roads in the Granite State, this report can provide guidance on how policymakers in other states have addressed this new technology.

1. INTRODUCTION

In January 2016, U.S. Transportation Secretary Anthony Foxx drafted updates to preliminary autonomous vehicle policies set forth by the National Highway Traffic Safety Administration (NHTSA) from 2013.¹ Most recently, in September 2016, NHTSA issued further updated guidelines for the safe development of highly autonomous vehicles. The policy update examined AV technology policy in four parts—vehicle performance guidelines, model state policy, the current NHTSA regulatory tools, and possible new regulatory actions of the administration.² In these guidelines, the NHTSA proposed a formal classification system for various levels of autonomous vehicles, shown in Figure 1.³ We focus our analysis on the vehicles in Level 4 or Level 5, in which all critical functions are automated.

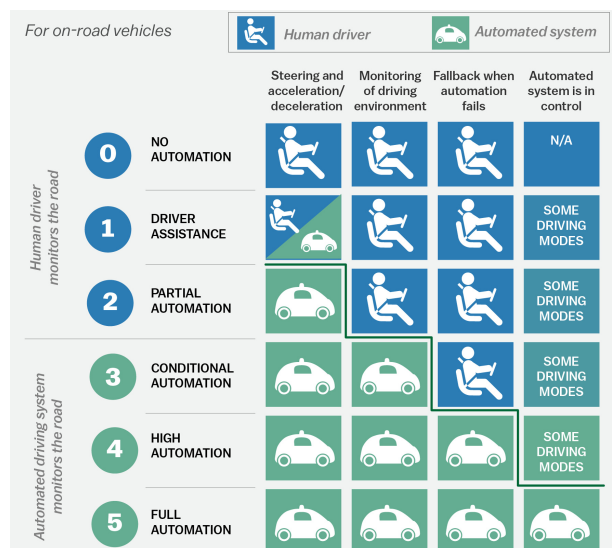


Figure 1. Levels of Vehicle Automation



The NHTSA guidance clearly defines the roles of the federal government compared to the roles of state governments. NHTSA is responsible for setting and enforcing federal motor vehicle safety standards, investigating defects, educating the public, and issuing additional guidance, while states are responsible for licensing, traffic laws, safety inspections, insurance requirements, and liability regulations.⁴

New Hampshire currently has no laws or rules that address the testing or operation of autonomous vehicles. Should an autonomous vehicle crash today, there would be no New Hampshire law guiding legal actors and courts in their efforts to address the situation.⁵

In 2011, Nevada became the first state to authorize the operation of autonomous vehicles. Absent legislation, autonomous vehicles can operate freely and without restriction, which could affect public safety and create legal problems in the event of a crash. Florida, for example, passed HB 1207 (2012) to promote safe autonomous vehicle testing, as it noted that the state neither prohibited nor regulated autonomous technology prior to the passage of the bill.⁶ Florida, like other states, then built on this initial bill to include vehicle, license, insurance, and liability requirements, addressing more substantive issues that developed as the technology changed.

In total, as of January 2017, nine states plus Washington D.C. have enacted 26 bills concerning autonomous vehicles. The remaining 35 proposed bills have either died in committee or failed to pass in their state legislatures, with five bills so far introduced this legislative cycle. Figure 2, which is based on our analysis, displays both states that have introduced autonomous vehicles legislation as well as those states that have succeeded in enacting legislation. Highlighted in light green are the nine states plus Washington D.C. that have enacted autonomous vehicles legislation, and in orange are the states that saw bills proposed but not enacted. New Jersey, along with New Hampshire, have introduced bills this legislative session addressing autonomous vehicles.

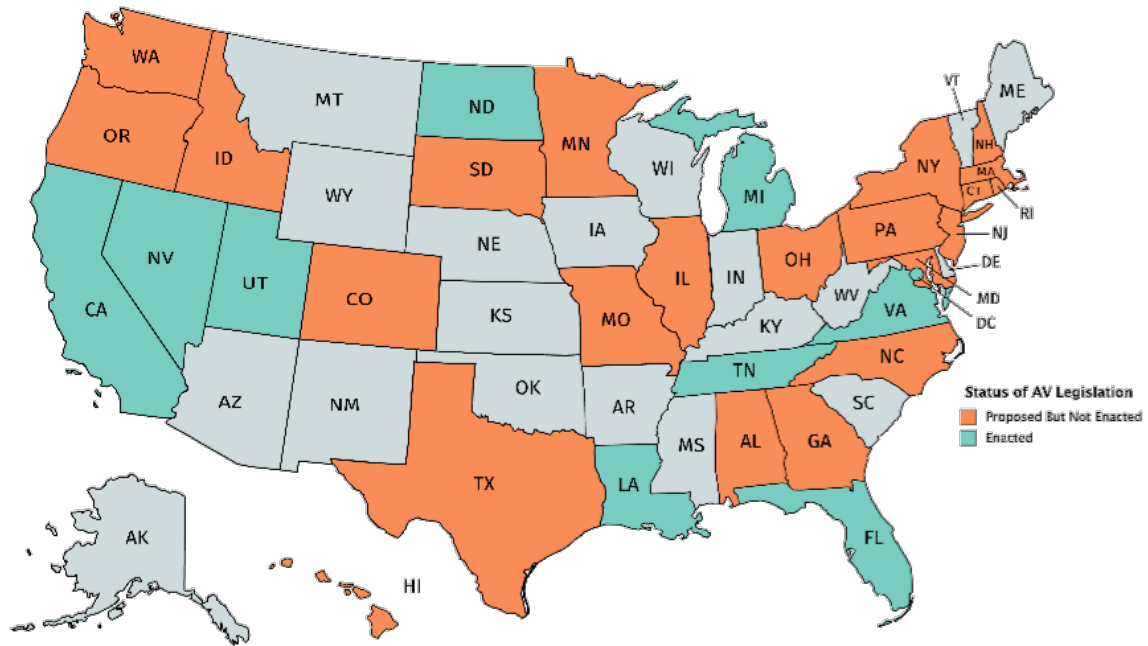


Figure 2. Status of State Autonomous Vehicle Legislation through 2016

Some states, such as Michigan and Tennessee, packaged together several bills, which passed in rapid succession. Seventeen bills passed in the 2015-2016 legislative session, indicating a flurry of legislation more recently, as illustrated by Figure 3.

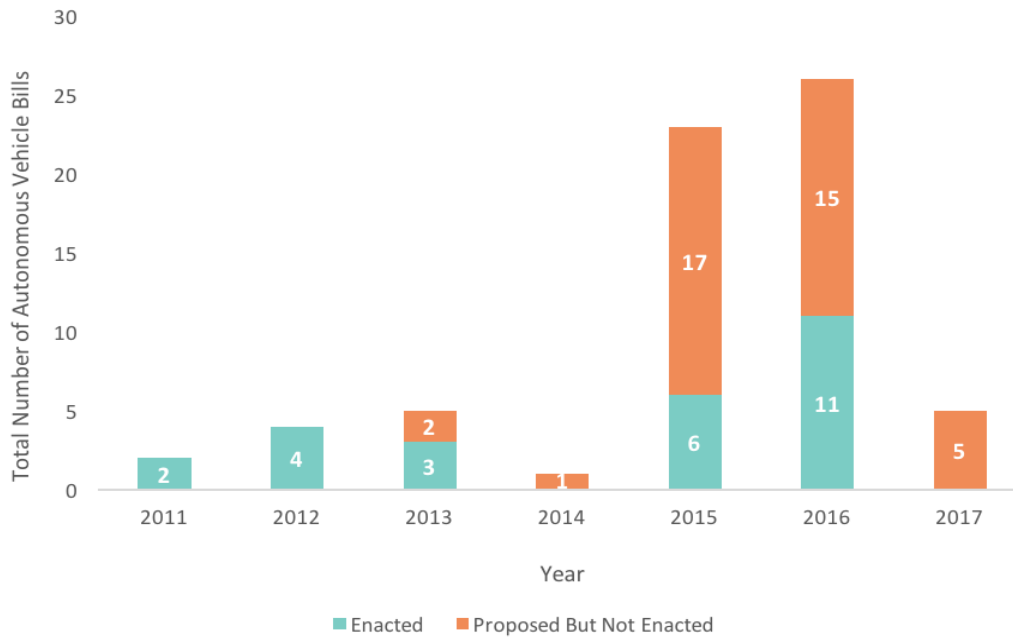


Figure 3. Autonomous Vehicles Legislation Introduced by States (2011-2017)



This increasing trend in both proposed and passed bills suggests autonomous technology is expanding, with more states finding the need to adapt. Since fully autonomous vehicles (Levels 4 and 5 in Figure 1) are approaching viability, New Hampshire has an opportunity to pass legislation to regulate autonomous vehicles before they appear on the roads of the Granite State.

2. METHODOLOGY

Our methodology is as follows: First, we explored the universe of autonomous vehicles legislation. We conducted our analysis in January 2017, including the 66 state bills across 31 states and Washington D.C. that were introduced prior to the end of January 2017. We primarily sourced bills from the National Conference of State Legislatures and the Automated Driving compendium, compiled by Gabriel Weiner and Bryant Walker Smith.⁷

We then read each bill and classified all 66 bills and bill language based on how bills addressed the following categories: definitions, registration requirements, operator requirements, license requirements, insurance requirements, vehicle requirements, and liability regulations. We define these categories and relevant sub-categories as well. In Section 3, we present examples of the most common and most extensive bill language in each category of interest, with more complete data appearing in the Appendix.

Additional categories we considered were “study,” which indicated whether a bill established a study committee or mandated the production of a report, and “testing,” which indicated whether a bill addressed autonomous vehicles testing. We did not focus on these two additional types of bills in our analysis for several reasons. First, we viewed study committees as tangential to our scope. For example, in 2013, New Hampshire HB 444, which would have established a study committee to research autonomous vehicles, was deemed inexpedient to legislate primarily because it was preliminary at the time.⁸ Most of the autonomous vehicles legislation that we explored was introduced after HB 444, including other study committees as well as rules and regulations. We did not want to classify text for a study committee when one is no longer necessary. Second, autonomous vehicle testing is very local. Much of the text related to testing allows for testing at specific locations under state-specific circumstances and was thus not relevant for New Hampshire.

We also interviewed experts (regulators, committee chairs, bill sponsors) from states with the most extensive language to see if their experiences might provide guidance for New Hampshire. These results are detailed in Section 4.

Section 3 proceeds by focusing on each of the seven categories in depth, discussing the range of variation in legislative text as well as relevant sub-categories.



3. REGULATORY DIMENSIONS AND LANGUAGE OF LEGISLATION

3.1 Definitions

The first attempt to define an autonomous vehicle was proposed by the state of Nevada in 2011 and has since been expanded to categorize various technology related vehicles.⁹ States must define “autonomous vehicles” and “autonomous technology” separately from existing motor vehicles, as autonomous vehicles legally are distinct entities with separate regulations from human-operated motor vehicles.

Of the 66 bills proposed across the United States, 50 included a definition of autonomous vehicles. Those bills that did not include a definition either solely authorized a study or testing, or those states had already defined autonomous vehicles in a previous bill. The stringency of the definitions within the bills varies slightly within this subgroup. At the least-specific end of the spectrum, Tennessee SB 598 (2015) defines autonomous technology without noting examples of specific technology systems found in autonomous vehicles:

“‘Autonomous technology’ means 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.”¹⁰

Other legislation, such as Michigan SB 995 (2016), details more specific operating systems by providing a more comprehensive definition that examines motor vehicles and automated technology. The language used in SB 995, quoted below, is similar to the model language used in 29 of the 50 bills:

“Sec. 2b. (2) “‘Automated motor vehicle’ means a motor vehicle on which an automated driving system has been installed, either by a manufacturer of automated driving systems or an upfitter¹ that enables the motor vehicle to be operated without any control or monitoring by a human operator. Automated motor vehicle does not include a motor vehicle enabled with 1 or more active safety systems or operator assistance systems, including, but not limited to, a system to provide electronic blind spot assistance, crash avoidance, emergency braking, parking assistance, adaptive cruise control, lane-keeping assistance, lane departure warning, or traffic jam and queuing assistance, unless 1 or more of these technologies alone or in combination with other systems enable the vehicle on which any active safety systems or operator assistance systems are installed to operate without any control or monitoring by an operator.

¹ An “upfitter” is, as defined elsewhere in the bill, “a person that modifies a motor vehicle after it was manufactured by installing an automated driving system in that motor vehicle to convert it to an automated motor vehicle.” It also includes subcomponent system producers.



(3) ‘Automated technology’ means technology installed on a motor vehicle that has the capability to assist, make decisions for, or replace a human operator.”¹¹

Of the 50 bills with definitions, two Tennessee bills included special clauses, SB 1561 (2016) and HB 1564 (2015), which create a specific distinction between a “No-Operator-Required Autonomous Vehicle” or “NORAV” and an “Operator-required autonomous vehicle” or “ORAV.” A NORAV is defined as “an autonomous vehicle that may have operational controls for a human operator, a steering wheel, accelerator, or brake, but does not require a human operator to be present in the vehicle during vehicle operation.” In contrast, an ORAV is defined as “an autonomous vehicle equipped with operational controls for a human operator, including a steering wheel, accelerator, and brake, and requires a human operator to be present in the vehicle for vehicle operation.”¹² Overall, across these 50 bills, there is not substantial variation in definition language, as most text follows the same pattern.

3.2 Registration Requirements

Registration of autonomous vehicles, as distinct from other regulated motor vehicles, represents a concern for state departments of motor vehicles, revenue, and law enforcement. Still, within the universe of laws we analyzed (outlined above in Section 2), only a few states have expressly called for distinctive autonomous vehicle registrations. Of the 66 bills in our pool, only four states and six bills include language to regulate vehicle registration. This low number may suggest that states may either be taking a hands-off approach to registration or may be regulating at the executive branch agency level rather than at the legislative level.¹³ For example, as discussed later in the expert interviews in Section 4, the Executive Director of the Pennsylvania Senate Transportation Committee cited the Senate’s intent to leave a significant portion of the registration requirements to the Pennsylvania Department of Transportation (PennDOT).¹⁴

The stringency of registration requirements varies greatly within this small subgroup of six bills. For example, at the lower end of the spectrum, Alabama’s SB 178 requires autonomous vehicles to be “registered and licensed in the same manner as other motor vehicles,” but defers to the Alabama Law Enforcement Agency and Department of Revenue the authority to “adopt rules necessary to effectuate the registration and licensing of autonomous vehicles.”¹⁵ More stringent and straightforward are New Jersey A 851 (2017) and Pennsylvania SB 1412 (2016), which call for the express registration of autonomous vehicles as distinct from other motor vehicle registration and, in the latter case, the demarcation of “HAV” for Highly Automated Vehicle.¹⁶ Finally, other bills mandate special license plates that must be carried by dealers of autonomous vehicles.¹⁷

Taken together, while the pool of bills that include registration requirement text is small, they span several different policies, ranging from the maintenance of the status quo in which autonomous vehicles are registered in the same way as other state regulated motor



vehicles, to stricter requirements such as Pennsylvania’s “HAV” marking or special license plates.

3.3 Operator Requirements

Given the nature of autonomous vehicle technology, specifically the ability to activate and operate the vehicle from inside and remotely, several states have included language to limit operator behavior and increase operator liability. Generally, 15 bills include language on operator requirements, broken down into two subcategories: bills that require an operator to be present, and those that hold operators liable if they cause the vehicle to activate regardless of whether the operator is present inside of the vehicle (see Figure 4 below).

There are four bills in the first subcategory that expressly require the physical presence of the operator in the motor vehicle due to the availability of active control in the event of an autonomous technology failure. New Jersey A 3745, for example, stipulates:

“Section 1b. the operator is seated in the driver’s seat, monitoring the safe operation of the autonomous vehicle, and is capable of taking over immediate manual control of the autonomous vehicle in the event of an autonomous technology failure or other emergency”¹⁸

Legislation in New Jersey is similar to the legislative language of Oregon, Pennsylvania, and Tennessee that requires the physical presence of an operator.

The 11 other bills, however, extend liability beyond physical presence. Alabama SB 178 (2016) illustrates language that is common across these 11 bills:

“Section 2. (a) An autonomous vehicle may be operated in autonomous mode in this state only if ALEA has issued a certificate of compliance for the make and model of the vehicle. For the purpose of enforcing the traffic laws and other laws applicable to drivers and motor vehicles operated in this state, the person operating the autonomous vehicle in autonomous mode shall be deemed the driver of the autonomous vehicle regardless of whether the person is physically present in the autonomous vehicle while it is engaged.”¹⁹

Overall, while most bills acknowledge the preference for a physical driver present in the vehicle to reduce the likelihood of dangerous events, 11 of the 15 bills extend operator liability to those in control of the vehicle regardless of their presence. In these states, a remote operator of the vehicle, someone who is not sitting in the driver’s seat or elsewhere in the vehicle, would be liable in the event of a crash. A state’s determination of the “operator” definition is thus a crucial necessity for autonomous vehicle legislation.

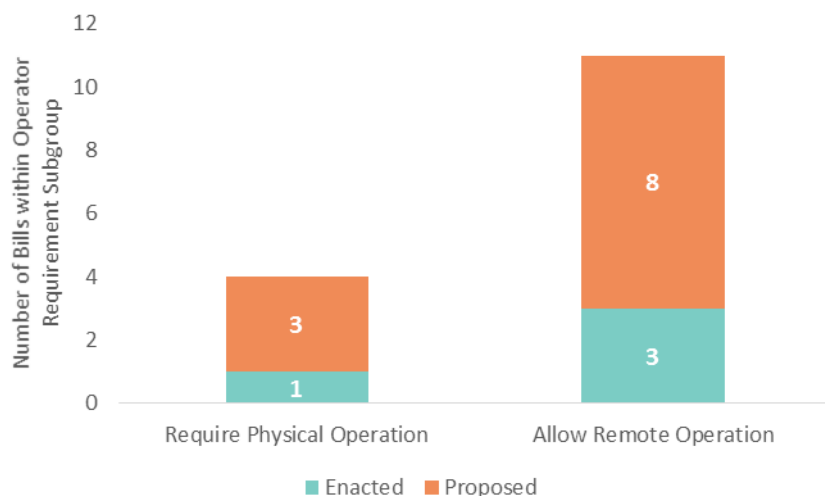


Figure 4. Number of Bills Enacted and Proposed by Operator Requirement Subgroup

3.4 Driver's License Requirements

Driver's license requirements present a challenge for autonomous vehicles and their operators, as the technology changes rapidly, and each change may alter the nature of autonomous vehicle operation. Of the 66 bills we studied, 23 bills in 17 states and Washington D.C. address this issue, while the others do not mention driver's licenses or impose additional requirements.

Additional requirements could come in the form of a driver's license endorsement, which currently regulates drivers who want to transport hazardous materials, transport liquid in a tank, transport more than fifteen passengers, operate trailers, and drive school buses.²⁰ Having an endorsement would prevent drivers in other states without driver's license endorsements from operating autonomous vehicles in New Hampshire. An analogue to this type of endorsement relates to triple trailers, which are illegal in New Hampshire but legal in other states. New Hampshire offers that endorsement so that it can cover residents who wish to operate triple trailers in other states. Autonomous vehicle operators with an endorsement in New Hampshire would likely be able to operate autonomous vehicles in every state, including those that mandate endorsements. However, imposing such an endorsement may be burdensome to stakeholders from the manufacturing and technology industries. In Nevada, for example, it was initially included to demonstrate that an autonomous vehicle owner understood the technology and its limits. Today, Nevada is looking to repeal this requirement and potentially work with the insurance requirement to strike a balance between safety concerns and burdensome regulation.²¹

We classified bills that addressed driver's licenses into two sub-categories: bills that contain these driver's license "endorsements" and those that did not. Figure 5 shows the distribution across the two categories:

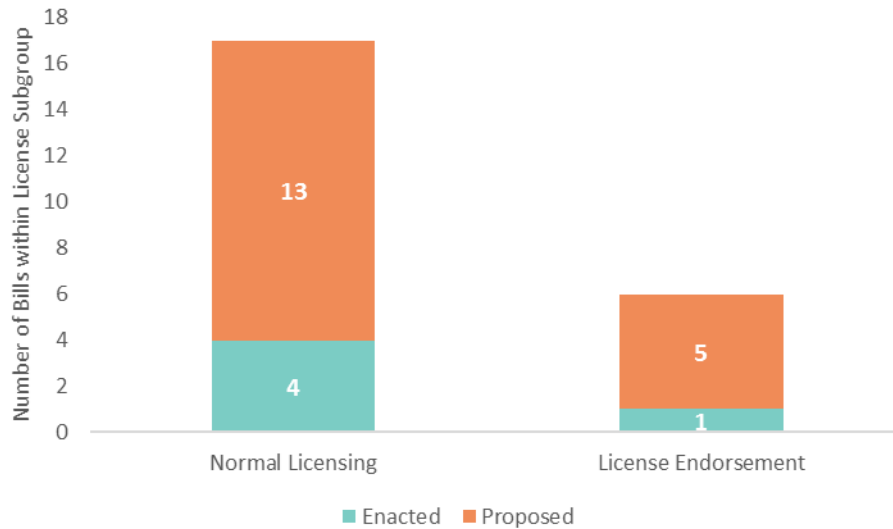


Figure 5. Number of Bills Enacted and Proposed by License Requirement Subgroup

Six bills in four states, only one of which has been enacted, add a special endorsement on their driver’s licenses for operators of autonomous vehicles and mandate that operators possess this endorsement. Such an endorsement addresses the reality that an autonomous vehicle operator does not necessarily have to be present in the vehicle. A clear example of this text occurs in A 851 (2017) in New Jersey:

“Section 2.a. The New Jersey Motor Vehicle Commission shall establish a driver’s license endorsement for the operation of autonomous vehicles on the highways, roads, and streets of this State. A person shall not operate an autonomous vehicle in autonomous mode unless that person has obtained an endorsement on that person’s driver’s license to operate an autonomous vehicle.
b. An endorsement to a driver’s license allowing a person to operate an autonomous vehicle shall not require that a person actively drive the autonomous vehicle.”²²

The 16 bills in the 13 states plus Washington, D.C. that mention driver’s licenses simply require that the operator possess a regular or commercial driver’s license to operate an autonomous vehicle. This requirement covers the states that have introduced autonomous vehicles legislation, as some bills that do not mandate a driver’s license of some sort solely establish a study or introduce definitions.

3.5 Insurance Requirements

Because autonomous technology presents its own set of risks and challenges, some states have taken extra steps to impose additional insurance requirements for autonomous vehicle testing. Of the 66 bills we examined, 28 bills in 21 states impose insurance requirements of some variety, broken down into three categories: mandates for



conventional driver’s license insurance, requirements for special insurance of \$5 million, and requirements for insurance of \$10 million. Figure 6 shows the distribution of states across these categories.

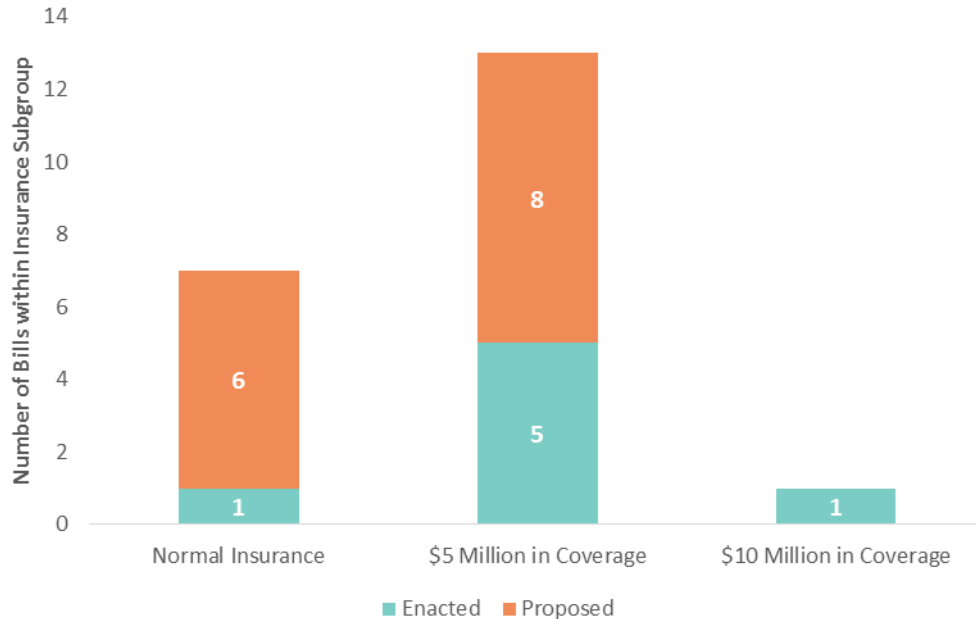


Figure 6. Number of Bills Enacted and Proposed by Insurance Requirement Subgroup

We refer to conventional insurance as a requirement that an operator or driver possess standard car insurance. An example is in Nevada AB 511 (2011), which establishes regulations that “Set forth requirements for the insurance that is required to test or operate an autonomous vehicle on a highway within this State.”²³ Only Michigan requires \$10 million in insurance coverage, while 10 bills in seven states require normal insurance and 13 bills require insurance of \$5 million. One state, Florida, repealed its requirement for \$5 million in insurance, reverting to only requiring “normal” insurance, a move that reflects the developments from testing to general autonomous vehicle regulation.²⁴ Of the fourteen bills that require \$5 or \$10 million in insurance coverage, many require proof of insurance to be submitted directly to the state before operating or testing autonomous vehicles. New Hampshire HB 314 (2017) models language used in 10 other states, which states:

“Prior to the start of testing in this state, the entity performing the testing shall submit to the department of safety, division of motor vehicles, a surety bond or documentation of liability insurance coverage of at least \$5 million.”²⁵

States that imposed additional requirements on autonomous vehicle testers generally required pre-registration and submission of insurance prior to approval, while states that legalized autonomous vehicle operation largely just required that insurance coverage of



some sort be present in an autonomous vehicle. The high dollar value of insurance requirements dwarfs simple driver's license liability minimums, which range from \$30,000 for all individuals injured in an accident and \$5,000 for property damage to \$100,000 for all injured individuals and \$25,000 for property damage.²⁶ New Hampshire is the only state in the country that does not require driver's insurance, but it does mandate the driver be able to meet financial responsibility requirements should the driver be found responsible for an accident. The minimum coverage available in New Hampshire is \$25,000 per person involved in an accident, up to \$50,000 for all individuals, and \$25,000 for property damage.²⁷

3.6 Vehicle Requirements

In order to regulate autonomous vehicles, states must distinguish them from other, Level 3 or below vehicles. Twenty-one bills in 13 states include language related to vehicular requirements. We categorize these bills into two subgroups: bills that limit the definition of autonomous vehicles, and bills that require operator assistance features.

A unique challenge in the regulation of these vehicles is determining what technology qualifies as autonomous. For this reason, 10 states exclude technology that does not pertain to the driving of the vehicle without active human operation. Massachusetts SB 1841(2015) reflects language typical of these 10 bills:

“Section 1J (a)...A vehicle equipped with one or more crash avoidance systems, including, but not limited to, electronic blind spot assistance, automated emergency braking systems, park assist, adaptive cruise control, lane keep assist, lane departure warning, traffic jam and queuing assist, or other similar systems that enhance safety or provide driver assistance, but are not capable, collectively or singularly, of driving the vehicle without the active control and continuous monitoring of a human operator, is not an autonomous vehicle.”²⁸

Alternatively, bills in the second subgroup require technology that assists the active control capabilities of the vehicle. For example, New York AB 31 (2015) demands a means to engage and disengage the autonomous technology, an internal indicator of whether the vehicle is currently operating autonomously, and an alert system for whether relevant autonomous technology is failing and requires the vehicle operator to resume control.²⁹ Other examples of autonomous vehicle requirements include: the ease of locating the autonomous vehicle deployment switch,³⁰ storage of data up to 30 seconds before a crash that can be preserved for three years,³¹ automatic return of control to a driver with steering wheel pressure,³² and the meeting of Federal Motor Vehicle Safety Standards.³³

Overall, there is a significant degree of variation in vehicle requirement language. Bills in this category commonly define “autonomous” vehicles as using computers and



technology that allow the safe operation of a vehicle in automatic mode. At the more stringent end of the regulation, we find 14 bills of 21 to reference specific technology and features that are required of autonomous vehicles in their state. On the less stringent end, we have the definition of autonomous vehicles limited by features that would qualify vehicles as Level 2 automobiles or lower in 10 of the 21 bills.

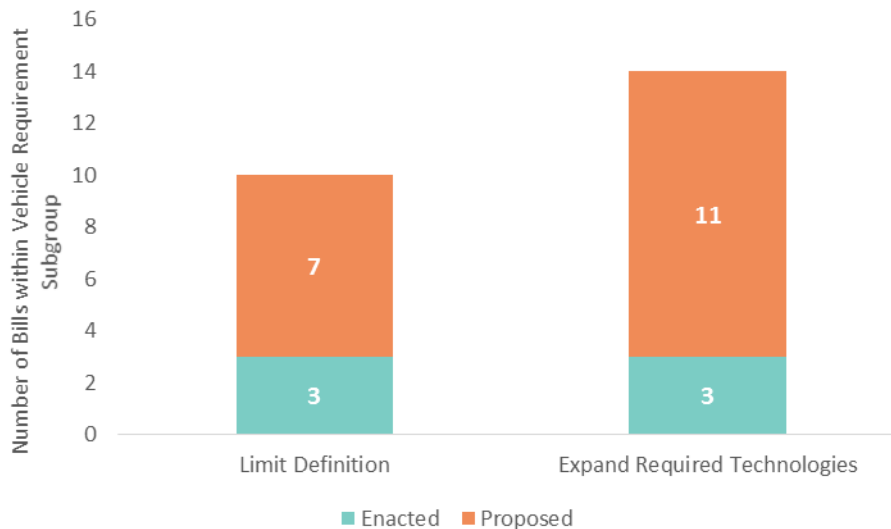


Figure 7. Number of Bills Enacted and Proposed by Vehicle Requirement Subgroup

3.7 Liability Regulations

Under current law, if an autonomous vehicle crashes, the car manufacturer may be held liable in court if there is a failure in technology. Without an exemption under law, major automobile manufacturers face potential litigation in the event of autonomous vehicle crashes, even though the cars they manufacture require a human driver. As such, 21 bills in 16 states contain language that exempts the original vehicle manufacturer from liability in the event of a crash due to modifications to that vehicle, including five states plus Washington, D.C. where such legislation passed. New Hampshire House Bill 314 (2017) contains this language:

“The original manufacturer of a vehicle converted by a third party to an autonomous vehicle shall not be liable in, and shall have a defense to and be dismissed from, any legal action brought against the original manufacturer by any person injured due to an alleged vehicle defect caused by the conversion of the vehicle, unless the manufacturer participated in or facilitated the adaption of the vehicle to autonomous technology or unless the alleged defect was present in the vehicle as originally manufactured.”³⁴

This language is almost identical across states. There are subtle differences, seen in Florida HB 7061 (2016) and ID SB 1108 (2015), that change “shall not be liable” to “is



not liable.”³⁵ Texas in HB 933 (2015) and Michigan in SB 996 (2016) also include subcomponent producers.³⁶ Including these liability exemptions enables original manufacturers to allow their cars to be modified without fearing lawsuits.

4. EXPERT INTERVIEW FINDINGS FROM STATES WITH EXISTING REGULATIONS

In an effort to provide additional information about the legislation described in Section 3, we contacted a number of agency officials, state legislators, and committee staff to learn their perspectives on autonomous vehicle regulation. We reached out to 25 experts across multiple levels of government and have included information from our detailed conversations. The three interviews detailed below represent the highest information sources with whom we spoke, represent states with substantial legislation, and address a range of issues that may be relevant to efforts in New Hampshire.

4.1 Subject Matter Experts

Data from our in-depth interviews are drawn from the following experts:

1. Mr. Nolan Ritchie, the Executive Director of the Pennsylvania Senate Transportation committee
2. Mr. Kelly Bartlett, the Senior Policy and Legislative Advisor for the Michigan Department of Transportation
3. Ms. April Sanborn, Services Manager at the Nevada Department of Motor Vehicles

4.2 Proper Categorization of Autonomous Vehicle Legislation Components

We started by asking each interviewee about our categorization of autonomous vehicle legislation components. Both Mr. Ritchie and Mr. Bartlett noted the role of the federal government in regulating autonomous vehicles, citing the need to work with NHTSA, particularly about vehicle requirements. States that enacted their own vehicle requirements could impose a burden on states that did not, potentially interfering with the role of the federal government in creating national standards.

Cybersecurity and privacy issues for autonomous vehicles were major concerns of constituents in Michigan, especially as autonomous vehicles near mass production. In Nevada, Ms. Sanborn noted enforcement authority as another category, as testing presents different requirements from general consumer operation. All interviewees generally agreed with the remaining categories that we examined in Section 3.



4.3 Regulatory Goals and Challenges

An important theme from our interviews was the influence of factors outside of the legislative process on the drafting and passing of autonomous vehicles regulation.

In Pennsylvania, the bills failed primarily because of the upcoming federal guidelines, to which a Pennsylvania task force ultimately deferred. On February 21, 2017, Pennsylvania SB 427 was introduced, with a hearing scheduled for March 21, 2017. The legislation reflects an attempt by Pennsylvania to continue to revise its policies following the introduction of revised federal guidelines.

In Michigan, policymakers found that an initial 2013 law was too restrictive, necessitating a new long-term solution, as Ford, General Motors, and Uber, among other stakeholders, required legislative guidance and stability before implementing testing programs.

Nevada also solicited feedback from stakeholders, reworking its laws to impose sanctions on violators and to prevent regulations from inhibiting technological advancements. Because the technology is still evolving, Nevada wanted to ensure that it could adapt to any major changes.

4.4 Special Driver's License Endorsements

One unique source of variation across states is the creation of a special driver's license endorsement for autonomous vehicles. Pennsylvania SB 427 has language related to this issue, as the state considered both manufacturer pushback against special license provisions and interstate travel considerations for license holders. In Michigan, driver's license endorsements were discussed but not included because of the complexity of who could be riding in the vehicle, such as having only minors as passengers.

In Nevada, the endorsement came about from a public safety need. Ms. Sanborn cited the following example:

“Consider that you have been trained on the new features of your Tesla but you let your 16-year-old son drive the car. He is not aware of the features and in a panic causes an accident. Who is ultimately responsible for ensuring he understands the limits and capabilities of your vehicle?”

The endorsement in Nevada primarily aimed to protect consumers from updates in technology. Despite this effort, stakeholders in manufacturing and technology viewed the requirement as an additional burden, and Nevada is currently looking to remove the requirement.



4.5 Physical Presence of Operator

As discussed, not every state requires the operator to be physically present in an autonomous vehicle. The goal in Pennsylvania is to have physical presence as an option for Level 4 or 5 autonomous vehicles, ultimately aiming to limit liability and responsibility. Because Nevada was the first state to create autonomous vehicles regulations, it had little reference to this issue. Thus, it required operators to be physically present in the early stages of the technology to take control in the event of system failure. After technology is proven safe, however, Nevada anticipates allowing Level 5 autonomous vehicles to operate without a driver physically present.

4.6 Vehicle Registration

In Pennsylvania, the process of autonomous vehicle registration is not separate from regular motor vehicle registration, although the state includes a distinct “highly autonomous vehicle” coding for autonomous vehicles during registration. While still in the testing phase, Nevada has a special registration process. Business entities and after-market companies looking to test autonomous vehicles must apply for a special autonomous vehicle license. Consumer vehicles require a special green autonomous vehicles license plate, although Nevada is looking to remove this requirement and replace it with a certificate and electronic flag in the state vehicle database.

4.7 Considerations for New Hampshire

We asked each expert to weigh in on special considerations for the Granite State. Mr. Ritchie suggested focusing on developing policies instead of regulations, recommending engagement with local stakeholders, such as vehicle manufacturers, law enforcement, local AAA, Mothers Against Drunk Driving, local governments, insurance firms, and local institutions of higher education. He also suggested working with a New England coalition of states.

Mr. Bartlett also recommended engaging corporate stakeholders, such as Ford, Uber, and Google, which proved very useful to the members of the Michigan Senate Transportation Committee. Their input caused Michigan to shift to use “automated driving system” instead of “autonomous technology” as the primary language utilized in legislation. Mr. Bartlett also highlighted potential benefits of autonomous vehicles in rural states.

Ms. Sanborn highlighted similarities with Nevada, as outside of Las Vegas, much of the state is rural. She noted a potential urban-rural divide, with urban areas being more accepting of autonomous vehicles and rural areas more attached to manually operated cars. She also noted the general regulatory confusion, with the federal government still working on proper regulations that will ultimately help determine the future of



autonomous vehicle legislation and regulation in Nevada. Ms. Sanborn noted continued engagement with other states until the NHTSA establishes basic federal regulations.

5. CONCLUSION

Autonomous vehicles are likely to appear soon in the Granite State. The proliferation of autonomous vehicles combined with the advancement in autonomous vehicle technology has made self-driving cars, trucks, and other vehicles a reality. Other states are addressing this new technology, and New Hampshire has an opportunity to do so as well and introduce a bill that keeps New Hampshire up-to-date with the rules and regulations being enacted in other states across the country.

The legislation we examined includes a comprehensive set of bills that have been introduced or have been enacted across the country, through the end of the 2016 legislative cycle. We anticipate that many more states will introduce legislation as the 2017 legislative session begins, and we note that several states that have already enacted legislation continue to modify and revise their statutes.³⁷ Autonomous technology is evolving, and technological developments could force states to revisit their laws in order to remain current. We have highlighted examples of legislative text that other states have utilized, noting the text that is most comprehensive and most commonly used, but we do not judge the text that is most appropriate for New Hampshire, nor do we recommend a specific bill as one New Hampshire should adopt. Instead, we present an array of options for New Hampshire policymakers to consider in this legislative session.

While in this report we do not discuss the effects of autonomous vehicles on the economy or the workforce, we think it is important to mention the potential implications of changing technology on many aspects of the state's economy. Given the aging population of New Hampshire, autonomous vehicles could provide an opportunity to transition the elderly who can no longer drive away from the roads while maintaining their standard of living. As a rural state, New Hampshire has unique characteristics, such as wildlife and dirt roads, which pose additional concerns for safe and effective autonomous vehicle operation. There are many other challenges and opportunities that autonomous vehicles present in general and for New Hampshire that merit further study.



APPENDICES: EXTENDED EXAMPLES OF REGULATORY LANGUAGE

Appendix A. Definitions Language

As examined in the body of the report, definitions of “autonomous vehicles” and “autonomous vehicle technology” vary slightly in language. Of the more comprehensive definitions, Massachusetts HB 2977 (2015) is a strong example, defining “autonomous technology” as:

“technology installed on a motor vehicle that has the capability to drive the vehicle on which the technology is installed without the active control or monitoring by a human operator. The term excludes a motor vehicle enabled with active safety systems or driver assistance systems, including, without limitation, a system to provide electronic blind spot assistance, crash avoidance, emergency braking, parking assistance, adaptive cruise control, lane keep assistance, lane departure warning, or traffic jam and queuing assistant, unless any such system alone or in combination with other systems enables the vehicle on which the technology is installed to drive without the active control or monitoring by a human operator.”

Additionally, HB 2977 defines “autonomous vehicle” as “any vehicle equipped with autonomous technology.” This language is common across multiple states, as autonomous technology breaks down into two parts: a statement of the level of autonomy (Level 4 or 5) necessary to not require a human operator, and an exclusion that distinguishes Level 4 or 5 autonomy from other systems currently available. As many cars have included emergency braking and electronic blind spot assistance, for example, legislation that regulates autonomous vehicles generally separates these fully autonomous vehicles from those that require a human operator.



Appendix B. Registration Requirements Language

Further details and differences in registration requirement text across the six bills that include such language are detailed in the excerpts included below.

Alabama S 178 (2016)

“Each autonomous vehicle operated in the state shall be registered and licensed in the same manner as other motor vehicles.”

“ALEA and the Department of Revenue may adopt rules necessary to effectuate the registration and licensing of autonomous vehicles.”

Michigan SB 169 (2013)

“A dealer owning a vehicle of a type otherwise required to be registered under this act may operate or move the vehicle upon a street or highway without registering the vehicle if the vehicle displays, in the manner prescribed in section 225, 1 special plate issued to the owner by the secretary of state. As used in this subsection, ‘dealer’ includes an employee, servant, or agent of the dealer.”

New Jersey A 851 (2017)

“Requirements for the registration of the autonomous vehicle, pursuant to R.S.39:3-4;

Pennsylvania SB 1412 (2016)

“A highly automated vehicle used for testing shall be properly registered in accordance with section 1301 (relating to registration and certificate of title required).”

“If a highly automated vehicle is registered by the Commonwealth, the highly automated vehicle shall be registered by the department using the code ‘HAV’ in a new data field.”

Pennsylvania SB 1268 (2015)

“Marked in a manner approved by the department as being under remote control operation if the autonomous vehicle is being controlled without a human operator in the vehicle.”



Appendix C. Operator Requirements Language

The Operator Requirement section of this report discusses the two specific classifications of “operators” in autonomous vehicle bills. Below, we have included additional text from bills that fall into both the “require physical operation” and “allow remote operation” subcategories. The language included is added to show the variation in language within each subcategory.

Require Physical Operation

Oregon SB 620 (2015)

“Operator requirements. An autonomous vehicle may be tested and operated on the highways of this state only if ...The operator is in the driver’s seat of the autonomous vehicle, is monitoring the operation of the autonomous vehicle and is capable of taking immediate manual control of the autonomous vehicle in the event of a failure of the autonomous system or other emergency.”

Pennsylvania SB 1268 (2015)

“When an autonomous vehicle is being operated, the operator must: (1) Be a licensed driver. (2) Be able to take immediate manual or remote control of the autonomous vehicle in the event of a failure or malfunction of the autonomous technology or other emergency. (3) Monitor the operation of the autonomous vehicle.”

Tennessee SB 1561 (2016)

“An ORAV may be tested and operated on the streets and highways of this state only if: (1) The operator possesses the proper class of license for the type of ORAV being tested or operated; and (2) The operator is: (A) In the driver's seat of the ORAV; (B) Monitoring the operation of the ORAV; and (C) Capable of taking immediate manual control of the ORAV in the event of a failure of the autonomous system or other emergency.”

Allow Remote Operation

California SB 1298 (2012)

“An ‘operator’ of an autonomous vehicle is the person who is seated in the driver's seat, or if there is no person in the driver's seat, causes the autonomous technology to engage.”



Hawaii SB 630 (2015)

“A person shall be deemed to be the operator of an autonomous motor vehicle operating in autonomous mode when the person causes the motor vehicle's autonomous technology to engage, regardless of whether the person is physically present in the motor vehicle while the vehicle is operating in autonomous mode.”

South Dakota SB 139 (2014)

“‘Operator,’ any individual seated in the driver's seat, or, alternately, the person who causes the technology of an autonomous motor vehicle to engage.”

Massachusetts H 2977 (2015)

“A person who possesses a valid driver license may operate an autonomous vehicle in autonomous mode. For purposes of this chapter, unless the context otherwise requires, a person shall be deemed to be the operator of an autonomous vehicle operating in autonomous mode when the person causes the vehicle's autonomous technology to engage, regardless of whether the person is physically present in the vehicle while the vehicle is operating in autonomous mode.”



Appendix D. Driver's License Requirements Language

As discussed in the body of the report, driver's license requirements fall into two categories: those that require some form of a license and those that require an additional endorsement. We have included an example of a minimum requirement, as seen in Florida's HB 7061 (2016):

“A person who possesses a valid driver license may operate an autonomous vehicle in autonomous mode on roads in this state if the vehicle is equipped with autonomous technology, as defined in s. 316.003(2)”

Similarly, some states authorize autonomous vehicles just for testing, as does New Hampshire in HB 314 (2017):

“For testing purposes, a human operator with a valid driver's license shall be present in the autonomous vehicle to monitor the vehicle's performance and intervene, if necessary, unless the vehicle is being tested or demonstrated on a closed course.”

Other states impose an additional requirement on the driver to ensure safety of the vehicle in the event of failure, as seen in Ohio's HB 608 (2016):

“A person who holds a valid driver's or commercial driver's license is present in the autonomous vehicle, is monitoring the safe operation of the autonomous vehicle, and is capable of taking immediate control of the autonomous vehicle if a technology failure or other emergency occurs.”

In contrast, driver's endorsements take the following form (with very slight modification), as seen in New Jersey's A 851 (2017):

“a. The New Jersey Motor Vehicle Commission shall establish a driver's license endorsement for the operation of autonomous vehicles on the highways, roads, and streets of this State. A person shall not operate an autonomous vehicle in autonomous mode unless that person has obtained an endorsement on that person's driver's license to operate an autonomous vehicle.

b. An endorsement to a driver's license allowing a person to operate an autonomous vehicle shall not require that a person actively drive the autonomous vehicle.”



Appendix E. Insurance Requirements Language

As noted in the body of the report, insurance requirements either mandate normal vehicle insurance or require additional coverage in the form of a surety bond or similar instrument prior to the start of testing. An example of basic language is in Idaho's SB 1108 (2015):

“If an autonomous driven vehicle is being tested on highway within the state, the test driver must be...In possession of a valid driver's license issued in their name and insured by vehicle liability insurance as required by law.”

Of the states that require additional insurance, Alabama's SB 178 (2016) shows the minimum language necessary:

“Each autonomous vehicle approved for operation of the public roads and operated by a licensed driver shall carry liability insurance in an amount of at least five million dollars (\$5,000,000).”

States that allow testing require the insurance to be submitted to the relevant Department of Public Safety, as seen in New York's AB 31 (2015):

“Prior to the commencement of any testing pursuant to this section, the entity shall submit to the department an instrument of insurance, surety bond or proof of self-insurance acceptable to the commissioner in an amount of not less than five million dollars.”

Similarly, Michigan in SB 995 (2016) also requires submission of insurance prior to testing, though in the amount of \$10,000,000:

“As used in this section, section 665a, and section 665b only, motor vehicle manufacturer also includes a person that satisfies all of the following... The person has obtained an instrument of insurance, surety bond, or proof of self-insurance in the amount of at least \$10,000,000.00, and has provided evidence of that insurance, surety bond, or self-insurance to the department in a form and manner required by the department.”



Appendix F. Vehicle Requirements Language

Included in the body of this report are the two subcategorizations of the vehicle requirements across autonomous vehicle legislation. Below, we have included additional examples of bills that limit the definition of autonomous vehicles, and those that require specific functionality for vehicles to qualify as autonomous. Generally, the bills in the former category are similarly structured across state bills and we have, therefore, only included a small subset.

Limit Definition of Autonomous Vehicles

Alabama S 178 (2016)

“Autonomous Vehicle: A motor vehicle that uses artificial intelligence, sensors, and global positioning system coordinates to drive itself without active intervention of a human operator. The term excludes a vehicle enabled with a safety system or driver assistance system, including, without limitation, a system to provide electronic blind spot assistance, crash avoidance, emergency braking, parking assistance, adaptive cruise control, lane keep assistance, lane departure warnings and traffic jam and queuing assistance, unless the vehicle is also enabled with artificial intelligence and technology that allows the vehicle to carry out all the mechanical operations of driving without the active control or continuous monitoring of a natural person.”

GA S 113 (2015)

““Autonomous technology” means technology installed on a motor vehicle that provides the motor vehicle with the capability to drive without the direct active controller monitoring by a human operator. The term excludes a motor vehicle equipped with active safety systems or driver assistance systems, including, without limitation, a system to provide electronic blind spot assistance, crash avoidance, emergency braking, parking assistance, adaptive cruise control, lane keep assistance, lane departure warning, or traffic jam and queuing assistant, unless any such system alone or in combination with other systems enables the vehicle on which the technology is installed to drive without the direct active control or monitoring by a human operator.”

Expand Required Vehicular Technologies or Components

Alabama S 178 (2016)

“The vehicle has a separate mechanism in addition to, and separate from, any other mechanism required by law, to capture and store the autonomous technology sensor data for at least 30 seconds before a collision occurs between the autonomous vehicle and



another vehicle, object, or natural person while the vehicle is operating in autonomous mode. The autonomous technology sensor data shall be captured and stored in a read-only format by the mechanism so that the data is retained until extracted from the mechanism by an external device capable of downloading and storing the data. Such data shall be preserved for three years after the date of the collision. (3) The vehicle has a switch to engage and disengage the autonomous operation of the vehicle that is easily accessible to the operator of the autonomous vehicle and is not likely to distract the operator from focusing on the road while engaging or disengaging the autonomous operation. (4) The vehicle has a system to safely alert the operator of the autonomous vehicle to take control of the autonomous vehicle if a technology failure is detected. (5) The vehicle is equipped with autonomous technology which does not adversely affect any other safety features of the vehicle which are subject to federal regulation.”

Oregon SB 620 (2015)

“An autonomous vehicle may be tested and operated on the highways of this state only if: (a) The autonomous vehicle has a mechanism to engage and disengage the autonomous system that is easily accessible to the operator; (b) The autonomous vehicle has a visual indicator inside the autonomous vehicle to indicate when the autonomous system is engaged and when the autonomous system is disengaged; (c) The autonomous vehicle has a failure alert system to notify the operator when a system failure is detected; (d)(A) The failure alert system allows the operator to take immediate manual control of the autonomous vehicle when a failure of the autonomous system or other emergency is detected; or (B) The failure alert system stops the autonomous vehicle if the operator does not or cannot take immediate manual control of the autonomous vehicle when a failure of the autonomous system or other emergency is detected; and (e) The failure alert system allows the operator to take immediate manual control of the autonomous vehicle in more than one manner, including but not limited to using the brake, the accelerator or the steering wheel.

(3) An autonomous vehicle may be operated on the highways of this state only if the autonomous vehicle has a system that captures and stores the autonomous system sensor data for the autonomous vehicle for at least 30 seconds before a collision can occur. The data system described in this subsection must store data in a read-only format for a minimum of three years after the date of a collision.”

Tennessee HB 2173 (2015)

“When a motor vehicle's autonomous technology is engaged, an operator may use an integrated electronic display for communication, information, and other uses enabled by the display; provided, that the display is integrated with the vehicle such that it operates and functions in coordination with such autonomous technology and disables automatically any moving images visible to the motor vehicle operator when the autonomous technology is disengaged.”



New Jersey A 3745 (2017)

“A certification by the manufacturer that the autonomous technology satisfies the following requirements: the autonomous technology has the ability to be easily engaged or disengaged by the operator; the autonomous vehicle has a visual indicator inside the cabin of the vehicle to indicate when the autonomous technology is engaged; the autonomous vehicle has a system to safely alert the operator if an autonomous technology failure is detected while the autonomous technology is engaged, and when an alert is given, the autonomous vehicle shall do either: (i) (a) require the operator to take control of the autonomous vehicle; or (ii) (b) be capable of coming to a complete stop if the operator does not or is unable to take control of the autonomous vehicle. the autonomous vehicle shall allow the operator to take control in multiple ways, including, but not limited to, the use of the brake, the accelerator pedal, or the steering wheel, and shall alert the operator that the autonomous technology has been disengaged; the autonomous vehicle has a separate mechanism, in addition to, and separate from, any other mechanism required by law, to capture and store the autonomous technology sensor data for at least 30 seconds before a collision occurs between the autonomous vehicle and another vehicle, object, or person while the vehicle is operating in autonomous mode. The autonomous technology sensor data shall be stored for three years from the date of the collision and captured and stored in a read-only format by the mechanism so that the data is retained until extracted from the mechanism by an external device capable of downloading and storing the data.”



Appendix G. Liability Regulations Language

As noted in the body of the report, liability regulations exempt the original vehicle manufacturer from liability in the event of a crash due to modifications by installing autonomous technology. We include here text that demonstrates the slight variation in language across states on this dimension:

NH HB 314 (2017)

“The original manufacturer of a vehicle converted by a third party to an autonomous vehicle shall not be liable in, and shall have a defense to and be dismissed from, any legal action brought against the original manufacturer by any person injured due to an alleged vehicle defect caused by the conversion of the vehicle, unless the manufacturer participated in or facilitated the adaption of the vehicle to autonomous technology or unless the alleged defect was present in the vehicle as originally manufactured.”

FL HB 7061 (2016)

“The original manufacturer of a vehicle converted by a third party into an autonomous vehicle is not liable in, and shall have a defense to and be dismissed from, any legal action brought against the original manufacturer by any person injured due to an alleged vehicle defect caused by the conversion of the vehicle, or by equipment installed by the converter, unless the alleged defect was present in the vehicle as originally manufactured.”

MI SB 998 (2016)

“(1) The manufacturer of a vehicle is not liable and must be dismissed from any action for alleged damages resulting from any of the following unless the defect from which the damages resulted was present in the vehicle when it was manufactured:

- (a) The conversion or attempted conversion of the vehicle into an automated motor vehicle by another person.
- (b) The installation of equipment in the vehicle by another person to convert it into an automated motor vehicle.
- (c) The modification by another person of equipment that was installed by the manufacturer in an automated motor vehicle specifically for using the vehicle in automatic mode.

(2) A subcomponent system producer recognized as described in section 244 of the Michigan vehicle code, 1949 PA 300, MCL 257.244, is not liable in a product liability action for damages resulting from the modification of equipment installed by the subcomponent system producer to convert a vehicle to an automated motor vehicle unless the defect from which the damages resulted was present in the equipment when it was installed by the subcomponent system producer.



The Nelson A. Rockefeller Center at Dartmouth College

The Center for Public Policy and the Social Sciences

- (3) A motor vehicle mechanic or a motor vehicle repair facility that repairs an automated motor vehicle according to specifications from the manufacturer of the automated motor vehicle is not liable in a product liability action for damages resulting from the repairs.
- (4) Sections 2945 to 2949a do not apply in a product liability action to the extent that they are inconsistent with this section.”



REFERENCES

- ¹ "Autonomous Self-Driving Legislation." *National Conference of State Legislatures*. N.p., 25 Oct. 2015. Web.
- ² Ibid.
- ³ Roberts, David. "The Department of Transportation just issued a comprehensive policy on self-driving cars." *Vox*. N.p., 27 Feb. 2017. Web.
- ⁴ "Federal Automated Vehicles Policy: Accelerating the Next Revolution in Roadway Safety." *U.S. Department of Transportation, National Highway Traffic Safety Administration*. September 2016.
- ⁵ Smith, Steven. Personal interview. 18 Oct. 2016.
- ⁶ "Autonomous Self-Driving Legislation." *National Conference of State Legislatures*. N.p., 25 Oct. 2015. Web.
- ⁷ Gabriel Weiner and Bryant Walker Smith, *Automated Driving: Legislative and Regulatory Action*, cyberlaw.stanford.edu/wiki/index.php/Automated_Driving:_Legislative_and_Regulatory_Action and *Autonomous Self-Driving Legislation 2015*.
- ⁸ Hearing for NH HB 444 (2013). 28 Mar. 2013.
- ⁹ *Autonomous Self-Driving Legislation 2015*.
- ¹⁰ TN. Senate. SB 598. *Motor Vehicles - As enacted, prohibits any political subdivision...* Reg. Sess. 2015-2016 (2015)
- ¹¹ MI. Senate. SB 995. *A bill to amend 1949 PA 300*. Reg. Sess. 2015-2016 (2016)
- ¹² TN. Senate. SB 1561. *As enacted, redefines "autonomous technology" for...* Reg. Sess. 2015-2016 (2015)
- ¹³ Sierra-Ortega, Jonathan. Personal interview. 21 Feb. 2017.
- ¹⁴ Ritchie, Nolan. Personal interview. 22 Feb. 2017.
- ¹⁵ AL. Senate. SB 178. *Motor vehicles, autonomous technology...* Reg. Sess. 2015-2016 (2016)
- ¹⁶ N.J. Assembly. A 851. *Directs MVC to establish driver's license endorsement for autonomous vehicles*. Reg. Sess. 2016-2017 (2017) and PA. SB 1412 *An Act amending Title 75 (Vehicles)...* Reg. Sess. 2015-2016 (2016)
- ¹⁷ PA. SB 1268 *An Act amending Title 75 (Vehicles)...* Reg. Sess. 2015-2016 (2015)
- ¹⁸ N.J. Assembly. A 3745. *Permits testing and use of autonomous vehicles on State roadways under certain circumstances*. Reg. Sess. 2016-2017 (2017)
- ¹⁹ AL SB 178 (2016)
- ²⁰ "Classifications and Endorsements." *New Hampshire Department of Safety: Division of Motor Vehicles*. N.p., 27 Feb. 2017. Web.
- ²¹ Sanborn, April. Personal interview. 23 Feb. 2017.
- ²² NJ A 851 (2017)
- ²³ NV. Assembly. AB 511. *Revises certain provisions governing transportation*. Reg. Sess. 2011-2012 (2011)
- ²⁴ Sanborn interview.
- ²⁵ N.H. House. HB 314. *Relative to autonomous vehicles*. Reg. Sess. 2017-2018 (2017)
- ²⁶ "Compulsory Auto/Uninsured Motorists." *Insurance Information Institute*. N.p., 27 Feb. 2017. Web.
- ²⁷ "Your Guide to Understanding Auto Insurance in the Granite State." *State of New Hampshire Insurance Department*. 2009. Web.
- ²⁸ MA. Senate. SB 1841 *An Act relative to autonomous vehicles*. Reg. Sess. 2015-2016 (2015)
- ²⁹ N.Y. Assembly. AB 31. *Provides for and regulates the operation and testing of motor vehicles with autonomous technology*. Reg. Sess. 2015-2016 (2015)
- ³⁰ MA. House. H 2977. *For legislation to authorize the operation of autonomous vehicles...* Reg. Sess. 2015-2016 (2015)
- ³¹ CA. Senate. SB 1298. *An act to add Division 16.6...* Reg. Sess. 2011-2012 (2012)
- ³² NJ A 3745 (2017)
- ³³ OR. Senate. SB 620 *Relating to Autonomous Vehicles*. Reg. Sess. 2015-2016 (2015)



The Nelson A. Rockefeller Center at Dartmouth College

The Center for Public Policy and the Social Sciences

³⁴ NH HB 314 (2017)

³⁵ FL. House. HB 7061. *Establishing the Seaport Security...* Reg. Sess. 2015-2016 (2016) and ID. Senate. SB 1108. *Amends and adds to existing law to provide insurance requirements...* Reg. Sess. 2015-2016 (2015)

³⁶ TX. House. HB 933. *Relating to the testing of autonomous motor vehicles.* Reg. Sess. 2015-2016 (2015) and MI. Senate. SB 996. *A bill to amend 1949 PA 300.* Reg. Sess. 2015-2016 (2016)

³⁷ Sanborn interview.