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Corporate Solutions

TAKING A BACK SEAT---LEGAL ISSUES WITH AUTONOMOUS VEHICLES

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The development of self-driving, or "autonomous" vehicles has increased significantly in the last three years. Passenger vehicles , such as Teslas equipped with autopilot technology [official website], are already capable of driving autonomously on the highway. Uber is currently testing a fleet of autonomous cars in downtown Pittsburgh and autonomous trucks are also hitting the road as Uber demonstrated when its autonomous tractor-trailer truck transported 50,000 beers 120 miles across Colorado.

At the 2017 Detroit Car Show many traditional OEMs such as Volkswagen, Toyota, and Ford demonstrated autonomous driving features in several of their new models and new entrants such as Google, Tesla, and Farady demonstrated their latest concept cars which are fully loaded with technology that will eventually take over the bulk of the driving process.

The U.S. Department of Transportation (DOT) has defined autonomous vehicles as "the archetype of our future transportation." In September 2016, the National Highway Traffic Safety Administration (NHTSA) issued its Federal Automated Vehicle Policy which included 15 guidelines for the testing and deployment of autonomous vehicles. The NHTSA enthusiastically defines its new policy as "accelerating the next revolution in roadway safety." While the NHTSA 's guidance includes recommended best practices for the "pre-deployment design, development and testing of HAVs" there are currently no federal regulations relating to the testing or deployment of AV. The space is literally that new – it is evolving right before our eyes.

Where technology goes lawyers often follow. In 2014, ,Stanford Law School added a course on the law of autonomous driving to its curriculum. The purpose of this paper is to provide an overview of automated vehicles ("AV") technology and predict how the court might respond to personal injury and product liability claims involving AV's.

The views and predictions expressed are solely those of the author who looks forward to working with other interested Swiss Re employees on this emerging issue.

How Do Autonomous Cars Work? (A Non-Engineers Understanding)

AV's use what engineers call "sense-plan-act" design. The cars use a combination of sensors, radars, and cameras to download data on the driving environment. This sensing equipment sends the data to a computer which applies logic based decision making software algorithms to the data. The computer software then sends the data output to the car and directs it to make automated movements such as braking or acceleration.

There are two different approaches companies can take to AV technology which could impact how the courts might treat future product liability claims. A company can market the technology as a service which will be controlled by the terms of the sales contract or they can develop a vehicle specifically for autonomous driving which equipment would be considered a "product".

The Google Way

Google began its self driving car project in 2009.

Rather than develop its own self driving car Google combined its autonomous technology with preexisting vehicles. In 2011, Google began testing its technology on six Toyota Priuses, an Audi, and a Lexus.

On March 28, 2012, Google posted a YouTube video showing Steve Mahan, a Morgan Hill, California resident, being taken on a ride in its self-driving Toyota Prius. In the video, Mahan states "Ninety-five percent of my vision is gone, I'm well past legally blind". The YouTube video notes that Mr. Mahan and his car are on a carefully programmed route which takes him from his home to a drive-through restaurant, then to the dry cleaning shop, and finally back home.

The Google website explains how this amazing feat occurred. "The laser range finders map out the driving environment, the cameras and vehicle radars . . . detect potential obstacles and the GPS determines the location of the vehicle to help it stay on the correct path". There is a feature on the dashboard which allows the driver to monitor what the autonomous technology is doing.

In December 2016, Google spun off its self driving car project into a company called Waymo, which stands for "a new way forward in mobility." As of February 2017, Waymo is testing three autonomous vehicles: A prototype, the Lexus RX450h, and 2017 Chrysler Pacifica Hybrid minivans. It plans to have 100 of the driverless minivans on the road by the end of 2017.

According to John Krafcik, Waymo's CEO its fleet is designed "from the ground up," with a hardware suite capable of "safely handling the complex task of full autonomy. The Waymo's radar system is capable of seeing a football helmet from two full football fields away." The company has more than 2 million self-driven miles, which has provided the company with "over 300 years of human driving experience." According to a recent report which the company filed with the State of California, its AV's drove nearly 636,000 miles in 2016—almost 50% more than in 2015. And "disengagements," when the driver needed to regain control of the vehicle, dropped from 341 to 124.

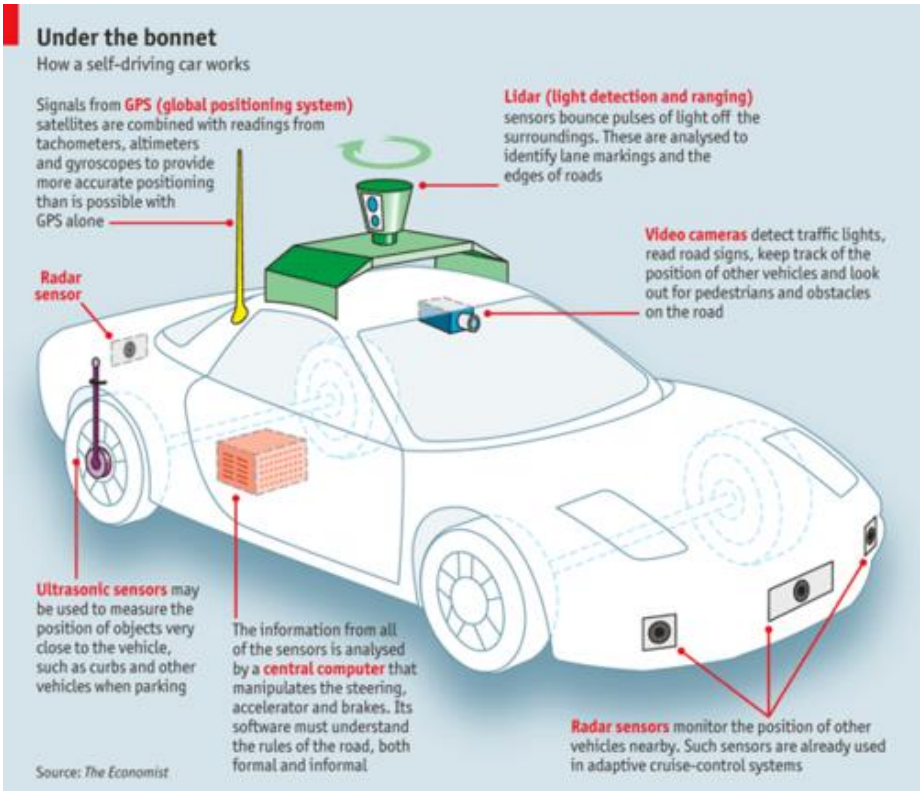
The law in all 50 states still requires a driver behind the steering wheel and in the Google car the driver can assume control of the vehicle at any time by moving the steering wheel, touching the pedals or pressing a button that switches the car out of self-driving mode. If

the car does not know what to do in certain driving situations a voice comes on letting the user know that the car is giving control back to the driver.

The OEM Way

To date none of the world's car manufacturers have brought a fully self-driving car to market but many of them have incorporated AV technologies which require human intervention into their models.
For example, the Lexus advanced parking guidance systems requires the human driver to align the vehicle with the desired spot, manually activate the autonomous parking technology and engage the brakes to deactivate the autonomous parking technology once the manoeuvre is complete. According to the Lexus website the system uses six sonar sensors, ParkMate software, and computer processors. Almost all of the new model high end vehicles have adaptive cruise control (ACC) which controls a car's position relative to the location of objects around it and lane keeping assistance systems which help a driver stay in his or her lane by providing minuscule amounts of "activation" to the steering systems .
Perhaps the best way to understand AV technology is to use categories -created by the NHSTA:

Level 0-The human driver is in complete control of all functions of the call
Level 1: One function is automated
Level 2: More than one function is automated at the same time (i.e. steering and acceleration) but the driver must remain constantly attentive
Level 3: The driving functions are sufficiently automated that the driver can safely engage in other activities
Level 4: The car can drive itself without a human driver



How Big and Where Will The Market Be?

According to data analyst company, IHS Automotive cars with full driver control are expected to hit the world's highways before 2025 and self-driving "only"cars will be on the market by 2030.

IHS predicts s total worldwide sales will grow from 230,000 in 2025 to 11.8 million by 2035. It anticipates that 7 million cars will be on the road with both driver and autonomous control and 4.8 million will be fully autonomous. The study anticipates that by 2050 nearly all of the vehicles in use will be self-driving.

The price premium for the electronics technology will add approximately $7,000 to $10,000 to a car's sticker price in 2025, a figure that will drop to $5,000 in 2030 and $3,000 in 2035.

IHS predicts North America will account for 29% of worldwide sales of self-driving cars with human controls (level 3) and self-driving only cars (level 4) in 2035, or nearly 3.5 million

vehicles. China will capture the second largest share at 24 %, or more than 2.8 million units, while Western Europe will account for 20% of the total, 2.4 million vehicles.

"Shared Driving" Is What We Are Likely to See

There are no barriers to the increased availability of Level 2 technology such as Adaptive Cruise Control, Lane Keep Assistance, Collision Avoidance with Brake Support, and Adaptive Lights which are now widely available on many models.

Despite the rosy predictions of HIS and other analysts there are many hurdles on the way to a world full of SDC's. What is likely to happen is cars which offer "shared driving" will be the first to reach market. The driver will be able to drive autonomsly in certain operating conditions i.e. on certain roads at specified speeds and will revert to traditional manual driving when outside those boundaries or at the request of the human driver.

In the past we have seen a long lag between the time the technology was developed and the time it was actually widely used. For example, the first patents for airbags were issued in the early 1950s and by the 1970's airbag manufacturing companies existed yet it was not till 1999, that airbags became a mandatory feature. What is different today is the speed with which improved technology reaches the market, consumer demand for more expensive cars, and more active government regulators.

Barriers to Deployment

There are significant legal and technical barriers to fully implemented AV and SDC technology

Legal Barriers

The Need for a New Legal Framework as the Line Between Man & Machines Blur

There are many issues that may be untangled and established before a framework for lawmakers and insurers is established. For example, how will liability for accidents between SDC and manually driven cars be determined? Currently, autonomous capabilities in most vehicles are at what IHS calls “level 1,”or simple driver-assist warnings for lane departures or forward collisions, or “level 2”with lane keep assistance or autonomous braking features to avoid crashes.

As the technology becomes more intuitive with time, the lines between decisions made by driver and machine will blur which will as discussed below pose significant challenges for litigants and the court system.

Inconsistent State Laws in the US

Different states attempts to regulate AV technology could result in a crazy quilt of incompatible requirements and regulations that would make it hard to operate vehicles with this technology in multiple states. (See chart and map at end of this paper).

As of January 1, 2017, eight states (California, Florida, Louisiana, Michigan, Nevada, North Dakota, Tennessee and Utah) and the District of Columbia currently have statutes addressing autonomous vehicles. Additionally, the governors of Arizona and Massachusetts signed executive orders concerning autonomous vehicles. The laws in Nevada, Florida, and Michigan all provide that the OEM is **not** liable for damages resulting from another person's conversion or attempted conversion of the vehicle into an automated motor vehicle or the modification of installed equipment, unless the defect which causes the damage was present in the vehicle when it was manufactured.

Existing state statutes regarding autonomous vehicles fall into three general categories: (1) those permitting general use of autonomous vehicles, (2) those that permit the use of autonomous vehicles for testing purposes only, and (3) those that do not regulate the use of autonomous vehicles.

Florida and the District of Columbia have authorized the general use of autonomous vehicles. In 2016, Florida amended its autonomous vehicle statute, allowing any person with a valid driver's license (the "Operator") to operate an autonomous vehicle on Florida roads. Importantly, the statute does not require the Operator to physically be in the vehicle. Instead, the car must have a mechanism to either allow the Operator to take control of the vehicle if the autonomous technology fails, or cause the vehicle to come to a complete stop. The District of Columbia took a slightly more restrictive approach, allowing autonomous vehicles on public roads if a licensed driver is seated in the driver's seat and can manually take control over the vehicle at any time

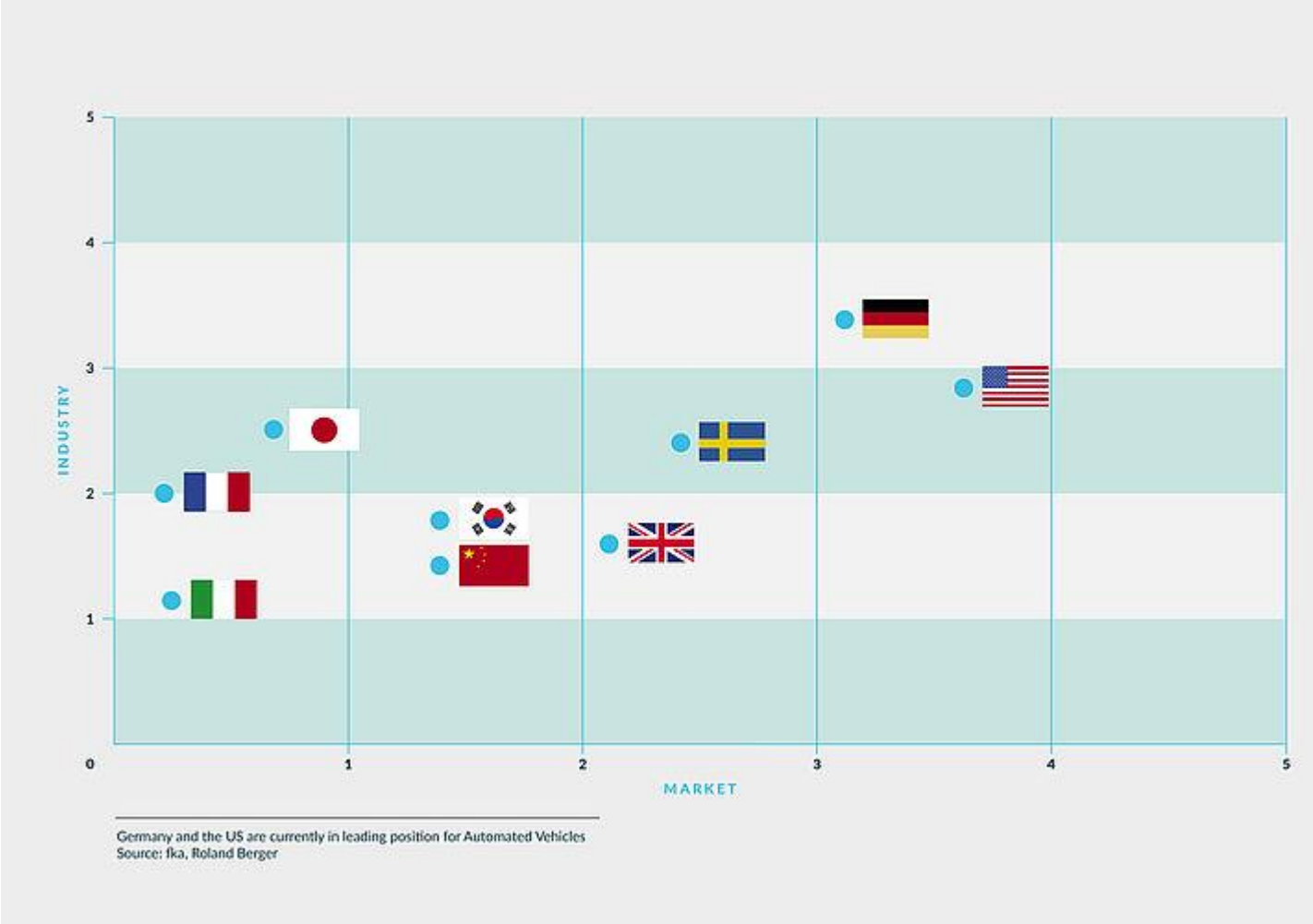
Other state laws on autonomous vehicles are more restrictive, permitting the use of autonomous vehicles only for testing purposes, or not explicitly permitting the use of autonomous vehicles at all. For example, Michigan and Nevada only permit autonomous vehicles to be used for testing purposes. Louisiana defines "autonomous technology," but does not otherwise regulate autonomous vehicles. And North Dakota and Utah authorized studies on how to best regulate autonomous vehicles. Finally, Tennessee, rather than authorizing the use of autonomous vehicles, merely barred local governments from prohibiting the use of autonomous vehicles.

Even in California, where autonomous Google cars have undergone thousands of hours of testing on public roads, autonomous vehicles are only allowed for testing purposes with a human seated in the vehicle at all times and only with a testing permit. In addition, the California Code of Regulations excludes vehicles weighing more than 10,000 pounds, which effectively prohibits the testing of autonomous tractor-trailers. However, the California legislature recently took the significant step of allowing permits for limited testing of autonomous vehicles without a human in the driver's seat and without a steering wheel, gas pedal or brake pedal.

The governors of three states have taken steps to promote autonomous vehicles in the absence of legislative action. Arizona's governor issued an executive order instructing the Arizona Department of Transportation to establish pilot programs to permit the testing of autonomous vehicles, with or without persons inside the vehicle. The governor of Massachusetts 'issued an executive order establishing an autonomous vehicle working group whose purpose is to issue guidance for safe testing of autonomous vehicles in designated areas. Virginia's governor helped create the Virginia Automated Corridors [a public-private partnership to encourage the growth of autonomous vehicles by designating portions of public roads for testing.

The Rest of the World

The automotive experts at Roland Berger GmbH and fka Forschungsgesellschaft Kraftfahrwesen mbH Aachen (fka) have created the Automated Vehicles Index, which compares the relative competitive positions of the key automotive nations, which it defines as the US, Germany, China, Sweden, the UK, South Korea, France, Italy and Japan.
The Index considers each countries legislative framework as well as the sales figures for vehicles with highly developed AV systems in the different countries. The US is currently leading this dimension ahead of Germany and Sweden. Whereas the US has a very large market volume (in absolute terms) for vehicles fitted with relevant assistance systems, Germany and Sweden rank second and third respectively due to the very high specific share of new vehicles fitted with such systems. One challenge still facing OEMs is the fact that the legal framework is fraught with uncertainty. Even though Germany decided to amend the Vienna Convention in April this year, thus taking important steps toward the licensing of self-driving cars, the US still offers the best prerequisites for automated driving.
German OEMs retain their lead over US automakers when it comes to incorporating automated functions in mass produced vehicles. But other countries are catching up and the competition is intensifying. In recent months a range of manufacturers, including some from China and South Korea, have announced plans to launch automated driving functions in mass produced vehicles. South Korean and Chinese OEMs have also been putting new prototype vehicles on the market.



Germany and the U.S. are currently in the leading position for automated vehicles (Source: fka, Roland Berger).

The race is well and truly on.

Government Regulation

There are several national and international government and industry efforts to develop principles guidelines and standards for AV technologies and a client who can demonstrate compliance with the industry standards and government regulations would have a strong defense to a traditional American product liability suit.
It is important to remember:

Regulations are mandatory requirements developed by policymakers that are specified by law and are enforceable by the government.

Standards, are engineering criteria developed by the technology community that specify how a product should be designed or how it should perform. Standards have no authority; they are voluntarily adopted by an industry or group to insure consistency, interoperability, and safety.

For example, the Society for Automotive Engineering, (SAE International) developed standards for the comfort, fit, and convenience of seat belts in trucks and buses which are voluntarily met by manufacturers and are not enforced by government regulators.

Standards become enforceable law, however, when they are included as part of a regulation. For example, the Federal Motor Vehicle Safety Standards (FMVSSs) specify performance standards for a wide range of safety components that must be met by law, including that vehicles must meet specific crash test−survivability requirements. .

There are numerous national and international government and industry efforts to develop principles, guidelines, and standards for AV technologies which Underwriters may want to discuss with our clients.

The Crash Avoidance Metrics Partnership is a research consortium of nine OEM's that brings auto manufacturers together on projects that "accelerate the implementation of crash avoidance countermeasures to improve traffic safety by defining and developing necessary pre-competitive enabling elements of future systems". In 2012, the group did a pilot program with the US DOT that involved 690 drivers using 24 cars testing connected vehicle technology (V2V).

Several organizations address intelligent transport systems more broadly. The International Harmonized Research Activities Working Group on Intelligent Transport Systems (IHRA-ITS) was put together to lead research and encourage collaboration on related safety issues; one of the objectives is to conduct research that provides "a strong grounding for internationally harmonized regulations ".

The International Organization for Standardization (ISO) has set up an international working group under its intelligent transport systems technical committee to evaluate design guidelines and recommend standards for any technologies that aid in "avoiding crashes; increasing roadway efficiency; adding to driver convenience; reducing driver workload; improving the level of travelers' safety, security, and assistance . . . warn of impending danger; advise of corrective actions; partially or fully automate driving tasks; report travelers' distress; and request needed emergency services"

The SAE similarly has an intelligent transport systems division that addresses these technologies.

Because AV technologies are still evolving the standards are not yet precisely defined from a claims lawyer's perspective. For example, the ISO standard for lane departure warning states, “An easily perceivable haptic and/or audible warning shall be provided” But, what does “easily perceivable” mean and for what population of drivers?

In addition, although these standards include many specifications and some basic test procedures, there is nothing that defines the conformance requirements (i.e., test methods and procedures) so it's impossible to determine if the technology or system is actually in compliance with the specifications

Technology Risks-Software Reliability and Cyber Security

There is no question that electronics of the car will become a target for malicious hacking attacks. Automotive risk managers and engineers will have to ensure products are reinforced with hardware-based, tamper-proof security, as well as highly sensitive software and data integrity controls that detect unauthorized access. It will also be critically important to have fail safe redundancies built into the automation systems.

Software Upgrades

Software upgrades will also pose a challenge as they might need to be backward compatible with earlier models of the vehicles Moreover, as more models offer AV features software and system upgrades will need to perform on diverse platforms which will make reliability and quality assurance challenging.

System Security

Systems security will also be a concern so the viruses and malware don’t prevent the proper functioning of the vehicles system. Building robust security protocols across many different automakers vehicles and communications platforms is going to technically challenging

Data ownership and privacy

In AV's the vehicle communication platforms will generate very valuable data about the car and its driver. For instance, Insurance companies will want data on individual driving habits while retailers and law enforcement agencies will have a completely different agenda. At present there is no clear regime on ownership and control of data. Our OEM and software company clients will need to make sure they are anonymously aggregating vehicle data so they do not reveal drivers personal identifiable information. In December 2013, the US Government Accounting Office issues a report on Car Location Based services to the Chairman of the Senate Subcommittee on Privacy, Technology and the Law which dealt only with the myriad of issues associated with GBS and location tracking software such "On Star".

Human Driver Reengagement

Human driver reengagement will pose another challenge. The owner of a driverless car is going to want to enjoy the benefits of the technology and will engage in other tasks while the car is driving but will need to quickly reengage (in a matter of seconds or less) at the car's request. The research on distracted driving suggests this may be a significant challenge.

Vehicle 2 Vehicle

In the context of automated vehicles the role of V2V infrastructure communication is still in flux. While this technology could ease the task of automated driving it's not clear how state governments will respond and if they will be able to design a system compatible with all models. In addition, V2V requires a substantial investment in infrastructure i.e. all traffic lights would need to be equipped with radios so they can communication with cars on the road.

What it will AV Technology Mean to Auto Insurers?

New preliminary 2016 data from the National Safety Council estimates that as many as 40,000 people died in motor vehicles crashes last year, a 6% rise from 2015.

Fewer Accidents-Lower Rates

AV technologies will likely reduce the number and overall cost of crashes which will likely reduce auto insurance costs.

It is likely that AV technology will reduce the frequency of crashes. In 2010, the Insurance Institute for Highway Safety (IIHS) estimated that if all vehicles had forward collision and lane departure warning systems, side view (aka blind spot) assistance, and adapative headlights, nearly a third of crashes and fatalities could be prevented. Automatic braking which allows a car to stop when it detects an obstacle would also reduce the number of rear-end collisions. Level 4 technology might significantly reduce crash statistics because driver error is the primary source of crashes. This is especially true since 39% of fatal crashes in 2011 involved alcohol use by the driver.

To encourage early adoption insurers may offer discounts to consumers who purchase automotive with the appropriate systems. In Europe, for example, some insures have offered a 20% discount on auto insurance for policyholders who purchase a car with lane keeping function and ACC.

LOOKING INTO A CRYSTAL BALL

There will be Fewer Cases but they will be More Expensive to Develop

How Products Liability Law Might Apply Autonomous Vehicles

1. Manufacturing Defects

Manufacturing defects occur when the product does not meet the manufacturer's specifications and standards and the defect caused the plaintiff's injury.

For instance, if the laser sensors on an AV do not detect oncoming traffic or tell the driver when to turn, like the specifications require, then the user will bring a manufacturing defect claim.

However, because of the interplay between software and the car's actual equipment in the AV and SDC context American plaintiffs face a new and significant complication which is the courts reluctant to apply the manufacturing defect doctrine to software. As a generally matters courts have equated software to the information in a book which is not a product for strict liability purposes. In support of this view courts have and noted in software production nothing tangible is manufactured and the software is usually licensed not sold.

It will be very important that our clients (be they OEM's or software developers) include the appropriate risk shifting provisions in the sale contracts.

If courts begin to rule that software is a product the plaintiffs complaints will likely include allegation such as the following: (1) the company failed to write or test the program properly, (2) the company failed to correct significant bugs in the program, (3) the company did not adequate warn of limitations in the program, (4) the company failed to instruct users how to operate the program, or (5) failed to provide adequate security for the system.

The applicable standard of care in each instance will depend on the specific circumstances. In addition, as technology evolves, it is possible that the courts will hold vendors liable for less obvious breaches of duty such as the failure to insure that the software does not contain any hidden viruses.

2. Design Defects

Risk-Utility Test

The risk-utility test is the dominant test for design defects in products liability in the US.

Section 2(b) of that Restatement provides:

A product . . . is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design by the seller . . . and the omission of the alternative design renders the product not reasonably safe. A manufacturer is not required under the risk-utility test to use the safest design possible. Rather, under the risk-utility test "[a] product is defective in design if the safety benefits from altering the design as proposed by the plaintiff would have exceeded the costs of such an alteration."

To prevail, a plaintiff must present a reasonable alternative design that would have prevented the accident. In the AV context, design defect claims will likely allege a defect in the design of some tangible feature of the vehicle or may allege a defect in the software that controls the vehicle. For instance, a plaintiff could allege that the sensors could have been designed better to capture the surroundings of the automobiles or the software could have had better acceleration features.

In order to prove software defect the plaintiff will need a highly specialized expert to testify as to how the algorithm could have been designed in a safer manner that would have prevented the accident. The complexity of the technology, the costs of a risk-utility suit and the difficulty in having a qualified expert testify to the alleged design defect, may be a deterrent to plaintiffs lawyers in anything other than the most serious cases of clear liability.

Consumer Expectations Test

The Consumer Expectation test has been adopted by only a handful of states.

The Restatement (Second) of Torts defines a design defect as a defect that is unreasonably dangerous beyond the contemplation of the consumer. A product has a design defect if it is "dangerous to an extent beyond that which would be contemplated by the ordinary consumer who purchases it."

Under the consumer expectations test, a court looks to what a reasonable consumer would expect from a product. Because of the complexity of traditional automobiles, several courts have refused to apply the consumer expectations test to automotive product liability suits.

In the AV context the consumer will expect the vehicle to operate on its own in a reasonably safe manner and it's possible that advertising and media coverage could lead consumers to have unrealistic expectations of the AV's capabilities.

Failure to Warn

The final category of traditional products liability law is the warning defect claim. There are two parts to the duty to warn: "informing buyers of hidden dangers" and instructing buyers on how to safely use the product.

The Restatement (Third) of Torts: Products Liability states that:

A product . . . is defective because of inadequate instructions or warnings when the foreseeable risks of harm posed by the product could have been reduced or avoided by the provision of reasonable instructions or warnings by the [manufacturer] . . . and the omission of the instructions or warnings renders the product not reasonably safe.

This standard focuses on whether the warnings provided were adequate.

In the AV context the principal obligation of manufacturers will be letting consumers know of any dangers driver may face when using the autonomous technology. For instance, if the vehicle is brought to a particular location that the GPS maps cannot identify, the vehicle could malfunction and cause harm. A consumer may not know that the vehicle struggles in remote locations, and the manufacturer would have a duty to warn the owner that the autonomous technology could malfunction or does not operate properly there.

In addition, the OEMs will have a duty to properly instruct users on how to safely use the AV or SDC. This may require a special instruction video that users must watch before purchasing vehicles equipped with autonomous technology. One of our clients, Thor has a very clever practice of videotaping their dealer's staff as they walk a customer through the RV prior to handing them the keys. They give a copy of the tape to the customer as a "keepsake" and maintain a copy. Since the tape shows the salesmen warning the new owners of certain features (i.e. do not take the batteries out of the carbon monoxide detector) it is powerful evidence in any later failure to warn cases.

Evidence Issues

Costs Will Go Up and Federal Court Will Be the Best Venue

Under any of the products liability theory two evidentiary issues—expert testimony issues and subsequent remedial measures—are likely to pop up in any AV or SDC products liability suits.

Because of the complexity of the technology, a plaintiff will need expert testimony to explain product safety and accidents to the court and the jury, which will make most AV/SDC product liability suits cost prohibitive.

For instance, in design defects, the major hurdle for a plaintiff will be presenting evidence of a reasonable alternative design. Autonomous vehicles by their very nature are futuristic and the car's movement is controlled by algorithms. To prove a defect a plaintiff will need an expert witness to testify to a jury that the highly complex algorithm could have been written safer and that the costs of discovering and implementing this new algorithm would not exceed the benefits of doing so.

To do so will likely require multiple experts: a computer scientist to understand the algorithm; a mathematician to rewrite the equation; an economist to weigh the costs and benefits of the change; and an expert in the field of autonomous vehicles to make sure that this is possible and that it would not have adverse effects on the vehicle.

To help ease these costs, depending on the jurisdiction, a plaintiff will be able to use a subsequent update in the algorithm or safety update as evidence that there was a reasonable alternative design. In federal courts, however, Federal Rule of Evidence (FRE) 407 prohibits introduction of subsequent remedial measures. The ability to use a subsequent update to the algorithm in state court will greatly improve a plaintiff's chance of success on the design defect claim because it will remove costs associated with developing an algorithm and proving the algorithm will help increase safety.

The plaintiff will need to file the claim in state court to avoid FRE 407's bar against subsequent remedial measures. In any jurisdiction, a plaintiff will be able to introduce updates to the algorithm—and algorithms used by competing manufacturers—if they predate the accident but were not installed in the plaintiff's car. However, while our OEM clients took different approaches to technology such a roof crush protection and seat belt design this time it may be different because the technology used in AV's and SDC is very likely going to require consistency among systems and equipment. The nine OEM's who participated in the DTO's test of driver connected technology all installed the same system in their vehicles which is a plaintiffs nightmare, particularly if our clients can demonstrate the systems they eventually install meet the government or ISO standards.

Conclusion

SDCs and AV are a matter of " not if but when." And they create complex questions about accident liability and safety risk management for clients, insurers, and brokers.

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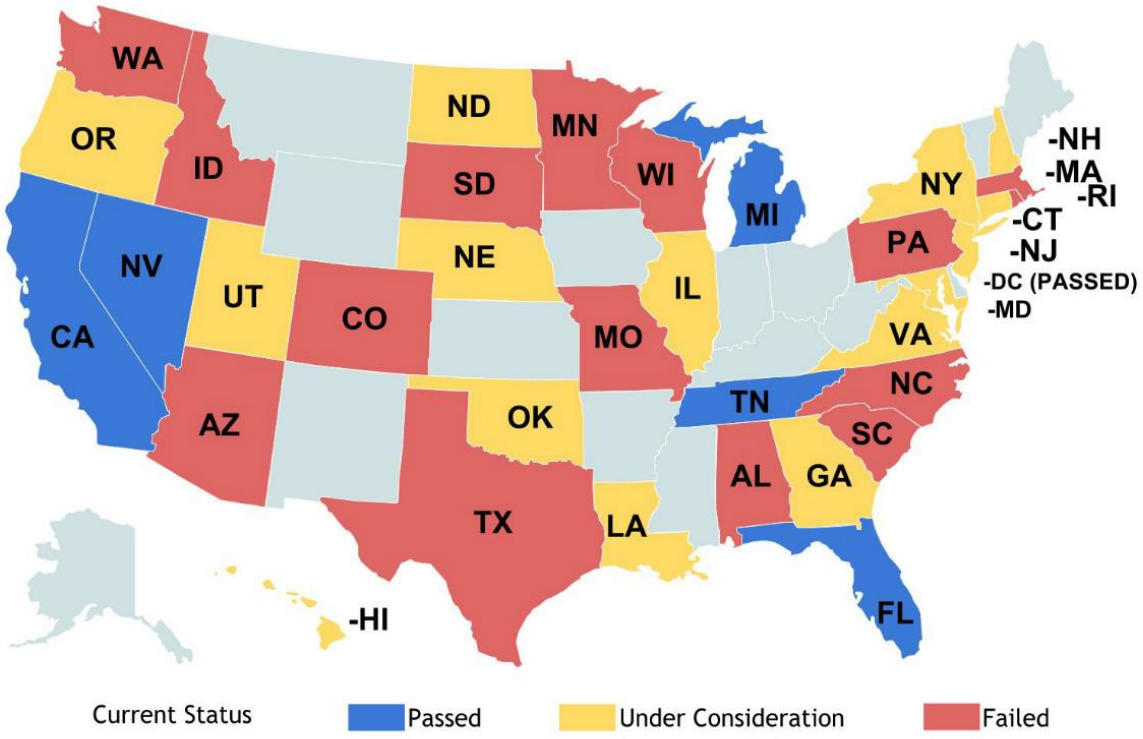

Gabriel Weiner and Bryant Walker Smith, Automated Driving: Legislative and Regulatory Action, cyberlaw.stanford.edu/wiki/index.php/Automated_Driving:_Legislative_and_Regulatory_Action

Federal Bills

Bill	Title	Introduced	Last_Action	Status	Description

HR 3876	Autonomous Vehicle Privacy Protection Act of 2015	2015-11-02	2015-11-03	Committee	
HR 22	Fixing America's Surface Transportation (FAST) Act	2015-01-06	2015-12-04	Enacted	

State Bills

Legislatures in the following states are considering or have considered bills related to automated driving.

Current

State	Bill	Introduced	Last_Action	Status	Description
California	AB 399	2017-02-09	2017-02-10	Committee	
California	SB 251	2017-02-07	2017-02-08	Committee	
California	SB 145	2017-01-17	2017-01-26	Committee	
California	AB 87	2017-01-05	2017-01-19	Committee	
Connecticut	SB 260	2017-01-18	2017-01-23	Committee	
Connecticut	HB 5185	2017-01-04	2017-01-23	Committee	
Georgia	SB 54	2017-01-24	2017-01-25	Committee	
Hawaii	HB 1596	2017-01-25	2017-01-30	Committee	
Illinois	HB 2747 SB 1432	2017-02-08	2017-02-09	Committee	
Maryland	SB 902	2017-02-03	2017-02-08	Committee	

	HB 1013				
Maryland	SB 9	2016-10-05	2017-02-13	Unfavorable Report from Committee	
Michigan	SB 927 SB 928	2016-04-28	2016-11-09	Committee	See comments.
Nebraska	LB 627	2017-01-18	2017-02-02	Committee	
Nevada	AB 69	2016-11-17	2017-02-06	Committee	
New Hampshire	HB 314	2017-01-05	2017-02-08	Committee	
New Jersey	A3745	2016-05-19	2016-12-12	Committee	Permits testing of autonomous vehicles under certain circumstances.
New Jersey	A851	2016-01-27	2016-01-27	Committee	Directs MVC to establish driver's license endorsement for autonomous vehicles.
New Jersey	A554	2016-01-27	2016-01-27	Committee	
New Jersey	S343	2016-01-12	2016-01-12	Committee	Defines "artificial intelligence," "autonomous mode," "autonomous vehicle," and "sensors," directs state MVC to establish a driver's license endorsement for the operation of autonomous vehicles, and directs the head of the state MVC to adopt regulations authorizing the operation of autonomous vehicles.
New York	A1037	2017-01-10	2017-01-10	Committee	
New York	S2234	2017-01-09	2017-01-12	Committee	

	A452				
North Dakota	HB 1394	2017-01-16	2017-02-02	Second Reading	
North Dakota	HB 1202	2017-01-09	2017-02-07	Committee	
Oklahoma	SB 202	2017-02-06	2017-02-07	Committee	
Oregon	HB 2461	2017-01-09	2017-01-17	Committee	
Tennessee	HB 1131 SB 1072	2017-02-09	2017-02-09	Committee	
Tennessee	HB 705 SB 513	2017-02-07	2017-02-07	Committee	
Tennessee	HB 296 SB 252	2017-01-31	2017-02-03	Committee	
Tennessee	HB 381 SB 151	2017-01-26	2017-02-07	Committee	
Utah	HB 257	2017-02-01	2017-02-10	Committee	
Virginia	HB 1372	2016-01-22	2016-02-16	Committee	

Enacted

State	Bill	Introduced	Last_Action	Status	Description
California	AB 1592	2016-01-06	2016-09-29	Enacted	Authorizes the Contra Costa Transportation Authority to conduct a pilot project testing autonomous vehicles not equipped with steering wheels, brake pedals, accelerators, or operators inside, at specified locations and speeds under 35 miles per hour.
California	SB 1298	2012-02-23	2012-09-25	**Enacted**	As amended, defines "autonomous technology," "autonomous vehicle," and "operator"; finds that the state "presently does not prohibit or specifically regulate the operation of autonomous vehicles"; requires rulemaking before **2015**; permits current operation under certain conditions; imposes additional oversight on the operation of vehicles without a human in the driver's seat; and requires that the "manufacturer of the autonomous technology installed on a vehicle shall provide a written disclosure to the purchaser of an autonomous vehicle that describes what information is collected by the autonomous technology equipped on the vehicle." Recent amendment **struck** previous language stating "the intent of the Legislature that current law governing the conversion of vehicles originally manufactured by a third party shall control issues of liability arising from the operation of the autonomous vehicle if that vehicle was converted by an autonomous technology manufacturer."
District of Columbia	B19-0931	2012-09-19	2013-01-23	**Enacted**	Defines "autonomous vehicle" 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," requires a human driver "prepared to take control of the autonomous vehicle at any moment," restricts conversion to recent vehicles, and addresses liability of the original manufacturer of a converted vehicle. Final version *removed* previous provisions requiring autonomous vehicles to operate on alternative fuels and imposing a vehicle-miles-traveled tax in lieu of DC motor fuel tax. Passed Congressional review (April 2013).
Florida	HB 7027	2015-12-02	2016-04-04	**Enacted**	
Florida	HB 7061	2016-01-12	2016-04-14	**Enacted**	
Florida	CS/HB 1207 CS/HB 1207	2012-01-04	2012-04-16	**Enacted**	As wholly amended, defines "autonomous technology" and "autonomous vehicle," "finds that the state does not prohibit or specifically regulate the testing or operation of autonomous technology in motor vehicles on public roads," specifies that "[a] person who possesses a valid driver license may operate an autonomous vehicle in autonomous mode," addresses liability of the original manufacturer of a vehicle on which a third party has installed autonomous technology, establishes certain conditions under which an autonomous vehicle may be tested, and directs state DHSMV to prepare specific report for the legislature by February 2014. See more.

Florida	SB 52	2012-11-19	2013-05-29	**Enacted**	Bans texting but exempts operators of autonomous vehicles operating in autonomous mode.
Louisiana	HB 1143	2016-03-01	2016-06-02	Enacted	Defines "autonomous technology" for purposes of the Highway Regulatory Act.
Michigan	SB 0169	2013-02-07	2013-12-26	**Enacted**	Defines "automated technology," "automated vehicle," "automated mode," "upfitter," expressly permits testing of automated vehicles by certain parties under certain conditions, defines operator, addresses liability of the original manufacturer of a vehicle on which a third party has installed an automated system, directs state DOT with SOS to submit report by February 1, 2016.
Michigan	SB 0663	2013-11-06	2013-12-27	**Enacted**	Declares that the original manufacturer of a vehicle is not liable for damages resulting from another person's conversion or attempted conversion of the vehicle into an automated motor vehicle, or the modification of installed equipment, unless the defect from which the damages resulted was present in the vehicle when it was manufactured. Similarly addresses liability of subcomponent system producers for equipment installed by those producers to convert vehicles into automated motor vehicles.
Michigan	SB 995	2016-05-25	2016-12-13	**Enacted**	See comments.
Michigan	SB 996	2016-05-25	2016-12-13	**Enacted**	See comments.
Michigan	SB 997	2016-05-25	2016-12-13	**Enacted**	See comments.
Michigan	SB 998	2016-05-25	2016-12-13	**Enacted**	See comments.
Nevada	AB 511	2011-03-28	2011-06-17	**Enacted**	Defines "autonomous vehicle" and directs state DMV to adopt rules for license endorsement and for

					operation, including insurance, safety standards, and testing.
Nevada	SB 140	2011-02-10	2011-06-17	**Enacted**	Permits the use of handheld wireless communications devices in vehicles that are lawfully operating autonomously.
Nevada	SB 313	2013-03-20	2013-06-02	**Enacted**	Amends Nevada's autonomous driving statute to, inter alia, (1) incorporate and potentially modify certain rules promulgated by the DMV, (2) addresses liability of the original manufacturer of a vehicle on which a third party has installed autonomous technology, and (3) add "except in case of emergency" to the statement "that a person is not required to actively drive an autonomous vehicle."
North Dakota	HB1065	2015-01-06	2015-03-26	Enacted	Establishes a legislative management study of automated vehicles.
Tennessee	SB 2333 HB 2173	2016-01-21	2016-03-31	Enacted	
Tennessee	SB 1561 HB 1564	2016-01-12	2016-02-01	**Enacted**	
Tennessee	HB 616 SB 598	2015-02-10	2015-05-06	**Enacted**	Prohibits local governments from prohibiting the use of a vehicle solely on the basis of it being equipped with autonomous technology if the vehicle otherwise complies with applicable safety regulations, defines "autonomous technology" as technology "that has the capability to drive [a] motor vehicle without the active physical control or monitoring by a human operator."

Utah	HB 280	2016-02-03	2016-03-23	Enacted	
Utah	HB 373	2015-02-20	2015-03-27	Enacted	Authorizes the department of transportation to conduct a connected vehicle testing program.

Other

Bill status at conclusion of legislative session.

State	Bill	Introduced	Last_Action	Status	Description
Alabama	SB 178	2016-02-09	2016-02-09	Committee	
Arizona	HB 2679	2012-01-30	2012-02-09	Failed Transportation Committee	Defines "autonomous vehicle" and directs state DOT to adopt rules for license endorsement and for operation, including insurance, safety standards, and testing.
Arizona	HB 2167	2013-01-23	2013-01-31	Committee	Similar to Florida's statute. DOT report due by April 1, 2015.
California	AB 2682	2016-02-19	2016-11-30	Committee	Requires CA DMV, upon the development of a model state policy on autonomous vehicles by the National Highway Traffic Safety Administration, to hold public hearings on the model policy and consider, to the extent authorized by other law, conforming DMV regulations with that policy.
California	AB 2866	2016-02-19	2016-11-30	Committee	

California	AB 2415	2016-02-19	2016-11-30	Committee	
California	SB 431	2015-02-25	2016-11-30	Passed Senate	Amends existing law on following distance to allow for driver-assistive truck platooning.
California	AB 1164	2015-02-27	2015-07-16		Amends existing law addressing autonomous vehicles.
California	AB 2258	2014-02-21	2014-04-28	Committee	Authorizes the City of Lancaster to research and develop autonomous public buses.
Colorado	SB 13-016	2013-01-09	2013-02-05	Indefinitely Postponed	Defines "drive" and redefines "driver" in the vehicle code, establishes conditions under which a "person may use a guidance system to drive a motor vehicle," permits the use of a wireless telephone when using such a guidance system, provides that "[t]he driver is responsible for any damage caused by a motor vehicle being driven by means of a guidance system to the same degree as if the driver were manually driving the vehicle," eliminates following distance restrictions for a vehicle being so driven, and directs the "department" [of revenue or of transportation?] and the state patrol to submit a

					joint report by August 30, 2018.
Connecticut	HB 6344	2015-01-22	2015-02-05	Committee	Expressly allows for use of autonomous vehicles for testing purposes, directs department of motor vehicles to promulgate regulations concerning autonomous vehicles.
Florida	SB 1392	2016-01-06	2016-02-12	Committee	
Florida	SB 1394	2016-01-06	2016-02-12	Committee	
Florida	SB 1272	2014-02-25	2014-05-01	Committee	
Florida	SB 1768 SB 1768	2012-01-06	2012-03-09	Tabled for CS/HB 1207*	Amended with the text of, and laid on table in favor of, CS/HB 1207.
Georgia	SB 113	2015-02-12	2016-01-11	Recommitted	
Georgia	HR 1265	2014-02-06	2014-03-18	Passed	Establishes a Georgia House study committee on autonomous vehicle technology.
Georgia	SB 369	2014-02-07	2014-02-26	Second Reading	
Hawaii	HB 2687	2016-01-27	2016-02-01	Committee	
Hawaii	HB 1458	2015-01-29	2015-02-09	Committee Recommendation to Defer	
Hawaii	HB 632	2015-01-26	2015-01-28	Committee	
Hawaii	HB 2420	2014-01-23	2014-01-27	Committee	

Hawaii	HB 1461	2013-01-24	2013-12-18	Committee	Seeks to "authorize, for testing purposes, the operation of autonomous vehicles," defines "autonomous technology," "autonomous vehicle," "guided operator" (for testing purposes), and "manufacturer," requires manufacturers to apply before testing autonomous vehicles on public roads, establishes conditions for testing, establishes certain offenses, establishes conditions for operating autonomous vehicles, addresses liability of the original manufacturer of a vehicle on which a third party has installed autonomous technology, exempts a nonreckless guided operator from liability, and instructs the department of motor vehicles to (1) issue rules for testing by January 2, 2015 and (2) provide an annual report to the legislature.
Hawaii	HB 2238	2012-01-23	2012-03-01	Substituted*	Amended to the exclusion of all autonomous driving provisions (which previously defined "autonomous motor vehicle" and directed state transportation director to adopt rules for license endorsement

					and for operation, including insurance, safety standards, and testing). See also HR 163/HCR 212 below:
Hawaii	HR 163 HCR 212	2012-03-14	2012-03-30	Committee*	Asks state DOT to review law and policy related to "driverless cars" and directs it to provide findings and legislative suggestions by 2013. Note that "HCR" is a House Concurrent Resolution.
Idaho	S 1108	2015-02-25	2015-03-13	Passed Senate	
Illinois	HB 3136	2015-02-25	2016-07-31	Committee	
Louisiana	HB 233	2016-03-01	2016-04-19	Committee	
Louisiana	HR 133	2014-05-12	2014-06-05	Passed	
Louisiana	HB 937	2014-02-28	2014-03-24	Committee	Authorizes the operation of autonomous motor vehicles.
Louisiana	HB 938	2014-02-28	2014-03-24	Committee	Authorizes the research and testing of autonomous vehicles.
Maryland	SB 126	2016-01-15	2016-02-08	Unfavorable Report from Committee	Establishes a task force to study issues related to "self-driving vehicles" with a report due to the governor and general assembly on or before January 1, 2018.
Maryland	HB 172 SB 778	2015-01-29	2015-03-26	Unfavorable Report from Committee	Establishes a task force to study issues related to "self-driving vehicles" with a report due to the governor and general

					assembly on or before January 2017.
Maryland	HB 538	2014-01-29	2014-03-10	Unfavorable Report from Committee	Establishes a task force to study issues related to "self-driving vehicles" with a report due to the governor and general assembly on or before January 2017.
Massachusetts	S 1841	2015-04-15	2016-06-06	Committee	
Massachusetts	H 4321 H 2977	2015-01-20	2016-05-23	Committee	
Massachusetts	HB 3369	2013-01-22	2014-09-08	Committee	Nearly identical to Florida's statute (with report due by February 2015).
Minnesota	SF 2569 HF 3325	2016-03-10	2016-04-14	Committee	
Minnesota	HF 1416 HF 1580 SF 1270	2013-03-14	2013-03-14	Committee	Directs the commissioner of transportation to "evaluate policies and develop a proposal for legislation governing regulation of autonomous vehicles" by January 31, 2014.
Missouri	HB 924	2015-02-11	2015-03-31	Committee	
New Hampshire	HB 444	2013-01-03	2013-03-28	Inexpedient to Legislate[7]	Establishes a committee of legislators "to study the use of autonomous vehicles in New Hampshire" and instructs the committee

					to deliver a report by November 1, 2013.
New Jersey	S734 A1326	2014-01-14	2015-01-12	Committee	Defines "artificial intelligence," "autonomous mode," "autonomous vehicle," and "sensors," directs state MVC to establish a driver's license endorsement for the operation of autonomous vehicles, and directs the head of the state MVC to adopt regulations authorizing the operation of autonomous vehicles.
New Jersey	A2757	2012-05-10	2012-05-10	Committee*	Defines "autonomous vehicle" and directs state MVC to adopt rules for license endorsement and for operation, including insurance, safety standards, and testing. Identical to NJ A3020.
New Jersey	A3020	2012-06-07	2012-06-07	Committee*	Defines "autonomous vehicle" and directs state MVC to adopt rules for license endorsement and for operation, including insurance, safety standards, and testing. Identical to NJ A2757.
New York	S7879	2016-05-19	2016-05-24	Passed Senate	
New York	A31	2015-01-07	2016-01-06	Committee	
New York	S4912 A7391	2013-05-01	2014-05-02	Committee	Defines "autonomous vehicles," establishes general requirements for autonomous vehicles, expressly permits their

					operation and testing under certain conditions, addresses liability of the original manufacturer of a vehicle converted by a third party into an autonomous vehicle, and directs the commissioner of motor vehicles to study the operation and testing of autonomous vehicles and report his or her findings, including recommendations and legislative proposals, by February 12, 2015.
North Carolina	HB 782	2015-03-26	2015-04-15	Committee	Directs DMV to study the potential implementation of "autonomous vehicle technology" on state roads.
North Carolina	SB 600	2015-03-26	2016-06-30	Committee	Directs DMV to study the potential implementation of "autonomous vehicle technology" on state roads.
Oklahoma	HB 3007	2012-01-19	2012-02-07	Committee*	Defines "autonomous vehicle" and directs state DPS to to adopt rules for license endorsement and for operation, including insurance, safety standards, and testing.
Oregon	SB620	2015-02-10	2015-07-06	Committee	Defines "autonomous system," "autonomous vehicle," and "manufacturer," establishes certification

					for testing and selling of autonomous vehicles, directs the department of transportation to adopt rules for testing, establishes requirements for testing and operation, including data recording and disclosure, addresses liability of the original manufacturer of a vehicle on which a third party has installed an autonomous system.
Oregon	HB 2428	2013-01-14	2013-04-17	Committee	Defines "autonomous system," "autonomous vehicle," and "manufacturer," establishes application procedure and conditions for testing of autonomous vehicles, directs the department of motor vehicles to adopt rules for testing, establishes requirements (similar to California's) for data recording and disclosure, addresses liability of the original manufacturer of a vehicle on which a third party has installed an autonomous system.
Pennsylvania	S 1268	2016-05-18	2016-05-18	Committee	
Rhode Island	SB2514	2016-02-25	2016-03-29	Committee	
South Carolina	HB 4621	2014-02-06	2014-02-06	Committee	
South Carolina	HB 4015	2013-04-24	2013-04-24	Committee	Defines "autonomous technology,"

					"autonomous vehicle," "operator," and "manufacturer," expressly permits testing of autonomous vehicles under specified conditions by certain parties, requires manufacturers to apply to and receive approval from the state DMV before operating autonomous vehicles on public highways, establishes minimum manufacturer certifications for approval, establishes requirements for data recording and disclosure, and directs the state DMV to adopt regulations by January 1, 2015.
South Dakota	SB 139	2014-01-31	2014-02-21	Tabled	
Texas	HB 4194	2015-04-14	2015-04-17	Committee	
Texas	HB 3690	2015-03-13	2015-03-19	Committee	
Texas	SB 1167	2015-03-10	2015-04-15	Committee	
Texas	HB 933	2015-01-26	2015-04-09	Committee	
Texas	HB 2932	2013-03-07	2013-03-19	Committee	Defines "autonomous motor vehicle," "autonomous technology," and "operator," requires operator to be licensed, and directs the "department" to "adopt

					rules authorizing" and regulating "the operation of autonomous motor vehicles."
Washington	HB 2106	2015-02-12	2016-03-10	Reintroduced	
Washington	HB 1439	2013-01-28	2014-01-13	Committee	Defines "autonomous vehicle" and "manufacturer of an autonomous vehicle," requires certification of vehicles for testing, directs the state patrol to adopt rules for such testing, including the rule that a "licensed driver is legally responsible for the autonomous vehicle for traffic infractions and criminal offenses in the same manner as a driver of a nonautonomous vehicle," and "does not prohibit ... operation and testing" before the adoption of those rules.
Washington	HB 1649	2013-02-04	2014-01-13	Committee	Defines "autonomous technology," establishes requirements for testing, establishes general requirements for vehicles controlled by autonomous technology, and directs the department of licensing to "review statutes and rules regarding autonomous vehicles and report ... on June 30, 2026."

Wisconsin	SB 80	2013-03-13	2013-04-8	Committee	Defines "autonomous vehicle," "autonomous technology," and "autonomous mode," specifies certain conditions for the testing and operation of such vehicles (including the presence of a human operator), and contemplates rulemaking by the state DOT.

State Executive Orders

State	Title	Last_Action	Description
Arizona	2015-09	2015-08-25	Directs state agencies to act to support the testing and operation of automated vehicles on public roads, authorizes university pilot programs, and establishes an oversight committee.

State Regulations

Administrative agencies in the following states are considering or have considered regulations related to automated driving.

State	Agency	Title	Last_Action	Status	Description
California	Department of Motor Vehicles		2015-12-16	Regulations proposed November 29, 2013.[8] Modification to proposed regulations proposed March 6, 2014.[9] Regulations for testing by manufacturers on public roadways adopted May 19, 2014, effective September 16, 2014.[10] Draft deployment regulations were issued December 16, 2015.[11]	See California DMV's autonomous vehicles regulations website.

				Public workshops are scheduled for January 28, 2016 and February 2, 2016.	
District of Columbia	Department of Motor Vehicles		2014-04-04	Regulations proposed April 4, 2014.[12] Final rulemaking action to adopt rules possible beginning May 4, 2014.	
Nevada	Department of Motor Vehicles	R084-11	2012-03-01	Regulation took effect on March 1, 2012.	Further defines "autonomous vehicle," establishes a special driver's license endorsement, and specifies requirements for testing, certification, operation, and safety. See Nevada DMV's autonomous vehicles website.

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