AUTONOMOUS VEHICLES
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In October 2016, while Coloradans were sleeping, a self-driving semi-trailer drove 51,744 cans of Budweiser beer from Fort Collins to Colorado Springs down Interstate 25.   With the rise of investment in and the use of autonomous vehicles, governments face new challenges to address this growing field. This *issue brief* describes autonomous vehicles, discusses current federal and state policy regarding those vehicles, and notes future policy considerations.

Autonomous Vehicles

Autonomous vehicles rely on an automation system to drive the vehicle.   The car and its automation system monitor the driving environment, not the human driver.   Varying levels of automation exist among autonomous vehicles, from automatic braking to Google's self-driving prototype vehicles. These six levels, adopted by the National Highway Transportation Safety Administration (NHTSA), range from no automation to full automation (Levels 0 to 5).

Federal Policy

In response to these variations, autonomous vehicles are grouped into six classes of automation by the National Highway Transportation Safety Administration (NHTSA).[1]

In general, the federal government regulates motor vehicle safety standards, while states enforce laws pertaining to vehicle titling and registration, traffic offenses, and motor vehicle insurance and liability. NHTSA reiterated its intent to regulate autonomous vehicle safety standards in its recent "Federal Automated Vehicles Policy,"[2] which provides guidance on autonomous vehicle performance and offers a model state policy.

Status updates. NHTSA policy requests that companies provide voluntary reports to help the agency evaluate how autonomous vehicle manufacturers are addressing safety, development, and testing. The voluntary reports will cover 15 topics: data recording and sharing; privacy; system safety; vehicle cybersecurity; human machine interface; crashworthiness; consumer education and training; registration and certification; post-crash behavior; federal, state, and local laws; ethical considerations; operational design domain; object and event detection and response; and validation methods.

NHTSA model state policy. The NHTSA model state policy provides broad guidelines to states considering legislation regarding autonomous vehicles.[3] The guidelines note that future changes to laws regarding "drivers" might become necessary when drivers are no longer exclusively human. In addition, the model policy

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[1]"Taxonomy and Defintions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles", SAE J 3016.

[2]"Federal Automated Vehicles Policy", National Highway and Transportation Safety Administration, September 2016, https://one.nhtsa.gov/nhtsa/av/av-policy.html.
[3]Ibid at 37.

notes that states should consider addressing future issues related to: law enforcement and emergency response; occupant safety; motor vehicle insurance; crash investigations and crash reporting; liability; motor vehicle safety inspections; education and training; vehicle modifications and maintenance; and environmental impacts.

State Laws

Currently, 20 states (Alabama, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Louisiana, Michigan, New York, Nevada, North Carolina, North Dakota, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, and Vermont) and the District of Columbia have enacted autonomous vehicle legislation, while the Governors of four states (Arizona, Massachusetts, Washington, and Wisconsin) have issued executive orders addressing autonomous vehicles.

Colorado law. Colorado law defines an "automated driving system" as a Level 4 or 5 automation system that is collectively capable, without any intervention or supervision by a human operator, of performing driving tasks.[4] The Colorado State Patrol and the Colorado Department of Transportation must approve all automated driving systems for testing and use in Colorado that do not yet comply with all applicable state and federal laws. Any violation of this requirement is a class B traffic infraction. Additionally, liability for a crash involving an automated driving system that is not under human control is determined in accordance with applicable state, federal, or common law.

Future Policy Considerations

Safety. Proponents of autonomous vehicles argue that autonomous vehicles will make driving safer. They believe that further automation, beyond automatic emergency brakes or vehicle-to-vehicle communication, can help reduce the 94 percent of car crashes that are due to human error.[5]

However, others argue that safety issues may arise between the interaction of both human and automated drivers on the road; specifically, if other human drivers or pedestrians do not react as an autonomous vehicle's software predicts. Also, experts raise concerns about driver alertness, highlighting issues between autonomous vehicles and a human driver's ability and alertness to take back control of a vehicle. California is studying this issue by requiring an autonomous vehicle disengagement report in which companies provide the state with information on the frequency with which human drivers take over during testing on public roads. Additionally, states may need to address law enforcement considerations, such as training and education, when autonomous vehicles enter roadways.

Liability. States enact their own motor vehicle insurance and liability laws and regulations. In the event of a crash of an autonomous vehicle, many potential scenarios and affected parties may exist (autonomous vehicle owners, operators, passengers, manufacturers, and others). Determining the "driver" of an autonomous vehicle and who is liable in the event of crash are among the issues that states will face with the rise of autonomous vehicles.

Privacy. Concerns around who collects data, what data is collected, whether permission is needed to collect data, who can access data, the safety of stored data, and how long data should be retained are issues governments and the private sector wrestle with frequently. In the future, states may need to address whether data collected from autonomous vehicles can be used by law enforcement and in judicial proceedings or whether vehicle owners will have a choice in whether data regarding their geolocation or driving behavior can be collected by private companies. Privacy and the security of autonomous vehicles' driving systems are issues that states may need to monitor with the growth of autonomous vehicles.

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[4]Section 42-1-102 (7.7), C.R.S.

[5]"National Motor Vehicle Crash Causation Survey;, National Highway and Transportation Safety Administration, https://crashstats.nhtsa.dot.gov/Api/Public/View/Publication/811059.