Did You Know?

- In 2011, Nevada became the first state to authorize the operation and testing of autonomous vehicles on its roadways.
- In 2012, Google announced that its self-driving cars had logged some 300,000 miles without a single accident under the computer’s control.
- According to the Insurance Institute for Highway Safety, nearly a third of all crashes could be prevented if all vehicles had forward collision and lane-departure warning systems, side-view (blind spot) assistance and adaptive headlights.

Autonomous Vehicles: On the Road to New Technologies

By Anne Teigen

In 1908, Henry Ford’s production of the gasoline-powered Model T automobile drastically changed how Americans worked, lived and travelled. With Americans moving from place to place quickly and efficiently by operating a machine, the automobile became an important technological marvel of the 20th century. The 21st century may bring another great marvel, an automobile that requires no operator at all, a self-driving vehicle. That, however, is still a ways off in the future. But what is more likely in the foreseeable future is an automated “co-pilot” that can help drivers avoid crashes.

Proponents of these cars note that each year approximately 35,000 highway fatalities and 95 percent of automobile crashes are caused at least in part by driver error. Self-driving cars are designed to remove human error by recognizing objects, other cars and hazards, and choosing the best route to reach a destination. Many see the production of autonomous vehicles a possible economic boom for their state. Some are concerned whether these driverless vehicles operating on public roads could pose a danger to other motorists and pedestrians. Others are concerned about vehicle tracking and invasion of privacy. The vehicles of tomorrow are being developed today, but many legal and policy questions arise related to autonomous (self-driving) vehicles.

More than a dozen states have considered, and four states—California, Florida, Michigan, Nevada—and the District of Columbia have enacted, legislation that paves the way for autonomous vehicles to become a reality.

Federal Action

In May 2013, The National Highway Traffic Safety Administration released a policy statement on automated vehicles, clarifying that a vehicle does not have to be completely self-driving to be considered “automated” and placing these vehicles into four categories:

- Level 1: Function-Specific Automation: Involves one or more specific control functions. Examples include electronic stability control or pre-charged brakes, where the vehicle automatically assists with braking to enable the driver to regain control of the vehicle.
• **Level 2: Combined Function Automation:** Involves automation of at least two primary control functions designed to work in unison to relieve the driver of control of those functions. (Example: adaptive cruise control in combination with lane centering.)

• **Level 3: Limited Self-Driving Automation:** Enables the driver to cede full control of all safety-critical functions under certain traffic or environmental conditions and to rely heavily on the vehicle to monitor changes in those conditions requiring transition back to driver control. The driver is expected to be available for occasional control, but with sufficiently comfortable transition time. (Example: the Google car.)

• **Level 4: Full Self-Driving Automation:** Performs all safety-critical driving functions and monitors roadway conditions for an entire trip. Design anticipates the driver will provide destination or navigation input, but is not expected to be available for control at any time during the trip.

NHTSA does not recommend states attempt to establish safety standards for self-driving vehicle technologies because it is so early in their development. The agency makes recommendations for states that pass legislation for “autonomous” vehicle testing, including:

• Ensure that a properly trained and licensed test driver who is familiar with the operation of the vehicle is seated in the driver’s seat at all times.

• Ensure that on-road testing of self-driving vehicles minimizes risks to other road users.

• Ensure that transitioning from self-driving mode to manual mode is safe and simple.

• Ensure test vehicles have the capability to detect, record and inform the driver of malfunctions.

• Encourage states to prohibit operation of self-driving vehicles on public roads for purposes other than testing.

**State Action**

In 2011, Nevada became the first state to authorize the operation and testing of autonomous vehicles on its roadways. The law provides that the autonomous vehicle must be registered, insured and have a certificate of compliance issued by the state Department of Motor Vehicles. The operator must have a driver’s license with a special endorsement, and the testing company must have a special license to test the technology with certain geographic limitations. In Nevada, an autonomous vehicle is defined as a “vehicle that uses artificial intelligence, sensors and global positioning system coordinates to drive itself without the active intervention of a human operator.” This definition is more in line with NHTSA’s level 3 or 4 categories.

California and Florida followed Nevada’s lead in 2012. California law authorizes the operation of autonomous vehicles on public roads, but requires the driver, in addition to being licensed, to be seated in the driver’s seat during operation and to be capable of taking over immediate manual control in the case of a technology failure. Florida’s law allowing autonomous vehicle operation and testing on public roads states that a person will be deemed the operator “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.”

In December 2013, Michigan became the fourth state to pass autonomous vehicle legislation, and it is the only state that expressly permits testing of automated vehicles by certain parties under certain conditions, but prohibits general operation of these vehicles. In addition to Michigan, 10 other states—including Arizona, Hawaii, Massachusetts, New Jersey, New York, Oregon, South Carolina, Texas, Washington and Wisconsin—considered, but did not pass, legislation related to autonomous vehicles in 2013. Many of these bills are pending carryover to 2014.

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