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ONE HUNDRED FOURTEENTH CONGRESS

Congress of the United States

COMMITTEE ON ENERGY AND COMMERCE
2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6115

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MEMORANDUM

November 11, 2016

To: Subcommittee on Commerce, Manufacturing, and Trade Democratic Members and Staff

Fr: Committee on Energy and Commerce Democratic Staff

Re: Hearing on "Disrupter Series: Self-Driving Cars"

On Tuesday, November 15, 2016, at 10:30 a.m. in room 2322 of the Rayburn House Office Building, the Subcommittee on Commerce, Manufacturing, and Trade will hold a hearing titled "Disrupter Series: Self-Driving Cars."

I. BACKGROUND

The term "autonomous vehicles" (also known as self-driving or driverless vehicles) typically refers to vehicles in which the steering, acceleration, or braking systems can operate with little or no direct input from the driver.[1] In addition to performing control functions, these vehicles may have the ability to monitor and independently respond to new situations or changing conditions.[2]

In recent years, major automakers and technology companies have announced commitments to developing autonomous vehicle technology.[3] Many auto companies plan to gradually add driver-assistance technologies to traditional car models until they can eventually

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[1] National Highway Traffic Safety Administration, *U.S. Department of Transportation Releases Policy on Automated Vehicle Development* (May 30, 2013) (press release).

[2] National Highway Traffic Safety Administration, *Preliminary Statement of Policy Concerning Automated Vehicles* (May 30, 2013).

[3] *30 Companies Are Now Making Self-Driving Cars*, Business Insider (Apr. 22, 2016) (www.businessinsider.com/30-companies-are-now-making-self-driving-cars-2016-4).

operate autonomously.[4] Other companies are developing vehicles that are built from the ground up to operate without a human driver.[5]

Proponents contend that self-driving cars could offer independence and mobility to those who are temporarily or permanently unable to drive, including disabled people, children, and seniors.[6]

II. CONSUMER ISSUES

A. Safety

In 2014, 32,675 people were killed and an additional 2.3 million were injured in crashes on U.S. roads.[7] Ninety-four percent of crashes are caused by driver error.[8] Some assert that self-driving cars have the potential to substantially reduce crash injuries and deaths.[9] For example, crashes caused by drunk driving, which accounts for about 31 percent of all crash fatalities, would likely decrease significantly with widespread adoption of autonomous vehicles.[10]

But widespread adoption of autonomous cars is likely decades away.[11] In the meantime, a number of safety concerns arise regarding the interaction between human-driven cars and autonomous cars as well as the interaction between drivers and semi-autonomous features.

Autonomous vehicle technology is not yet advanced enough for cars to operate without a driver's supervision.[12] However, this scenario presents challenges if drivers become overly reliant on the autonomous features.[13] The National Highway Traffic Safety Administration (NHTSA) and the National Transportation Safety Board (NTSB) are currently investigating two

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[4] RAND Corporation, *Autonomous Vehicle Technology: A Guide for Policymakers* (2016).

[5] Google Self-Driving Car Project, Home Page (www.google.com/selfdrivingcar) (accessed Nov. 7, 2016).

[6] *See* note 4.

[7] Department of Transportation National Center for Statistics and Analysis, *2014 Crash Data Key Findings* (Nov. 2015) (www-nrd.nhtsa.dot.gov/Pubs/812219.pdf).

[8] *See* note 4; Department of Transportation National Center for Statistics and Analysis, *Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey* (Feb. 2015) (www-nrd.nhtsa.dot.gov/Pubs/812115.pdf).

[9] *See* note 4.

[10] *Id.*

[11] *Who's Liable When a Self-Driving Car Crashes?*, Politico (Nov. 7, 2016) (www.politico.com/tipsheets/morning-transportation/2016/11/whos-liable-when-a-self-driving-car-crashes-217262).

[12] *See* note 4.

[13] *Id.*

2016 crashes involving Teslas reportedly operating in Autopilot mode, a software update that allows Tesla owners to beta test autonomous features in their vehicles.[14] It was also reported that neither the Autopilot system nor the drivers intervened to stop the cars from encountering obstructions in their paths.[15]

B. Cybersecurity and Privacy

Like other connected technologies, autonomous vehicles are susceptible to both malicious attacks and unintentional network disruptions.[16] Autonomous vehicles provide multiple cybersecurity vulnerabilities through connections to other vehicles, infrastructure, passengers' devices, GPS systems, and the internet.[17] One report warned that hacks of autonomous vehicles could impede market growth by undermining the public's willingness to adopt autonomous technology.[18]

Self-driving cars function by collecting real-time location data, passenger information, and travel history, and many operate using cameras and sensors that can "see" inside and outside the vehicle.[19] Questions have been raised regarding access to and ownership of the data collected by autonomous cars.[20] In addition, some have raised concerns about the need to balance vehicle function with consumer privacy.[21]

Both the industry and federal regulatory bodies have taken some steps to address privacy and cybersecurity concerns. The Automotive Information Sharing and Analysis Center, an industry-operated organization, published its own voluntary best practices for automotive

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[14] *What Happens When Tesla's AutoPilot Goes Wrong: Owners Post Swerving Videos*, Guardian (Oct. 21, 2015) (www.theguardian.com/technology/2015/oct/21/tesla-autopilot-goes-wrong-videos); *Fatal Tesla Crash Draws in Transportation Safety Board*, New York Times (Jul. 10, 2016) (www.nytimes.com/2016/07/11/business/fatal-tesla-crash-draws-in-transportation-safety-board.html).

[15] *Fatal Tesla Crash Draws in Transportation Safety Board*, New York Times (Jul. 10, 2016) (www.nytimes.com/2016/07/11/business/fatal-tesla-crash-draws-in-transportation-safety-board.html).

[16] *See* note 4.

[17] *Id*.

[18] *Why Driverless Cars May Never Happen*, Telegraph (Sep. 8, 2015) (online at www.telegraph.co.uk/finance/newsbysector/transport/11849650/Why-driverless-cars-may-never-happen.html).

[19] Senate Committee on Commerce, Science, and Transportation, Testimony of Dr. Mary Louise Cummings, Director of Humans and Autonomy Lab and Duke Robotics, Duke University, *Hearing on "Hand Off: The Future of Self-Driving Cars,"* 114th Cong. (Mar. 15, 2016).

[20] *See* note 4.

[21] *Id*.

cybersecurity in July 2016.[22] In March 2016, NHTSA and the FBI issued a joint public service announcement warning of the dangers of poor automobile cybersecurity.[23] NHTSA later released its own set of Cybersecurity Best Practices for Modern Vehicles in October 2016.[24] Some industry overseers have criticized NHTSA for failing to create mandatory standards with an enforcement mechanism.[25]

With regard to privacy, some members of the Alliance of Automobile Manufacturers, Inc. and of the Association of Global Automakers, Inc. publicly committed to following a set of privacy principles that are focused on providing notice of how and when they share information collected by vehicles or vehicle components.[26] Critics of the privacy principles have stated that the principles are not enough, noting that among other things they fail to provide consumers with the right to control their own data.[27]

C. Liability and Ethical Questions

Removing drivers from control of their vehicle raises questions of owner and manufacturer responsibility for incidents that occur while driving.[28] Some have argued that autonomous technology would decrease liability for owners and operators of self-driving

[22] *Auto-ISAC Releases Automotive Cybersecurity Best Practices*, SC Magazine (Jul. 22, 2016) (www.scmagazine.com/auto-industry-experts-develop-best-practices-for-securing-connected-vehicles/article/529888).

[23] *The FBI Warns That Car Hacking Is a Real Risk*, Wired (Mar. 17, 2016) (www.wired.com/2016/03/fbi-warns-car-hacking-real-risk).

[24] National Highway Traffic Safety Administration, *Cybersecurity Best Practices for Modern Vehicles* (Oct. 2016).

[25] *Feds to Carmakers: Adopt Cybersecurity Best Practices*, Detroit News (Oct. 24, 2016) (www.detroitnews.com/story/business/autos/2016/10/24/auto-cybersecurity/92683970/).

[26] Letter from Mitch Bainwol, President and Chief Executive Officer, Alliance of Automobile Manufacturers, Inc., and John Bozella, President and Chief Executive Officer, Association of Global Automakers, Inc., to the Honorable Edith Ramirez, Chairwoman, Federal Trade Commission (Nov. 12, 2014); Alliance of Automobile Manufacturers, Inc., *Auto Issues: Automotive Privacy* (www.autoalliance.org/auto-issues/automotive-privacy/automotive-privacy) (accessed Nov. 9, 2016); Alliance of Automobile Manufacturers, Inc., *Auto Issues: Principles* (www.autoalliance.org/auto-issues/automotive-privacy/automotive-privacy) (accessed Nov. 9, 2016).

[27] *Connected Car Privacy: Critics Say Automakers Principles Pledge Needs More Assurances*, International Business Times (Nov. 17, 2014) (www.ibtimes.com/connected-car-privacy-critics-say-automakers-principles-pledge-needs-more-assurances-1724988).

[28] *See* note 4.

vehicles.[29] Vehicle manufacturers, however, may face increased product liability in response to a crash.[30]

New ethical questions may also be raised if self-driving cars become ubiquitous and as drivers are removed from the decision-making process of vehicle operation.[31] Vehicles' crash avoidance systems will have to be specifically programmed to make life-or-death choices by weighing the costs to drivers, pedestrians, and property.[32] If so, some have questioned whether the algorithms being used to make such choices must be disclosed to riders and vehicle owners.[33]

III. FEDERAL AND STATE GOVERNMENT ROLES

A. Federal Government

Federal agencies, such as the U.S. Departments of Transportation (DOT) and Defense, have actively encouraged and supported the development of autonomous vehicle technology.[34] President Obama's FY2017 DOT budget request includes nearly $4 billion for pilot projects over the next ten years.[35] The FAST Act, enacted in December 2015, established DOT grants for autonomous vehicle development.[36] It also directs the Government Accountability Office (GAO) to submit a report and recommendations to Congress on the policy challenges of autonomous transportation within two years.[37]

NHTSA is responsible for establishing and enforcing federal motor vehicle safety standards for automated driving.[38] In 2013, and updated in January 2016, NHTSA issued a

[29] *Id.*

[30] *Id.*; *Who Is at Fault When a Driverless Car Gets in an Accident?*, Atlantic (April 25, 2014) (www.theatlantic.com/business/archive/2014/04/who-is-at-fault-when-a-driverless-car-gets-in-an-accident/361250).

[31] *The Ethics of Autonomous Cars*, Atlantic (Oct. 8, 2013) (online at www.theatlantic.com/technology/archive/2013/10/the-ethics-of-autonomous-cars/280360).

[32] *The Ethics of Saving Lives with Autonomous Cars Is Far Murkier Than You Think*, Wired (Jul. 30, 2013) (www.wired.com/2013/07/the-surprising-ethics-of-robot-cars).

[33] *Id.*

[34] *See* note 4.

[35] U.S. Department of Transportation, *Secretary Foxx Unveils President Obama's FY17 Budget Proposal of Nearly $4 Billion for Automated Vehicles and Announces DOT Initiatives to Accelerate Vehicle Safety Innovations* (Jan. 14, 2016) (press release).

[36] H.R. 22.

[37] *Id.*

[38] *See* note 4.

Preliminary Statement of Policy Concerning Automated Vehicles, which defined five levels of automation and offered recommendations for state regulations on testing self-driving vehicles.[39]

In September 2016, NHTSA released a Federal Automated Vehicles Policy.[40] The policy includes a voluntary fifteen-point safety assessment for manufacturers, as well as a model state policy for autonomous vehicle regulation.[41] It also provides guidance on the application of NHTSA's existing authorities to autonomous vehicles, and identifies new regulatory tools that the agency could potentially require.[42] The updated document adopts the definitions for six levels of vehicle automation used by the Society of Automotive Engineers International.[43] NHTSA and DOT are seeking public comment on the policy and plan to update it again within one year.[44]

In addition to the multiple federal agencies that oversee cybersecurity issues generally, the Federal Trade Commission (FTC) has a role in protecting the privacy and data security of consumers who use self-driving cars. If a company has a privacy policy for vehicle owners, FTC can enforce the policy under Section 5 of the FTC Act.[45] FTC has also taken enforcement action against manufacturers of other connected devices that fail to reasonably secure their products or networks.[46]

B. State Governments

To date, eight states (Nevada, California, Florida, Louisiana, Michigan, North Dakota, Tennessee, and Utah) and the District of Columbia have enacted autonomous vehicle legislation.[47] The governors of two additional states have issued executive orders regarding autonomous vehicles.[48] Much of the legislation is intended to encourage the development and

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[39] *See* note 2; National Highway Traffic Safety Administration, *2016 Update to Preliminary Statement of Policy Concerning Automated Vehicles* (Jan. 14, 2016).

[40] National Highway Traffic Safety Administration, *Federal Automated Vehicles Policy* (Sept. 20, 2016).

[41] *Id.*

[42] *Id.*

[43] *Id.*

[44] *Id.*

[45] 15 U.S.C. 45(a).

[46] *"Internet of Things" Security Is Hilariously Broken and Getting Worse*, Ars Technica (Jan. 23, 2016) (arstechnica.com/security/2016/01/how-to-search-the-internet-of-things-for-photos-of-sleeping-babies).

[47] National Conference of State Legislators, *Autonomous Self-Driving Vehicles Legislation* (www.ncsl.org/research/transportation/autonomous-vehicles-legislation.aspx) (accessed Oct. 12, 2016).

[48] *Id.*

testing of autonomous vehicles technology, while some of the legislation puts limitations on the use of autonomous car technology, such as requiring that a driver be in an operating car.[49] Some of the legislation requires studies of the technology.[50]

IV. WITNESSES

Panel One

The Honorable Mark R. Rosekind, Ph.D.
Administrator
National Highway Traffic Safety Administration

Panel Two

Mitch Bainwol
President and CEO
Alliance of Automobile Manufacturers

Laura MacCleery
Vice President, Consumer Policy and Mobilization
Consumer Reports

Gary Shapiro
President and CEO
Consumer Technology Association

Kirk Steudle, P.E.
Chief Deputy Director
Michigan Department of Transportation

Ann Wilson
Senior Vice President
Motor and Equipment Manufacturers Association

[49] *Id.*

[50] *Id.*