



**MEMORANDUM**

**February 7, 2020**

**To: Subcommittee on Consumer Protection and Commerce Members and Staff**

**Fr: Committee on Energy and Commerce Staff**

**Re: Hearing on “Autonomous Vehicles: Promises and Challenges of Evolving Automotive Technologies”**

On **Tuesday, February 11, 2020, at 10 a.m. in the John D. Dingell Room, 2123 of the Rayburn House Office Building**, the Subcommittee on Consumer Protection and Commerce will hold a hearing entitled, “Autonomous Vehicles: Promises and Challenges of Evolving Automotive Technologies.”

**I. BACKGROUND**

Automated vehicles (AVs)—also sometimes called autonomous, 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.<sup>1</sup> While manufacturers are already incorporating partial automation into vehicles and plan to expand such technology, fully automated cars that can handle the whole task of driving with no input from humans are not expected to be available within the next several years due to technological and regulatory hurdles.<sup>2</sup>

Most auto manufacturers already offer vehicles with advanced driver assistance systems (ADAS) that can prevent or mitigate accidents and collisions.<sup>3</sup> Vehicles equipped with ADAS

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

<sup>2</sup> National Highway Traffic Safety Administration, *Automated Vehicles for Safety* ([www.nhtsa.gov/technology-innovation/automated-vehicles-safety](http://www.nhtsa.gov/technology-innovation/automated-vehicles-safety)); *Despite High Hopes, Self-Driving Cars Are ‘Way in the Future’*, New York Times (July 17, 2019).

<sup>3</sup> *Id.*; *Cars with Advanced Safety Systems*, Consumer Reports (Jan. 22, 2020) ([www.consumerreports.org/car-safety/cars-with-advanced-safety-systems/](http://www.consumerreports.org/car-safety/cars-with-advanced-safety-systems/)).

features, such as automatic emergency braking (AEB), have been shown to prevent crashes and lower the injury rate in such crashes compared to vehicles without those systems.<sup>4</sup>

In November 2019, the American Automobile Association (AAA), Consumer Reports, J.D. Power, and the National Safety Council introduced and urged the adoption of standardized terminology for ADAS features to reduce consumer confusion and help drivers recognize that these systems are designed to assist, not replace an engaged driver.<sup>5</sup> On January 15, 2020, the U.S. Department of Transportation (DOT) endorsed the standardized terminology recommended by the four organizations, though manufacturers will not be required to adopt it.<sup>6</sup>

## II. FEDERAL AND STATE GOVERNMENT ROLES

The National Highway Traffic Safety Administration (NHTSA) is the federal agency responsible for establishing and enforcing federal motor vehicle safety standards for both standard and automated driving vehicles.<sup>7</sup> In September 2016, NHTSA released the first version of its federal guidance on automated vehicles, which outlined a voluntary safety assessment for manufacturers.<sup>8</sup> The fourth iteration of this guidance, which builds upon previously released versions, was published on January 8, 2020.<sup>9</sup>

To date, 29 states and the District of Columbia have enacted autonomous vehicle legislation.<sup>10</sup> Much of the legislation is intended to encourage the development and testing of autonomous vehicles technology. Some of the legislation puts limitations on the use of autonomous car technology, such as requiring that a driver be in an operating car or limiting

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<sup>4</sup> Jessica B. Cicchino, *Effectiveness of Forward Collision Warning and Autonomous Emergency Braking Systems in Reducing Front-to-Rear Crash Rates*, Accident Analysis and Prevention (Feb. 2017).

<sup>5</sup> Consumer Reports, *Clearing the Confusion: Recommended Common Naming for Advanced Driver Assistance Technologies* (Nov. 20, 2019) ([advocacy.consumerreports.org/research/clearing-the-confusion-recommended-common-naming-for-advanced-driver-assistance-technologies/](https://www.consumerreports.org/research/clearing-the-confusion-recommended-common-naming-for-advanced-driver-assistance-technologies/)).

<sup>6</sup> U.S. Department of Transportation, *U.S. Transportation Secretary Elaine L. Chao Announces New Initiatives to Improve Safety on America's Roads* (Jan. 15, 2020) (press release).

<sup>7</sup> National Highway Traffic Safety Administration, *Federal Automated Vehicles Policy* (Sept. 20, 2016).

<sup>8</sup> *Id.*

<sup>9</sup> U.S. Department of Transportation, *Ensuring American Leadership in Automated Vehicle Technologies: Automated Vehicles 4.0* (Jan. 8, 2020) (press release).

<sup>10</sup> National Conference of State Legislators, *Self-Driving Vehicles Enacted Legislation* ([www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx](https://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx)).

testing to certain defined conditions.<sup>11</sup> Many cities are considering the potential effect of AVs on their residents and entering into agreements with companies to test deployment.<sup>12</sup>

### III. SELECT CONSUMER ISSUES

#### A. Driver and Passenger Safety

In 2018, 36,560 people were killed in motor vehicle traffic crashes on U.S. roadways.<sup>13</sup> Ninety-four percent of crashes are thought to be caused by driver error.<sup>14</sup> While some argue that AVs could virtually eliminate those crashes, widespread adoption of fully autonomous cars is still likely decades away.<sup>15</sup> In the meantime, several safety concerns have arisen regarding whether manufacturers are doing enough to monitor drivers to ensure they remain attentive to the driving task, or whether current measures intended to ensure driver engagement are too easy to circumvent.<sup>16</sup>

#### B. Testing and Deployment

NHTSA has established best practices for states seeking to authorize autonomous vehicle testing on public roadways but sets no specific requirements.<sup>17</sup> Currently, more than 1,400 self-driving cars, trucks, and other vehicles are being tested by more than 80 companies across 36

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<sup>11</sup> *Id.*

<sup>12</sup> *City Planners Eye Self-Driving Vehicles to Correct Mistakes of the 20th-Century Auto*, Washington Post (July 20, 2019) ([washingtonpost.com/transportation/2019/07/20/city-planners-eye-self-driving-vehicles-correct-mistakes-th-century-auto/](https://www.washingtonpost.com/transportation/2019/07/20/city-planners-eye-self-driving-vehicles-correct-mistakes-th-century-auto/)).

<sup>13</sup> U.S. Department of Transportation National Highway Traffic Safety Administration, *2018 Fatal Motor Vehicle Crashes: Overview* (Oct. 2019) ([crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812826](https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812826)).

<sup>14</sup> 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](http://www-nrd.nhtsa.dot.gov/Pubs/812115.pdf)).

<sup>15</sup> *Key Volkswagen Exec Admits Full Self-Driving Cars 'May Never Happen,'* The Drive (Jan. 13, 2020) ([www.thedrive.com/tech/31816/key-volkswagen-exec-admits-level-5-autonomous-cars-may-never-happen](https://www.thedrive.com/tech/31816/key-volkswagen-exec-admits-level-5-autonomous-cars-may-never-happen)).

<sup>16</sup> *Tesla's Updated Navigate on Autopilot Requires Significant Driver Intervention*, Consumer Reports (May 22, 2019); *'Autopilot Buddy' That Tricks Tesla Vehicles Declared 'Unsafe' by US*, The Verge (June 19, 2018) ([www.theverge.com/2018/6/19/17479316/tesla-autopilot-buddy-aftermarket-nhtsa](https://www.theverge.com/2018/6/19/17479316/tesla-autopilot-buddy-aftermarket-nhtsa)); *Using an Orange to Fool Tesla's Autopilot Is Probably a Really Bad Idea*, Vice (Jan. 16, 2018) ([www.vice.com/en\\_us/article/a3na9p/tesla-autosteer-orange-hack](https://www.vice.com/en_us/article/a3na9p/tesla-autosteer-orange-hack)).

<sup>17</sup> National Highway Traffic Safety Administration, *Automated Driving Systems* ([www.nhtsa.gov/vehicle-manufacturers/automated-driving-systems](https://www.nhtsa.gov/vehicle-manufacturers/automated-driving-systems)).

states and D.C.<sup>18</sup> In California alone, 65 companies are registered to test autonomous vehicles.<sup>19</sup> However, residents in areas where self-driving cars are being tested on public roads feel vulnerable and have expressed concerns for and about their safety.<sup>20</sup>

Crashes and deaths involving AVs and vehicles with ADAS have sparked concern about whether there is sufficient oversight and regulation of these technologies, such as crashes involving Teslas reportedly operating in the vehicle's "Autopilot" mode.<sup>21</sup> An NTSB report on the January 2018 crash of a Tesla into a parked firetruck found that the crash was caused by a combination of design flaw in Autopilot, as well as driver inattention and over-reliance on the system.<sup>22</sup> In March 2018, a pedestrian was struck and killed by a self-driving Uber vehicle—the first pedestrian death associated with self-driving technology.<sup>23</sup> An NTSB investigation into the fatality faulted Uber's inadequate safety culture and recommended additional government oversight and guidance for testing.<sup>24</sup>

### C. Cybersecurity

Cybersecurity has become a growing concern as vehicles have become more automated and interconnected.<sup>25</sup> AVs are susceptible to both malicious attacks and unintentional network

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<sup>18</sup> *Over 1,400 Self-Driving Vehicles are Now in Testing by 80+ Companies Across the US*, TechCrunch (June 11, 2019) ([techcrunch.com/2019/06/11/over-1400-self-driving-vehicles-are-now-in-testing-by-80-companies-across-the-u-s/](https://techcrunch.com/2019/06/11/over-1400-self-driving-vehicles-are-now-in-testing-by-80-companies-across-the-u-s/)).

<sup>19</sup> State of California Department of Motor Vehicles, *Testing of Autonomous Vehicles with a Driver* (Dec. 5, 2019) ([www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/testing](http://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/testing)).

<sup>20</sup> *Silicon Valley Pioneered Self-Driving Cars. But Some of Its Tech-Savvy Residents Don't Want Them Tested in Their Neighborhoods*, Washington Post (Oct. 3, 2019) ([www.washingtonpost.com/technology/2019/10/03/silicon-valley-pioneered-self-driving-cars-some-its-tech-savvy-residents-dont-want-them-tested-their-neighborhoods/](https://www.washingtonpost.com/technology/2019/10/03/silicon-valley-pioneered-self-driving-cars-some-its-tech-savvy-residents-dont-want-them-tested-their-neighborhoods/)).

<sup>21</sup> *3 Crashes, 3 Deaths Raise Questions About Tesla's Autopilot*, Associated Press (Jan. 3, 2020) ([apnews.com/ca5e62255bb87bf1b151f9bf075aaadf](https://apnews.com/ca5e62255bb87bf1b151f9bf075aaadf)).

<sup>22</sup> *Id.*

<sup>23</sup> *Self-Driving Uber Car Kills Pedestrian in Arizona, Where Robots Roam*, New York Times (Mar. 19, 2018) ([www.nytimes.com/2018/03/19/technology/uber-driverless-fatality.html](https://www.nytimes.com/2018/03/19/technology/uber-driverless-fatality.html)).

<sup>24</sup> National Transportation Safety Board, *Collision Between Vehicle Controlled by Developmental Automated Driving System and Pedestrian Tempe, Arizona March 18, 2018* (Nov. 19, 2019) (NTSB/HAR-19/03); *U.S. Oversight of Self-Driving Cars Falls Short, NTSB Says in Review of Uber Death*, Washington Post (Nov. 19, 2019) ([www.washingtonpost.com/local/trafficandcommuting/us-oversight-of-self-driving-cars-falls-short-ntsb-says-in-review-of-uber-death/2019/11/19/6e583448-0a3f-11ea-97ac-a7ccc8dd1ebc\\_story.html](https://www.washingtonpost.com/local/trafficandcommuting/us-oversight-of-self-driving-cars-falls-short-ntsb-says-in-review-of-uber-death/2019/11/19/6e583448-0a3f-11ea-97ac-a7ccc8dd1ebc_story.html)).

<sup>25</sup> *Auto Industry Says Cybersecurity Is a Significant Concern as Cars Become More Automated*, Washington Post (Apr. 30, 2019) ([www.washingtonpost.com/transportation/](https://www.washingtonpost.com/transportation/)

disruptions.<sup>26</sup> AVs provide multiple cybersecurity vulnerabilities through connections to other vehicles, infrastructure, passengers' devices, GPS systems, and the internet.<sup>27</sup> Since AVs depend on machine learning, data inputs such as traffic signs can be a part of the attack surface.<sup>28</sup>

Both the industry and federal regulatory bodies have taken some steps to address cybersecurity concerns. The Automotive Information Sharing and Analysis Center (AUTO-ISAC), an industry-operated organization, published its own voluntary best practices for automotive cybersecurity in July 2016.<sup>29</sup> NHTSA released a set of Cybersecurity Best Practices for Modern Vehicles in October 2016.<sup>30</sup> The International Organization for Standardization (ISO) is also currently working on cybersecurity standards for vehicles.<sup>31</sup>

## V. WITNESSES

### **Cathy Chase**

President

Advocates for Highway and Auto Safety

### **John Bozzella**

President and CEO

Alliance for Automotive Innovation

### **Daniel Hinkle**

State Affairs Counsel

American Association of Justice

### **Mark Riccobono**

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2019/04/30/auto-industry-says-cybersecurity-is-significant-concern-cars-become-more-automated/).

<sup>26</sup> RAND Corporation, *Autonomous Vehicle Technology: A Guide for Policymakers* (2016).

<sup>27</sup> *Id.*

<sup>28</sup> *Bosch Deploys AI to Prevent Attacks on Cars' Electronic Systems*, Wall Street Journal (Jan. 6, 2020) ([www.wsj.com/articles/bosch-deploys-ai-to-prevent-attacks-on-cars-electronic-systems-11578306600](http://www.wsj.com/articles/bosch-deploys-ai-to-prevent-attacks-on-cars-electronic-systems-11578306600)).

<sup>29</sup> *Auto-ISAC Releases Automotive Cybersecurity Best Practices*, SC Magazine (July 22, 2016) ([www.scmagazine.com/auto-industry-experts-develop-best-practices-for-securing-connected-vehicles/article/529888](http://www.scmagazine.com/auto-industry-experts-develop-best-practices-for-securing-connected-vehicles/article/529888)).

<sup>30</sup> National Highway Traffic Safety Administration, *Cybersecurity Best Practices for Modern Vehicles* (Oct. 2016).

<sup>31</sup> RAND, *Why AV Safety and Cybersecurity Need to Be Pursued in Tandem* (Mar. 20, 2019) ([www.rand.org/blog/2019/03/why-av-safety-and-cybersecurity-need-to-be-pursued.html](http://www.rand.org/blog/2019/03/why-av-safety-and-cybersecurity-need-to-be-pursued.html)).

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