



ADVOCATES
FOR HIGHWAY
& AUTO SAFETY

**STATEMENT OF CATHERINE CHASE
PRESIDENT
ADVOCATES FOR HIGHWAY AND AUTO SAFETY**

ON

**“HIGHLY AUTOMATED VEHICLES: FEDERAL PERSPECTIVES ON
THE DEPLOYMENT OF SAFETY TECHNOLOGY”**

SUBMITTED TO THE

**UNITED STATES SENATE
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION**

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Introduction

Advocates for Highway and Auto Safety (Advocates) is a coalition of public health, safety, and consumer organizations, insurers and insurance agents that promotes highway and auto safety through the adoption of federal and state laws, policies and regulations. Advocates is unique both in its board composition and its mission of advancing safer vehicles, safer motorists and road users, and safer infrastructure.

In 2018, nearly 37,000 people were killed in motor vehicle crashes.¹ Moreover, crashes impose a financial toll of over \$800 billion in total costs to society and \$242 billion in direct economic costs, equivalent to a “crash tax” of \$784 on every American. This carnage and expense is unacceptable.

Available Commonsense and Cost-Effective Solutions

Every day on average, over 100 people are killed and nearly 7,500 people are injured in motor vehicle crashes. While far too many lives are lost and people are injured on our Nation’s roads each year, proven solutions are currently available that can prevent or mitigate these senseless tragedies. The National Highway Traffic Safety Administration (NHTSA) currently values each life lost in a crash at \$9.6 million. Each one of these preventable losses not only irreparably harms families and communities, but they also impose significant costs on society that can be avoided. While we are optimistic that in the future autonomous vehicles (AVs) may bring about meaningful and lasting reductions in motor vehicle crashes, that potential remains far from a near-term reality.

Therefore, it is essential that advanced vehicle technologies, also known as advanced driver-assistance systems (ADAS), which prevent and lessen the severity of crashes be required as standard equipment on all new vehicles. In fact, the National Transportation Safety Board (NTSB) has included increasing implementation of collision avoidance technologies in its Most Wanted Lists of Transportation Safety Improvements since 2016.²

Currently available collision avoidance systems include automatic emergency braking (AEB), lane departure warning (LDW), blind spot detection (BSD), rear AEB and rear cross-traffic alert. The Insurance Institute for Highway Safety (IIHS) has found that:

- AEB can decrease front-to-rear crashes with injuries by 56 percent;
- LDW can reduce single-vehicle, sideswipe and head-on injury crashes by over 20 percent;
- BSD can diminish injury crashes from lane change by nearly 25 percent;
- Rear AEB can reduce backing crashes by 78 percent when combined with rearview camera and parking sensors; and,
- Rear cross-traffic alert can reduce backing crashes by 22 percent.³

¹ Statistics are from the U.S. Department of Transportation unless otherwise noted.

² NTSB Most Wanted List Archives, https://ntsb.gov/safety/mwl/Pages/mwl_archive.aspx

³ IIHS, Real world benefits of crash avoidance technologies, available at: <https://www.iihs.org/media/259e5bbd-f859-42a7-bd54-3888f7a2d3ef/e9boUQ/Topics/ADVANCED%20DRIVER%20ASSISTANCE/IIHS-real-world-CA-benefits.pdf>

However, these crash avoidance safety systems are often sold as part of an additional, expensive trim package along with other non-safety features, or included only in high end models or vehicles. Moreover, there are currently no minimum performance standards to ensure they perform as expected. Additionally, the IIHS has found that while nighttime visibility is essential for safety, few vehicles are equipped with headlights that perform well.⁴ The Federal Motor Vehicle Safety Standard (FMVSS) 108 should be upgraded to improve headlight performance.

We urge Congress to require that advanced technologies that have proven to be effective at preventing and mitigating crashes be standard equipment with minimum performance standards. The Protecting Roadside First Responders Act (S. 2700/H.R. 4871) directs the U.S. Department of Transportation (DOT) to require certain crash avoidance technologies that meet a minimum performance requirement in all new cars. We urge the Committee to advance this legislation with urgency. In a similar vein, new trucks and buses should be required to have proven safety technologies including AEB and speed limiters. Therefore, Congress should swiftly enact the Safe Roads Act of 2019 (H.R. 3773), the School Bus Safety Act of 2019 (S.2278/ H.R. 3959) and the Cullum Owings Large Truck Safe Operating Speed Act of 2019 (S. 2033). On the path to AVs, requiring minimum performance standards for these foundational technologies will ensure the safety of motorists in vehicles and all roads users sharing the driving environment with them, while also building consumer confidence in the capabilities of these technologies.

Autonomous Vehicles are Not Ready for Public Roads, Public Sale or Public Safety

Autonomous vehicles (AVs), also known as driverless cars, are being developed and tested on public roads without sufficient safeguards to protect both those within the AVs and everyone sharing the roadways with them, and without express consent. Advocates is very concerned that an artificial rush to pass legislation, fueled by AV manufacturers wanting to rush their product to market and recoup their investments, could significantly undermine safety as well as public acceptance and ultimate success of these vehicles. Numerous public opinion polls show a high skepticism and fear about the technology, and for good reason. (*See Attachment.*)

At least six crashes resulting in four fatalities have occurred in the U.S. involving cars equipped with autonomous technology that are being investigated by the NTSB. The outcomes of these investigations will further identify safety deficiencies, determine contributing causes, and recommend government and industry actions to prevent future deadly incidents. We urge Congress to allow the critical information from these investigations, conducted by our Nation's preeminent crash investigators, to be released before taking action so as to help guide policy.

Just yesterday, the NTSB held a meeting to consider the probable cause of the tragic crash that occurred on March 18, 2018, in Tempe, Arizona, in which Elaine Herzberg was killed by an Uber test vehicle equipped with self-driving features. Several weeks ago, the NTSB opened the docket into this crash and a review of the materials shed light on the following alarming and disturbing details:

- The Uber test vehicle (Volvo XC90) was equipped with an AEB system as well as a function for detecting driver alertness. These systems were disabled when the vehicle automated driving functions were being tested. Given the specifications of these features, in simulations

⁴ IIHS, Headlights improve, but base models leave drivers in the dark (Nov. 29, 2018).

the Volvo would have avoided the collision in 17 out of 20 different scenarios and reduced the impact speed to less than ten miles per hour (mph) in the other three.

- The test “driver” is relied on to intervene and take action if the automated system exhibits erratic or unsafe behavior; however, the system was not designed to alert the driver to hazards in the path of travel. The automated system identified the pedestrian as a hazard in the lane 1.2 second before collision. The system was designed to then wait one second before taking any action. At 0.2 seconds before collision, the system provided an auditory signal that a controlled slowdown will be initiated. The “driver” (the fallback for this system) did not initiate a steering maneuver until 0.02 seconds before collision and did not start braking until after the impact. Uber had removed the second co-pilot from the testing protocol in the fall of 2017.
- The crash occurred in the evening, free of any inclement weather conditions, on an urban road with a speed limit of 45 mph. These conditions fell within the operational design domain (ODD) of the automated system. However, the system was not designed to account for jaywalking pedestrians despite the fact that a large portion of pedestrian crashes happen on urban roads, at night, and at midblock locations.

Some proponents of advancing the deployment of AVs contend the U.S. is falling behind other nations. However, this fear-inducing claim is misleading as other countries are taking a more deliberate, careful and cautious approach. For example, Germany requires a human to be behind the wheel of a driverless car in order to take back control and has other important elements including requirements for vehicle data recording. In the United Kingdom, testing has largely been limited to a handful of cities, and the government has published a detailed code of practice for testing AVs, but not applying to vehicles for sale. In Asia, Japan has allowed on-road testing with a driver behind the wheel and is currently working on regulatory and legal schemes for controlling the commercial introduction of AVs, but even so has not begun to address the highest levels of automation. Similarly, South Korea has plans to test these vehicles but has generally limited testing to 200 miles of public roads or to test tracks.

Furthermore, numerous industry executives and technical experts have stated that the technology is not ready and may not be for years ahead. This June, Gill Pratt, Director of the Toyota Research Institute said, “None of us have any idea when full self-driving will happen,”⁵ Bryan Salesky, CEO of Argo AI, said in July, “Level 5 as it’s defined by the SAE levels is a car that can operate anywhere – no geographic limitation. We’re of the belief, because we’re realistic, that Level 5 is going to be a very long time before it’s possible. I’m not saying that Level 5 isn’t possible but it is something that is way in the future.”⁶ John Krafcik, CEO of Waymo, said late last year, “This is a very long journey. It’s a very challenging technology and we’re going to take our time. Truly every step matters.”⁷ The disconnect between the readiness of the technology and the artificial urgency to pass legislation to allow for widespread deployment is alarming and the perceived need to expedite enactment of AV legislation, especially absent rulemaking requirements, is misguided.

⁵ Lawrence Ulrich, *Driverless Still a Long Way From Humanless*, N.Y. Times (Jun. 20, 2019).

⁶ Level 5 possible but “way in the future”, says VW-Ford AV boss, *Motoring* (Jun. 29, 2019).

⁷ WSJ Tech D.Live Conference (Nov. 13, 2018).

Boeing 737 MAX Crashes – Lessons Learned and Applicability to AVs

The recent crashes involving the Boeing 737 MAX airplane tragically highlight the catastrophic results that can occur when automated technology potentially malfunctions and is not subject to thorough oversight. Reports indicate that many aspects of the plane’s certification were delegated to Boeing. In fact, the Federal Aviation Administration (FAA) never fully evaluated the flawed automated system. The behavior of the planes in both crashes prior to the impact focused suspicion on the automated system known as the Maneuvering Characteristic Augmentation System (MCAS). The pilots, who were trained not in MCAS but were following Boeing’s instructions, attempted to shut off and override the MCAS system when it was activating erroneously. However, they were unable to regain control of the aircraft. News reports indicate that the pilots may have had as little as 40 seconds to recover control of the planes in such instances. Had a thorough evaluation of this system been undertaken, its flaws may have been detected and corrected, preventing two needless tragedies and the loss of hundreds of innocent lives.

Subsequent to the certification of the MAX airplane, at the direction of Congress, the FAA has alarmingly been given even less responsibility for the oversight of new technologies and equipment placed in planes.⁸ This change in policy was deeply concerning to regulators at the FAA who noted such a change in policy would “not be in the best interest of safety.”⁹ Moreover, FAA inspectors warned that doing so would turn the FAA into a “rubber stamp.”¹⁰ Yet, instead of ensuring proper government oversight, Congress created an advisory committee that has since become dominated by industry resulting in a federal agency being deferential to the industry it is tasked with regulating.¹¹

Upon reviewing aspects of the crashes involving the MAX, comparisons to the early stages of AV development should give all lawmakers and regulators serious pause. Safety systems that could have assisted the pilots were not required as standard equipment but were offered as an option at an additional cost, similar to what is currently occurring with crash avoidance technology for vehicles. Pilots receive extensive training on how to properly fly a commercial airplane including how to utilize complex operational systems. In sharp contrast, there are no federal training requirements for individuals testing or operating automated vehicle technology or for the consumers who purchase these vehicles and are using them on public roads. News reports indicate that the pilots may have had as little as 40 seconds to address a malfunction with the MCAS system and recover control of the plane, and were unable to do so. In AVs where drivers are expected to monitor their operation or serve as fall back operators, drivers could be faced with even shorter time periods to respond before a crash occurs. We urge this Committee to heed these important observations as it considers proper safeguards of AVs for testing and public sale.

Safeguards Necessary to Protect Public Safety

Legislation to allow for the successful development and deployment of AVs must advance a public safety agenda and not just an economic agenda. Both goals are compatible and achievable. Any bipartisan, bicameral bill must ensure that the U.S. DOT conducts thorough

⁸ Natalie Kitroeff and David Gelles, Before Crashes, Boeing Pushed To Undercut F.A.A. Oversight, N.Y. Times (Oct. 27, 2019).

⁹ *Id.*

¹⁰ *Id.*

¹¹ *Id.*

oversight, establishes a regulatory structure that sets minimum safety performance standards and requires industry accountability before driverless cars are available in the marketplace and sold to the public. It is vital that Congress adequately addresses the broad range of impacts on safety, mobility and infrastructure rather than rush enactment of a flawed bill that jeopardizes public safety and consumer confidence.

On October 28, 2019, staff of the Senate Commerce, Science, and Transportation Committee and House Energy and Commerce Committee released three draft sections of potential AV legislation. Despite numerous meetings, group letters and written responses from our organization and others to Committee staff regarding requests about safety priorities, recommended provisions and crucial objections, these three sections do not address our concerns. We vehemently oppose the use of these three sections as fundamental components of our nation's first AV law. Moreover, we were prevented from providing a comprehensive analysis as we were not given access to the totality of the potential AV legislation. For the purposes of submitting feedback to comply with the Committees staffs' request, we wrote a memo outlining our concerns, redlined the sections accordingly, and provided proactive language that must be included in any AV bill. Our high level concerns follow.

New Rulemakings to set Performance Standards are Essential.

Legislation should include requirements for DOT to issue minimum performance standards by a date certain before AVs are available for sale in the marketplace. Congress has already established this precedent with other lifesaving and cost-beneficial laws resulting in airbags, tire pressure monitoring, rollover and ejection prevention, and recently, rearview cameras. Issues include:

- **Human-Machine-Interface (HMI) for Driver Engagement:** Research demonstrates that even for a driver who is alert and performing the dynamic driving task, a delay in reaction time occurs between observing a safety problem, reacting and taking needed action. For a driver who is disengaged from the driving task during autonomous operation of a vehicle (i.e., sleeping, texting, watching a movie), that delay will be longer because the driver must first be alerted to re-engage, understand and process the situation, and then take control of the vehicle before taking appropriate action. According to an article published by Dr. M.L. Cummings and Jason Ryan entitled *Who Is in Charge? The Promises and Pitfalls of Driverless Cars*, “[d]rivers in an autonomous or highly automated car were less attentive to the car while the automation was active, were more prone to distractions, especially to using cellular phones, and were slower to recognize critical issues and to react to emergency situations, for example, by braking.”¹² The failure of the automated driving system to keep the driver engaged in the driving task was identified as a problem by the NTSB in its investigation of the 2016 fatal crash in Florida involving a Tesla Model S. Furthermore, IIHS highlighted this major safety problem in their August 7, 2018 Status Report: “Experimental studies have shown that drivers can lose track of what automated systems are doing, fail to notice when something goes wrong and have trouble retaking control.”

¹² Cummings, M.L., & J.C Ryan, “Who Is in Charge? Promises and Pitfalls of Driverless Cars.” TR News, (May-June 2014) 292, p. 25-30. *See also:* United States. Cong. Senate. Committee on Commerce, Science, and Transportation, *Hands Off: The Future of Self-Driving Cars*, Mar. 15, 2016, 114th Cong. 2nd Sess. (statement of Mary Cummings, PhD, Director, Duke Robotics Professor of Mechanical Engineering and Materials Science, Professor of Electrical and Computer Engineering Duke University).

- **Cybersecurity Standard:** AVs must be subject to cybersecurity requirements to prevent against hacking. See below section on cybersecurity for more detail on this position.
- **Electronics Safety Standard:** AVs must be subject to minimum performance requirements for the vehicle electronics that power and operate safety and autonomous driving systems. Electronic glitches are commonplace and relatively harmless in instances of computer or cell phone crashes. However, if an AV fails to operate properly on public roads, the outcomes could be catastrophic and result in mass casualties. Interference from entertainment functions and non-safety systems can affect the electronics that power critical safety systems if they share the same wiring and circuits. For example, in one reported instance a vehicle model lost power to its dashboard lights when an MP3 player was plugged in.¹³
- **“Vision Test” for AVs:** Driverless cars must be subject to a “vision test” to guarantee an AV will properly detect and respond to other vehicles, pedestrians, bicyclists, wheelchair users, roadway infrastructure, interactions with law enforcement and first responders, and other objects in the operating environment. A failure to properly detect and react to any of these road users or conditions could have tragic results, as demonstrated by the aforementioned March 2018 crash in Tempe, AZ that killed a woman walking a bicycle. According to the NTSB, the Uber vehicle in driverless mode misidentified the woman three times before the crash. Additionally, research has shown that simple modifications of a standard stop sign could cause an AV system to interpret it as a 45-mile-per-hour speed limit sign.¹⁴
- **Standard for Over-the-Air Updates:** It is anticipated that updates will be made to AV systems over the air that may change the functionality, capabilities and operational design domain (ODD) of the vehicle. In fact, Tesla is already performing these types of updates. In one reported instance, an update to a Tesla Model 3 left the vehicle without the use of essential safety systems including AEB.¹⁵ To protect against this type of problem and other safety-critical issues that can arise from over-the-air updates, a standard must be issued and provide that consumers be given timely and appropriate information on the details of the update as well as ensure any needed training or tutorials are provided. Safety upgrades should not be optional or force the consumer to incur additional expenses. Also, during the update process cybersecurity must be maintained.
- **Manual Override:** Occupants of a driverless car need the ability to assume control or shut the system down and get to a safe location in the event of a failure. A standard should be established to ensure the capability for a human to assume control of AV when it malfunctions or travels outside the ODD. The manual override must be accessible to all occupants, including people with cross-disabilities, children and other vulnerable populations.
- **Functional Safety Standard:** Functional safety is a process by which a product is designed, developed, manufactured and deployed to ensure that the product as a whole will function safely and as intended. Basically, a functional safety standard assures consumers that a vehicle will do what a manufacturer states it does, will do so safely, and

¹³ General Motors, LLC, Receipt of Petition for Decision of Inconsequential Noncompliance, NHTSA, 79 FR 10226, Feb. 24, 2014.

¹⁴ Ivan Evtimov, Kevin Eykholt, Earlence Fernandes, Tadayoshi Kohno, Bo Li, Atul Prakash, Amir Rahmati, Dawn Song, Robust Physical-World Attacks on Deep Learning Models, arXiv preprint 1707.08945, August 2017.

¹⁵ Patrick Olsen, Over-the-Air Update Left Tesla Model 3 Without Key Safety Features, Consumer Reports (Sep. 14, 2018).

will not operate outside of conditions under which it can operate safely. Legislation should direct NHTSA to establish a functional safety standard that requires a manufacturer to certify to the Agency that an AV has been tested to ensure it will operate reliably and safely under the conditions the vehicle is designed to encounter. Additionally, NHTSA should confirm the manufacturer's certifications are accurate by conducting their own testing as needed.

- **Revising Federal Motor Vehicle Safety Standards:** Any actions by NHTSA to revise existing FMVSS in order to facilitate the introduction of AVs must be conducted in a public rulemaking process and meet the safety need and equivalency provided by current standards.

Broadening Statutory Exemptions from FMVSS is Unwise, Unnecessary and Unsafe.

Federal safety standards have been established using thorough objective research, scientific studies and data. They are also subject to a robust and transparent public process and ensure the safety and security of all road users. No demonstrable evidence has been presented to show that the development and deployment of AVs requires larger volumes of exemptions from federal safety standards which are essential to public safety. Current law already permits manufacturers to apply for an unlimited number of exemptions. For each exemption granted, manufacturers can sell up to 2,500 exempt vehicles. The proposed exemption process in the October 28 staff draft and resultant huge numbers of exempt vehicles permitted on the road (potentially millions) *de facto* turn everyone -- in and around exempted vehicles -- into unknowing and unwilling human subjects in a risky experiment and without an independent institutional review board (IRB). It is also expected that the massive influx of new vehicles exempt from FMVSS will have ramifications (both those that can be predicted or some that cause unintended consequences) for our Nation's infrastructure including changes to or the need to more frequently maintain signage, lane markings, traffic signalization, and others.

There are substantial and grave problems with the staff draft language that pose serious risk to the public. Permitting major increases to exemption numbers beyond the current cap of 2,500 vehicles in a 12-month period will threaten the safety of everyone on the roads by exposing them to even more AVs exempt from FMVSS. Additionally, no metrics or criteria are enumerated for determining that these features or vehicles will be "safety equivalent." This misguided proposal to drastically revise established federal law would allow the industry to manufacture a large number of AVs under broad exemptions instead of requiring the Agency to take the necessary action to thoughtfully and thoroughly update and issue new standards specifically for AVs.

The following necessary actions were identified by Advocates in response to the October 28 staff draft:

- 1) Strike the huge increases in exemption numbers. There should be no increase in exemption numbers as manufacturers are already permitted up to 2,500 for sale. There also should be no "stair-step" approach which would allow a manufacturer to simply wait out a time period and get a large number of exemptions;
- 2) Replace the word "or" with "and" in determining safety equivalency as safety equivalency should only be determined if the exempted feature at issue meets the safety purpose and intent of the standard *and* if the vehicle operates at an overall level of safety at least equal to the safety of non-exempt vehicles;
- 3) Remove deadlines for NHTSA review which may limit the Agency's ability to thoroughly review each application for exemption. Currently, NHTSA lacks the needed

resources and/or expertise to accomplish the major responsibility of reviewing multiple applications requesting large volumes of new exemptions. Limiting deadlines will likely lead to the Agency rubber-stamping applications;

- 4) Enumerate criteria for review of previously granted exemptions;
- 5) Prohibit exemptions from crashworthiness standards;
- 6) Include safety-critical information in the exemption database such as the level of the vehicle's automation and its ODD;
- 7) Require information provided to the Secretary by manufacturers be made public, ensuring transparency;
- 8) Direct that the Secretary immediately review the safety performance of an AV or AV system granted an exemption from FMVSS upon a safety critical event resulting in death or serious injury. If warranted, the Secretary shall issue a do not drive order as well as suspend the sale of any new vehicles under the exemption;
- 9) Provide NHTSA with imminent hazard authority to take immediate action when the Agency determines a defect substantially increases the likelihood of death and injury;
- 10) Remove the current cap on civil penalties; and,
- 11) Provide the U.S. DOT with criminal penalty authority in appropriate cases in which corporate officers who acquire actual knowledge of a product danger that could lead to serious injury or death and fail to inform NHTSA and warn the public.

Ensuring Proper Oversight of Testing is Fundamental.

Under the FAST Act (P.L.114-94, Sec. 24404), automakers are permitted to test or evaluate an unlimited number of vehicles that do not comply with FMVSS. Please note that Advocates and other organizations strongly opposed this provision during deliberations on the FAST Act because no safety conditions were required of manufacturers that put experimental vehicles on neighborhood streets and roads. Nonetheless, AV testing is already underway, as affirmed by the University of Florida Transportation Institute which noted that approximately 80 companies are currently testing autonomous technology and AVs in the U.S.¹⁶ The only change Advocates supports to current law is imposing some fundamental and commonsense safeguards to the existing statutory language which should have been enacted in the FAST Act. The need for such protections was underscored when the NTSB noted that “at the time of the [Uber] crash and the writing of this report there was no Federal oversight of the testing of autonomous vehicles.”¹⁷

The language in the October 28 staff draft broadly expands the eligibility pool for entities that can test, evaluate or demonstrate AVs to “employees, agents, fleet management contractors, or other partners of the manufacturer of the highly automated vehicle, the automated driving system, or any component of the vehicle or system; or research institutions, including institutions of higher education and automated vehicle proving grounds.” Taken literally, this language could allow a human resources manager of an AV manufacturer (“employee”), a sales representative of an AV manufacturer (“agent”), an advertising agency of an AV manufacturer (“partner”), or a high school (“research institution”), to name a few examples, to avail themselves of this exemption. Furthermore, essential and basic enforcement authorities to protect the public are missing.

¹⁶ Brookings Institution, *Autonomous cars: Science, technology, and policy* (Jul. 25, 2019).

¹⁷ The Operations Factors Group Chairman’s Factual Report (HWY18MH010).

The following are critical actions to protect safety:

- 1) Require that any entity that is testing or evaluating an AV agree to suspend testing if a safety critical event resulting in death or serious injury occurs during testing. The suspension will be in place until the vehicle and testing procedures can be evaluated by NHTSA and corrective measures have been taken by the manufacturer;
- 2) Require any entity that is testing or evaluating an AV to agree to provide the Secretary any and all documentation provided to state authorities;
- 3) Require any entity that is testing or evaluating an AV to agree to establish an Institutional Review Board as defined in 21 CFR Part 56 to evaluate any testing involving human subjects;
- 4) Significantly restrict the expansion of those eligible to test, evaluate or demonstrate the motor vehicles with clear and precise criteria on eligibility;
- 5) Provide NHTSA with imminent hazard authority to take immediate action when the Agency determines a defect substantially increases the likelihood of death and injury;
- 6) Remove the current cap on civil penalties;¹⁸
- 7) Provide the U.S. DOT with criminal penalty authority in appropriate cases in which corporate officers who acquire actual knowledge of a product danger that could lead to serious injury or death and fail to inform NHTSA and warn the public; and,
- 8) Limit access to vehicles testing on public roads to individuals affiliated with the AV manufacturer.

Advisory Committees Should be Balanced and Subject to Basic Protocols.

Advisory committees are unacceptable substitutes for the Agency fulfilling its statutory mission and issuing safety standards through open public rulemakings. The work of an advisory committee should in no way impair, constrain or supplant the authority of the Secretary or NHTSA to issue timely regulations, institute oversight actions and propose program policies for AVs. For example, the U.S. DOT should not delay or defer regulatory actions on AVs while awaiting any report, recommendations or approval from any advisory committees.

Rather than expend scarce Agency funds and staff time on an advisory committee, NHTSA should be given the resources to hire experts with requisite knowledge. These types of committees, even so-called “balanced” ones, allow for undue industry influence, as demonstrated by the Boeing tragedy chronicled recently in *The New York Times* on October 27, 2019.¹⁹ Committees are time consuming and drain Agency resources. The October 28 staff draft text lacks clear language indicating that the report/recommendations from the Advisory Council (“Council”) do not in any way delay issuance of rules or affect the ability of the Secretary to issue regulations and other policies. Strict assurance that no interest can have more representation than any other and a general cap on membership numbers is essential. Moreover, the breadth of issue areas is extremely expansive and should not be delegated to an advisory council.

The following are necessary protections to ensure the measured, balanced and structured nature of the Council:

- 1) Significantly reduce the technical purview of the Advisory Council;

¹⁸ 49 USC 30165(a).

¹⁹ Natalie Kitroeff and David Gelles, Before Crashes, Boeing Pushed To Undercut F.A.A. Oversight, N.Y. Times (Oct. 27, 2019).

- 2) Provide authorization for a dedicated funding source so that the Council does not divert money from NHTSA's budget;
- 3) Require that members of the Council submit a financial disclosure that is made public;
- 4) Establish a structure of the Council including chairs, voting construct, consensus requirements, and the ability for dissenting members to report;
- 5) Ensure recommendations made by the Council, records of the Council meetings, meeting announcements and agendas, reports, transcripts, minutes and other documents are made available to the public;
- 6) Enumerate representation of some essential stakeholders including first responders, law enforcement, public health representatives, pedestrians and bicyclists; and,
- 7) Remove the limitation on the applicability of the Federal Advisory Committee Act (FACA (5 USC App.)).

Issuing a Cybersecurity Standard is Vital for Safety and Protection.

NHTSA must issue a minimum cybersecurity standard by a date certain to protect against potentially catastrophic hacks of AVs. As such, Advocates supports the enactment of the SPY Car Act of 2019 (S. 2182). Numerous high profile cyber attacks on a variety of industries have already occurred, and AVs will not be immune to this threat. In 2015, hackers demonstrated their ability to take over the controls of a sport utility vehicle (SUV) that was traveling 70 miles-per-hour on an Interstate outside of St. Louis, MO by accessing the vehicle's entertainment system using a laptop computer located miles away from the vehicle.²⁰ Traditional vehicles, which are less complex than AVs, have been weaponized and used in terrorist attacks including in New York City (2017), Toronto, Canada (2018), Berlin, Germany (2016) and Nice, France (2016).

Privacy Protections Needed to Guard Against Misuse.

AVs will be collecting significant amounts of personal data including the operation and location of the vehicle. Manufacturers must have robust safeguards and policies in place to protect this data from being stolen and/or misused. However, the ability of NHTSA, the NTSB and local law enforcement to access critical crash data in a timely manner must be preserved. In addition, the use of communication bandwidth needed for vehicle-to-everything communication must be limited to non-commercial use.

Consumers Must Be Given Sufficient Information about AVs.

Every manufacturer should be required to provide consumers with information about the capabilities, limitations and exemptions from safety standards for all vehicles sold in the U.S. During a September 2017 NTSB hearing on the 2016 fatal Tesla crash, the Board correctly criticized the lack of adequate and consistent consumer information about the capabilities, limitations and any exemptions granted for AV systems. Consumer information should be available at the point of sale, in the owner's manual and in any over-the-air updates. NHTSA should be directed to immediately issue an interim final rule (IFR) requiring such readily available information be provided to consumers. Additionally, similar to the user-friendly safecar.gov website, NHTSA must establish a website accessible by vehicle identification number (VIN) with basic safety information about the AV level, safety exemptions, and limitations and capabilities of the AV driving system, including any changes made by over-the-

²⁰ Andy Greenberg, Hackers Remotely Kill a Jeep on the Highway—With Me in It, Wired (Jul. 21, 2015).

air updates. The website will also allow NHTSA and other research groups to perform independent evaluations of the comparative safety performance of AV systems.

Any Submission to NHTSA Should be Informative and Include Sufficient Data.

Advocates recommends that each manufacturer be required to submit an Autonomous Technology Notice (ATN, formerly referenced by legislation as a “Safety Evaluation Report”) as it requires autonomous technology manufacturers to give notice to NHTSA about their planned actions. The ATN is not designed to be, nor can it be, a substitute for NHTSA promptly issuing minimum performance standards through a public rulemaking process. The primary purpose of the ATN is to give notice to the Agency and the public of the intention of the manufacturer to introduce an AV or AV system into commerce and provide documentation of the work undertaken to ensure its safe performance. Any AV produced must still meet all of the FMVSS and the submission of an ATN alone, cannot permit, in any way whatsoever, the sale of an AV that does not meet all applicable federal safety standards. In addition, if NHTSA finds that an ATN is deficient, manufacturers must be required to submit any additional information requested by the Agency.

AV legislation that requires a publicly-accessible submission to NHTSA must ensure that the report includes sufficient data and documentation necessary to adequately detail and evaluate the subject areas. Merely allowing manufacturers to “describe” their AV system has encouraged manufacturers to submit glossy, marketing-style brochures with little, if any, substantive or relevant information from which to ascertain critical information about safety and performance. As such, legislative language must direct companies to both “describe and document” how they are comprehensively addressing each issue area under the ATN, until a safety standard for that particular issue area has been established.

Past actions by several automakers to hide from the public and NHTSA known safety defects that have caused deaths and serious injuries and led to the recall of tens of millions of vehicles fortify this essential need. An ATN provision must require:

- 1) Submission of false or misleading information be subject to criminal penalties;
- 2) The cap on civil penalties be removed;
- 3) NHTSA to verify the level of automation being asserted by the manufacturer;
- 4) NHTSA be provided with sufficient time, a minimum of six months, to adequately analyze the ATN and request additional information if necessary; and,
- 5) At a minimum the topics covered by the ATN should include: System Safety, Data Recording, Cybersecurity, Human-Machine Interface, Crashworthiness, Capabilities, Post-Crash Behavior, Account for Applicable Laws (i.e. compliance with traffic safety laws) and Automation Function.

Collect Standardized Data, Make it Publicly Available and Require EDRs.

With the increasing number of AVs of different automation levels being tested and some being sold to the public, standardized recording and access to AV event data are necessary for the proper oversight and analysis of crashes.

The lack of standardization and collection of data is already hampering understanding and investigations of AVs. For example, as a result of the 2016 fatal Tesla crash in Florida, the NTSB has called for the U.S DOT to act on data collection. The NTSB recommended that NHTSA implement data collection requirements for all new vehicles equipped with AV control

systems, and to define a standard format for reporting this data. The NTSB also called for this data to be readily available to, at a minimum, the NTSB and NHTSA. This data should also be made public.

Every vehicle should be equipped with an event data recorder (EDR). While there is currently a NHTSA requirement for what data voluntarily-installed EDRs must capture, this information is insufficient to properly ascertain information about crashes involving AVs. IIHS also reiterated the need for EDRs in the August 7, 2018, Status Report: “IIHS has asked the agency to require event data recorders to encode information on the performance of automated driving systems in the moments before, during and after a crash. This information would help determine whether the human driver or vehicle was in control and the actions each entity took prior to the event.”²¹

Other data needs include:

- 1) Manufacturers must be required to report AV safety critical events to NHTSA, including crashes and disengagements;
- 2) NHTSA’s crash databases should be updated to capture AV crashes. This includes a revision of Early Warning Data to ensure manufacturers provide more information about crashes and incidents that could indicate a safety defect and lead to a recall; and,
- 3) A structure should be established to facilitate mandatory sharing of AV failures by manufacturers.

Provide Additional Resources and Enforcement Authorities.

Ensuring NHTSA has adequate resources, funds, staff and enforcement authority is essential for the Agency to successfully carry out its statutory mission and address the multiple challenges presented by the deployment of self-driving technologies. Even without the upcoming enormous challenges AV development and deployment will create, the Agency is chronically underfunded; NHTSA’s Operations & Research (O&R) budget is meager (only about \$350 million annually in the past 2 years). In fact, this year, the Administration proposed a draconian \$50 million cut in NHTSA’s O&R budget. The Agency cannot effectively oversee a multi-billion dollar industry and protect hundreds of millions of motorists without a significant increase in resources – both financial and staff. Currently, 95 percent of transportation-related fatalities and 99 percent of transportation injuries, involve motor vehicles. Yet, NHTSA receives only one percent of the overall DOT budget. Furthermore, it is estimated that currently more than 70 million cars are on the road with an open recall.²²

Any AV legislation must include the following provisions to address inadequate funds, staff and enforcement ability:

- 1) A significant increase in funding for NHTSA’s operations and research (O&R) budget;
- 2) Imminent hazard authority to take immediate action when the Agency determines a defect substantially increases the likelihood of death and injury; and,
- 3) Criminal penalty authority in appropriate cases in which corporate officers who acquire actual knowledge of a product danger that could lead to serious injury or death and fail to inform NHTSA and warn the public.

²¹ IIHS, Status Report, Reality Check-Research, deadly crashes show need for caution on road to full autonomy, Vol. 53, No. 4 (Aug. 7, 2018).

²² Consumer Federation of America, Over 70 Million Vehicles On The Road With Open Recalls (Sep. 18, 2018).

Guarantee Access for Individuals with Cross-Disabilities.

Autonomous driving technology has the potential to increase access and mobility for individuals with disabilities who may have varying needs. However, that goal can only be realized by Congressional directive in legislation. People with disabilities have different requirements for access and mobility – AVs may help increase mobility for some members of the disability community but provide little or no assistance to others. Installing an automated system in a vehicle or removing the driver in a ridesharing service will not sufficiently eliminate mobility barriers and may even exacerbate them. For example, wheelchair users may require a ramp or lift system as well as assistance in ensuring the wheelchair is properly secured or stowed during the ride. As such, full accessibility for all users must be required for all types of common and public use AVs. Additionally, funding should be authorized to promote research and development of accessible AVs and standards, including vehicle safety and crashworthiness standards, and technical assistance.

As previously stated, allowing AVs to be exempt from safety standards is dangerous for all road users, but could pose even more serious problems for people with cross-disabilities should the vehicle be involved in a crash, not function as intended, or have a defect. In the event of a failure, a person could be stranded in the vehicle with no driver. The diverse needs of members of the cross-disability community must be taken into account for systems that require human engagement as well as when developing a failsafe. Should there be an emergency that requires human intervention (such as a manual override), such a safeguard must be useable by any potential occupant of the vehicle regardless of a person's disability.

Federal, State and Local Roles Should Not be Altered.

The statutory mission of the U.S. DOT established by Congress in 1966 is to regulate the design and performance of motor vehicles to ensure public safety, which now includes automated driving system technology and driverless cars.²³ For more than 50 years, the U.S. DOT through the NHTSA has issued safety standards for passenger and commercial motor vehicles. The role of states is to regulate road safety by the passage of traffic safety laws. However, in the absence of comprehensive and strong minimum federal standards and regulations to govern the driverless car rules of the road, the states retain a legal right and a duty to its citizens to develop proposals and implement solutions to ensure public safety. There should be no attempt in legislation to prohibit states in any way from advancing AV safety in the absence of federal rules.

Conclusion

While fully driverless cars may have a future potential to reduce the carnage on our roads and expand mobility, commonsense, lifesaving solutions can and must be implemented now. Advocates urges Congress to direct the U.S. DOT to put the vital safeguards outlined in this testimony in place prior to the wide-scale deployment of unproven driverless cars onto public roads. We look forward to continuing to work with the Committee to make our Nation's roads safe for all.

²³ National Traffic and Motor Vehicle Safety Act of 1966, Pub. L. 89-563 (1966).



Public Opinion Polls Show Deep Skepticism About Autonomous Vehicles

2019 Reuters/Ipsos Pollⁱ

- 64% of Americans said they would not buy a self-driving car.
- 67% said self-driving cars should be held to higher safety standards than traditional cars.

2019 AAA Pollⁱⁱ

- 71% of U.S. drivers surveyed would be afraid to ride in a fully self-driving vehicle.

2018 SADD/State Farm Surveyⁱⁱⁱ

- When asked to rate how safe they would feel riding in a fully autonomous vehicle on a one-to-five scale with one being least safe and five being most safe, 55.6% of high school students polled said one.

2018 Allianz Global Assistance Survey^{iv}

- 57% of Americans say they are not very or not at all interested in utilizing self-driving/autonomous vehicles - up from 47% in 2017.
- When asked why they had a lack of interest in self-driving/autonomous cars, 71% of respondents cited safety concerns - up from 65% in 2017.
- The number of Americans who said they were not very or not at all confident that that self-driving/autonomous cars will develop safely enough to consider using jumped 12 percentage points from 36% in 2017 to 48% in 2018.

2018 Cox Automotive Survey^v

- 45% of respondents believe roadways would be safer if all vehicles were fully autonomous – down from 63% who said so in 2016.
- 68% of consumers said they'd feel uncomfortable riding in an autonomous vehicle fully driven by a computer.
- 84% of consumers think people should always have the option to drive themselves even in an autonomous vehicle.
- 75% of respondents believe autonomous vehicles need real world testing in order to be perfected but:
 - 54% prefer that this testing take place in a different town or city from where they live;
 - 54% would not feel comfortable walking near roads where these tests take place; and,
 - 50% would not feel comfortable driving on the same roads where these tests take place.

2018 ORC International Poll^{vi}

- 69% of respondents said they were concerned about sharing the road with driverless vehicles as motorists, bicyclists and pedestrians.
- 80% of Americans said that National Transportation Safety Board (NTSB) investigations of crashes involving cars equipped with self-driving technology will be helpful in identifying problems and recommending improvements.
- 84% of respondents believe the NTSB should complete these crash investigations before Congress acts on driverless car legislation.

2018 Public Policy Polling/Consumer Watchdog Poll^{vii}

- When informed that Congress is currently considering legislation to allow more driverless cars onto America's roads, 75% of respondents from four states (FL, CA, MI, SD) agreed that we need to apply the brakes on driverless cars until the technology is proven safe.
 - 78% of voters agreed in Florida.

- 71% agreed in California.
- 74% agreed in Michigan.
- 79% agreed in South Dakota.
- 76% of voters in Florida said they would not be likely to ride in a driverless car if it were available. 69% said so in California, 69% said so in Michigan and 77% said so in South Dakota.
- 84% of voters in Florida agreed that there should be regulations in place to help protect the public from public experiments with driverless cars. 87% agreed in California, 86% agreed in Michigan and 82% agreed in South Dakota.
- 80% of respondents agreed that federal and state governments, and not the driverless car industry, should regulate driverless vehicles for the safety of riders, pedestrians and other drivers.
- 56% of voters polled said they would be very concerned for their safety as a passenger, pedestrian, bicyclist or other driver on the road if a driverless car service were operating in their city.
- 56% of respondents said they were very concerned about the security of the data collected by driverless vehicles.
- 59% of voters polled said that they do not think that in their lifetimes, driverless cars will be safe enough to use.

2018 AAA Poll^{viii}

- 73% of American drivers said they would be too afraid to ride in a fully self-driving vehicle, up from 63% in late 2017.
- 63% of U.S. adults said they would feel less safe sharing the road with a self-driving vehicle while walking or riding a bicycle.

2018 Gallup Poll^{ix}

- 52% of Americans said that even after driverless cars are certified by government auto safety regulators, they would never want to use one.

2018 CARiD Survey^x

- 53% of respondents said they would feel somewhat or very unsafe riding in an autonomous car.
- 66% of those polled said they think the U.S. government must be involved in regulating autonomous vehicles.
- 75% of poll respondents said that if given a choice, they would still rather drive than ride autonomously.

2018 Morning Consult Poll^{xi}

- 50% of U.S. adults said that based on what they have seen, read or heard, they believe self-driving cars are somewhat less safe or much less safe than regular vehicles driven by humans.
- 57% of those polled said that based on what they have seen, read or heard, they have a not too favorable or not at all favorable view of self-driving cars.
- 38% of respondents said they would not ride in a self-driving car, versus 19% who said they would and 35% who said maybe in the future.

2018 Reuters/Ipsos Poll^{xii}

- 67% of Americans polled said they were uncomfortable with the idea of riding in self-driving cars.

2018 Morning Consult Poll^{xiii}

- 67% of adults polled were somewhat or very concerned about cyber threats to driverless cars.

2018 ORC International Poll^{xiv}

- 64% of respondents said they were concerned about sharing the road with driverless cars.
- 63% said they are not comfortable with Congress increasing the number of driverless cars which do not meet existing federal vehicle safety standards and would be available for public sale.
- 75% of Americans said they weren't comfortable with manufacturers being able to disable vehicle controls, such as the steering wheel, and brake and gas pedals, when an AV is being operated by the computer.

- 73% of those polled support the development of U.S. Department of Transportation safety standards for new features related to the operation of driverless cars.
- 81% said they support U.S. Department of Transportation cybersecurity rules to protect against hacking of cars that are being operated by a computer.
- 84% of Americans said they support uniform U.S. Department of Transportation rules to ensure that the human driver is alert in order to safely take control from the computer.
- 80% of respondents support minimum performance requirements for computers that operate driverless cars similar to those for computers that operate commercial airplanes.
- 87% said it would be helpful to have a U.S. Department of Transportation website for consumers to look up information about the safety features of a new or used driverless car which they may be purchasing.

2017 Pew Research Center Survey^{xv}

- 56% of U.S. adults surveyed said they would not ride in a self-driving vehicle.
- Of those who said they wouldn't, 42% of respondents said they didn't trust the technology or feared giving up control and 30% cited safety concerns.
- 30% of respondents think that autonomous vehicles will make roads *less* safe for humans if they become more widespread.
- 87% of respondents said they would favor a requirement that all driverless vehicles have a human in the driver's seat who can take control of the vehicle in case of an emergency.
- 53% of people surveyed said the development of driverless cars makes them feel very or somewhat worried.
- 52% said they would feel not too or not at all safe sharing the road with driverless passenger vehicles.
- 65% said they would feel not too or not at all safe sharing the road with driverless freight trucks.

2017 Morning Consult/POLITICO Poll^{xvi}

- 51% of registered voters polled said they were not too likely or not likely at all to ride as a passenger in an AV.
- 61% of respondents said they aren't likely to buy self-driving cars once they become available.
- 35% of those polled said they believe AVs are less safe than the average human driver, compared to 22% who said they were safer than human drivers and 18% who said AVs were about the same level of safety as the average human driver. Over a quarter (26%) said they didn't know or had no opinion.

2017 Deloitte Study^{xvii}

- 74% of U.S. consumers polled said they felt that fully autonomous vehicles will not be safe.
- 68% of respondents said an established track record of fully autonomous cars being safely used would make them more likely to ride in one.

2017 MIT AgeLab and New England Motor Press Association Survey^{xviii}

- 13% of respondents said they would be comfortable with a fully autonomous car, down from 24% in a similar 2016 survey.
- 48% said they would never purchase a car that completely drives itself when asked about their interest in purchasing a self-driving car.
- Of those who said they wouldn't purchase a completely driverless car, 37% said they feared a loss of control, 29% said they don't trust it, 25% said they believe it will never work perfectly, and 21% said it's unsafe.

2017 AAA Survey^{xix}

- 54% of U.S. drivers polled feel less safe at the prospect of sharing the road with a self-driving vehicle. Moreover, only 10% said they'd actually feel safer sharing the roads with driverless vehicles.
- 78% of Americans surveyed said they were afraid to ride in a self-driving vehicle.

2016 Kelley Blue Book Study^{xx}

- 51% of respondents said they would prefer to have full control of their vehicle, even if it's not as safe for other drivers.
- 64% said they need to be in control of their vehicle.

2016 Morning Consult Poll^{xxi}

- 43% of registered voters polled said autonomous cars are not safe. About one-third (32%) said they are safe, but that's not much more than the 25% who said they didn't know or didn't care.
- Majorities of voters found it unacceptable for a rider in a driverless car to text or email, read, watch movies or TV, be drunk or sleep.
- 76% said they were as worried about driverless cars operating on the same roads as cars driven by humans.
- When asked broadly about road safety, 80% said they were concerned. Likewise, 80% of respondents said they were concerned about glitches in an autonomous car's software.

Compiled by Advocates for Highway and Auto Safety, November 2019

ⁱ Americans still don't trust self-driving cars, Reuters/Ipsos poll finds, April 2019

ⁱⁱ AAA Annual Automated Vehicle Survey, March 2019

ⁱⁱⁱ SADD/State Farm, Teens' Thoughts Regarding the Future of Vehicle Technology, October 2018

^{iv} Allianz Global Assistance, Sharing Economy Index, September 2018

^v Cox Automotive, Evolution of Mobility: Autonomous Vehicles, August 2018

^{vi} ORC International and Advocates for Highway and Auto Safety, CARAVAN Public Opinion Poll: Public to U.S. Senate: Pump the Brakes on Driverless Car Bill, July 2018

^{vii} Consumer Watchdog, As Americans Hit the Road for Memorial Day, Consumer Watchdog Poll Finds Voters Want Congress to Apply the Brakes on Driverless Cars, May 2018

^{viii} American Automobile Association (AAA), American Trust in Autonomous Vehicles Slips, May 2018

^{ix} Gallup, Driverless Cars Are a Tough Sell to Americans, April 2018

^x CARiD and SurveyMonkey, How do American feel about autonomous driving?, April 2018

^{xi} Morning Consult, National Tracking Poll #180339, April 2018

^{xii} Reuters and Ipsos, Reuters and Ipsos Poll poll of 2,592 participants conducted between Jan. 11-18, 2018, January 2018

^{xiii} Morning Consult, National Tracking Poll #180108, January 2018

^{xiv} ORC International and Advocates for Highway and Auto Safety, CARAVAN Public Opinion Poll: Driverless Cars January 2018

^{xv} Smith, A. and Anderson, M., Pew Research Center, Automation in Everyday Life, October 2017

^{xvi} Morning Consult and POLITICO, National Tracking Poll #170904, September 2017

^{xvii} Deloitte Global Automotive Consumer Study, What's ahead for fully autonomous driving: Consumer opinions on advanced vehicle technology, January 2017

^{xviii} Abraham, H., Reimer, B., Seppelt, B., Fitzgerald, C., Mehler, B. and Coughlin, J., MIT AgeLab and New England Motor Press Association (NEMPA), Consumer Interest in Automation: Preliminary Observations Exploring a Year's Change, May 2017

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^{xx} Kelley Blue Book and Cox Automotive, Future Autonomous Vehicle Driver Study, September 2016

^{xxi} Nasr, A. and Johnson, F., Morning Consult, Voters Aren't Ready for Driverless Cars, Poll Shows, February 8, 2016