



ADVOCATES
FOR HIGHWAY
& AUTO SAFETY

March 27, 2020

The Honorable Frank Pallone, Jr., Chairman
The Honorable Greg Walden, Ranking Member
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Jan Schakowsky, Chairwoman
The Honorable Cathy McMorris Rodgers, Ranking Member
Subcommittee on Consumer Protection and Commerce
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairman Pallone, Ranking Member Walden, Chairwoman Schakowsky and Ranking Member Rodgers:

Thank you again for the opportunity to testify before the Subcommittee on Consumer Protection and Commerce of the Committee on Energy and Commerce on February 11, 2020 during the hearing, "Autonomous Vehicles: Promises and Challenges of Evolving Automotive Technologies."

A number of critical issues were raised during the hearing and in the additional questions for the record (QFRs) that deserve careful attention and resolution before autonomous vehicle (AV) legislation is introduced this session. As you are aware, your staff together with staff of the Senate Committee on Commerce, Science, and Transportation has released 13 sections of draft legislation. Advocates for Highway and Auto Safety (Advocates) has provided comprehensive responses to these sections and urges you review our submissions as well as our responses to the additional QFRs below. Moreover, considering that the February 11, 2020 hearing was not a hearing on specific legislation, we respectfully request to testify when the Subcommittee convenes to address an AV bill. Advocates has been integrally involved throughout the legislative process and offers essential expertise on improving safety for motorists and all road users, vehicles and roads, which is the motivating force behind advancing AVs.

Sincerely,

Catherine Chase, President

Encl.

Reponses to “Additional Questions for the Record”:

The Honorable Jan Schakowsky (D-IL)

- 1. Some proponents of advancing the deployment of AVs contend the U.S. is falling behind other nations.**
 - a. Will the development of autonomous technology currently taking place in the United States be hindered if legislation is not enacted this Congress that addresses AVs?**

Some proponents of advancing the deployment of autonomous vehicles (AVs) contend the U.S. is falling behind other nations. However, this fear-inducing claim is misleading as other countries are taking a more calculated, 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.¹ In the United Kingdom, testing has largely been limited to a handful of cities, and the government has proposed and published a detailed code of practice for testing AVs.² In Canada, several provinces prohibit certain types of AVs from being sold to the public.³ In Asia, Japan has allowed on-road testing with a driver behind the wheel and is currently working on regulatory and legal protocols for controlling the commercial introduction of AVs, but even so has not begun to address the highest levels of automation.⁴ While it was noted during the hearing that Toyota will have a test AV that will be offered for public demonstration rides in Japan this summer, the vehicle was built and tested at the company’s facility in Michigan.⁵ In China, all AV operations remain experimental and in fact it was just recently reported in the media that they have delayed the goal of widespread self-driving deployment to 2025.⁶ In sum, no country is selling fully automated vehicles to the public and by many accounts, none will do so for decades.⁷ The U.S. is not behind other countries in allowing AVs to go to market, but we are significantly behind in establishing comprehensive safeguards to ensure that the progress of AV development to a market ready product happens without jeopardizing or diminishing public safety.

According to the University of Florida Transportation Institute, approximately 80 companies are currently testing autonomous technology and AVs in the U.S.⁸ In addition, many companies have suspended testing due to the COVID-19 outbreak.⁹ Therefore, there is no need to rush legislation through Congress. Instead, policy makers should be taking a deliberate and meticulous approach in drafting the first federal law to address this burgeoning technology and ensure public safety.

¹ Dentons, Global Guide to Autonomous Vehicles 2020.

² *Id.*

³ *Id.*

⁴ Kyodo, JiJi, Cabinet paves way for self-driving vehicles on Japan's roads next year with new rules, The Japan Times (Sep. 20, 2019).

⁵ <https://global.toyota/en/newsroom/corporate/30344967.html>

⁶ Jill Shen, China delays self-driving car deployment goal to 2025, Tech Node (Feb. 24, 2020).

⁷ Lawrence Ulrich, Driverless Still a Long Way From Humanless, N.Y. Times (Jun. 20, 2019); Level 5 possible but “way in the future”, says VW-Ford AV boss, Moting (Jun. 29, 2019).

⁸ Brookings Institution, Autonomous cars: Science, technology, and policy (Jul. 25, 2019).

⁹ Andrew J. Hawkins, Coronavirus shows there’s no such thing as a totally human-free self-driving car (Mar. 18, 2020).

Furthermore, numerous industry executives and technical experts have stated that the technology is not ready now and may not be ready for years ahead. In June of 2019, Gill Pratt, Director of the Toyota Research Institute said, “None of us have any idea when full self-driving will happen.”¹⁰ Bryan Salesky, CEO of Argo AI, said in July of 2019, “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.”¹¹ John Krafcik, CEO of Waymo, said in late 2018, “This is a very long journey. It’s a very challenging technology and we’re going to take our time. Truly every step matters.”¹²

The disconnect between the readiness of the technology and the artificial urgency to pass legislation to allow for widespread deployment is alarming, especially if provisions are included in legislation, which is in the process of being drafted, that allow needless repeals or rollbacks of current federal law to allow for thousands of exemptions from the Federal Motor Vehicle Safety Standards (FMVSS). In fact, NHTSA released a statement on March 17, 2020 which admitted that the safety potential of automated driving systems is “unsubstantiated and the impacts unknown.” Furthermore, according to a public opinion poll commissioned by Advocates in January 2020, the public overwhelmingly opposes expanding such exemptions with 63 percent of respondents expressing concern with such a course of action. The perceived, but baseless, necessity perpetuated by some in the industry to expedite enactment of AV legislation, especially absent safety rulemaking requirements, is unwarranted and unwise. Widespread sale and deployment of the technology is still a long way off, we urge the Subcommittee to take the time to move deliberately and cautiously on AV legislation that prioritizes safety.

b. What approach should Congress take to enact legislation to ensure the safe and expedient development of the technology?

Legislation to allow for the successful development and deployment of AVs must put public safety first. Congress must advance a public safety agenda and not just an economic agenda. Both goals are compatible and achievable, and essential for both public safety and consumer acceptance. Any AV bill must ensure that the U.S. Department of Transportation (U.S. DOT) conducts thorough oversight, establishes minimum safety performance standards and requires industry accountability before driverless cars are available in the marketplace and sold to the public. There is a discernable difference between the frequently used phrase “regulatory framework” and “regulations.” The former sounds promising but comes with no concrete assurances, no specific requirements and no legal obligations, whereas the latter denotes that minimum performance standards must be met by every company, for every vehicle sold and for the protection of every consumer.

Further, any driverless car legislation must also regulate partially-autonomous (SAE Levels 2 and 3) vehicles. Crashes involving partially autonomous vehicles which comply with current FMVSS are occurring with frequency on our roads. The NTSB recently completed its investigation of a crash involving a Tesla Model X that was operating on its “Autopilot” system

¹⁰ Lawrence Ulrich, Driverless Still a Long Way From Humanless, N.Y. Times (Jun. 20, 2019).

¹¹ Level 5 possible but “way in the future”, says VW-Ford AV boss, Motoring (Jun. 29, 2019).

¹² WSJ Tech D.Live Conference (Nov. 13, 2018).

when it crashed into a roadway barrier in March of 2018 in Mountain View, California killing the vehicle's driver. The Nation's preeminent safety investigator found serious flaws with the Tesla's Autopilot system. A major and troubling finding was that the vehicle failed to "provide an effective means of monitoring the driver's level of engagement with the driving task". Furthermore, NTSB found that "[r]equirements are needed for driver monitoring systems for advanced driver assistance systems that provide partial driving automation (SAE Level 2 systems)." In addition, the vehicle continues to be used by drivers outside of the vehicle's intended geographic area or operational design domain (ODD) with deadly and tragic consequences.

It is vital that Congress adequately addresses the broad range of impacts on safety, accessible mobility, public transit diversion and infrastructure, among others, rather than rush enactment of a defective bill that jeopardizes public safety and consumer confidence.

2. In January, the U.S. Department of Transportation issued the fourth edition of its voluntary guidelines for automated vehicles entitled Ensuring American Leadership in Automated Vehicle Technologies: Automated Vehicles 4.0 (AV 4.0).

a. Are the voluntary guidelines issued by U.S. Department of Transportation for automated vehicles sufficient to protect public safety?

Advocates is extremely concerned with the "hands-off" approach the U.S. DOT has taken to "hands-free" driving. Our concerns are shared by Members of the NTSB. Speaking about a March 23, 2018 fatal crash involving a Tesla Model X in Mountain View, California, NTSB Chairman Robert Sumwalt said, "Government regulators have provided scant oversight, ignoring in some cases, this board's recommendations for system safeguards." The Board found that the National Highway Traffic Administration's (NHTSA) approach is, "misguided, because it essentially relies on waiting for problems to occur rather than addressing safety issues proactively." Speaking at the November meeting, Board Member Jennifer Homendy said, "In my opinion, they've put technology advancement here, before saving lives."

Voluntary guidelines are not enforceable because they are not legally binding and, therefore, are inadequate to ensure safety and protect the public. Manufacturers may unilaterally choose to deviate from the guidelines or ignore them entirely at any time and for any reason including internal corporate priorities such as cost or marketing considerations. In addition, some entities may choose to follow the guidelines while others may not, creating a dangerous and unreliable patchwork of safety protection. As noted, it has been reported that approximately 80 companies are testing AVs yet only 18 have submitted some form of a voluntary safety self-assessment. Consumers and NHTSA also have no legal recourse against a manufacturer's failure to follow the guidelines.

This is in stark contrast to federal regulatory standards such as airbags, electronic stability control (ESC), tire pressure monitoring systems and, more recently, rearview cameras. Before Congress acted and passed legislation mandating NHTSA to issue these safety standards, auto companies could decide whether or not to make these lifesaving technologies available as well as decide how they should perform. Additionally, the technologies, like rearview cameras, were

optional equipment and only available on high-end models or as part of expensive trim packages combined with luxury add-ons. Today, every vehicle sold in the United States is equipped with safety technologies that must meet minimum performance requirements set by NHTSA. Safety standards significantly decrease the cost to consumers and dramatically increase the number of crashes prevented and lives saved.

Further demonstrating the inadequacies of voluntary agreements, the March 2016 announcement by NHTSA and automakers to voluntarily equip automatic emergency braking (AEB) as standard equipment on most new passenger motor vehicles by 2022 highlights the substantial and glaring deficiencies in voluntary agreements such as lack of consistency and consumer expectation in AEB performance and in rate of incorporation of the technology in vehicles. Preceding this announcement, in January 2016 consumer groups petitioned NHTSA for a mandatory AEB standard. The petition was rejected in January 2017.¹³ Had the Agency granted the petition and issued a rule, these shortcomings would have been addressed and the public would have been afforded the protections this technology has been demonstrated to provide. According to the Insurance Institute for Highway Safety (IIHS), AEB reduce rear-end crashes by half. Instead of motorists benefitting from widespread safety improvements, based on the most recent reporting data available, two of America's largest automakers have abysmal records with regard to equipping their vehicles with this lifesaving technology. Only 29 percent of General Motors vehicles and a meager 9.5 percent of Fiat Chrysler vehicles were sold with AEB between September 1, 2018 through August 31, 2019.

The voluntary agreement contains no enforcement mechanisms to improve these troubling and grossly deficient statistics. Just this month Volvo announced that is recalling over 700,000 vehicles for problems with the AEB system. In addition, far too many vehicles continue to offer AEB as optional equipment as part of an expensive package. The IIHS has also conducted research that has demonstrated that some AEB systems have difficulty reacting to pedestrians.¹⁴ A federal standard mandating that AEB be equipped on vehicles as standard equipment and meet a minimum level of performance would address these shortcomings.

b. What actions should DOT take to ensure public safety?

The statutory mission of the U.S. DOT established by Congress in 1966 (Pub. L. 89-563) is to regulate the performance of motor vehicles to ensure public safety, which now includes automated driving system technology and AVs. For more than 50 years, the U.S. DOT, through the NHTSA, has issued safety performance standards for passenger and commercial motor vehicles. As of 2012, NHTSA estimated that since 1960 over 600,000 lives have been saved by motor vehicle safety technologies.¹⁵ Undoubtedly, many more have been saved during the last eight years.

Fully driverless cars may have a future potential to reduce the carnage on our roads and expand mobility, but commonsense, lifesaving solutions can and must be implemented now. Instead of

¹³ 82 FR 8391 (Jan. 25, 2017)

¹⁴ IIHS, Performance of pedestrian crash prevention varies among midsize cars (Oct. 29, 2019).

¹⁵ Lives Saved by Vehicle Safety Technologies and Associated Federal Motor Vehicle Safety Standards, 1960 to 2012, DOT HS 812 069 (NHTSA, 2015).

delaying and deferring regulatory actions and ignoring NTSB recommendations, NHTSA should immediately act on issuing safety standards for advanced driver-assistance system (ADAS) technology, such as AEB. The Agency should also conduct stronger oversight of these current technologies which are foundational to self-driving capacity. Additional needed standards include: human-machine-interface (HMI) for driver engagement; cybersecurity; electronics safety; a “vision test” for driverless cars; over-the-air updates; ensuring an AV operates within its operational design domain (ODD); and, functional safety. Consumers also must be given appropriate information about AVs including at the point of sale, in the owner’s manual, and on a publicly available website searchable by VIN.

Safeguards, transparency and oversight are vital to enable AVs to achieve the promises that have been put forth by those with tremendous financial stake in their sale. Minimum safety performance standards will not hamper innovation, but rather help advance public acceptance and support. Federal standards will set a baseline upon which AV manufacturers can compete to exceed and produce the best product. Some of the most critical standards needed include those listed above as well as a standard for a manual override when a fully autonomous system malfunctions.

3. Serious and fatal crashes involving vehicles equipped with automated driving systems, including partially-automated vehicles, have revealed significant flaws in this still developing technology.

On May 7, 2016, in Williston, Florida, a Tesla Model S on “Autopilot” struck and passed beneath a semitrailer, killing the driver. The failure of the automated driving system to keep the driver engaged in the driving task during the trip was identified as a problem by the NTSB during the crash investigation. The NTSB found that the Tesla “Autopilot” facilitated the driver’s inattention and overreliance on the system, which ultimately contributed to his death. The “Autopilot” was active for 37 minutes of the 41-minute trip and during the 37 minutes, the system detected the hands on the steering wheel only 7 times for a total of 25 seconds. A crash with alarmingly similar characteristics occurred on March 1 of last year, also in Florida (NTSB Investigation HWY19FH008).

Is driver distraction a serious concern for partially-automated systems (Levels 2 and 3) that require drivers to remain engaged and assume the driving task when needed?

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 effectively alerted to re-engage, understand and process the situation, and then take control of the vehicle before taking appropriate action. Dr. Mica Endsley, former Chief Scientist of the U.S. Air Force and an expert on situation awareness, decision-making and automation, has remarked, “Automation actually causes drivers to lose the

situation awareness that is required for safe driving and taking over control when needed.”¹⁶ Additionally, 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*, “Drivers 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.”¹⁷

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. The NTSB also recently completed its investigation of a crash involving a Tesla Model X that was operating on its “Autopilot” system when it crashed into a roadway barrier in March of 2018 in Mountain View, California killing the vehicle’s driver. The nation’s preeminent safety investigator found serious flaws with the Tesla’s Autopilot system including that it failed to “provide an effective means of monitoring the driver’s level of engagement with the driving task” and “[r]equirements are needed for driver monitoring systems for advanced driver assistance systems that provide partial driving automation (SAE Level 2 systems).” 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.”

These findings and research clearly demonstrate the need for Congress to require that NHTSA immediately begin rulemaking to issue a human-machine interface standard to ensure that human operators of these partially automated vehicles remain engaged and are prepared to assume the driving task in a timely manner.

- 4. On January 22, 2018, in Culver City, California, a Tesla Model S operating on “Autopilot” collided with a parked fire truck that was responding to the scene of separate crash. On March 18, 2018, in Tempe, Arizona, an Uber test vehicle operating on self-driving mode struck and killed a pedestrian walking a bicycle. Then, just a few days later on March 23, 2018, in Mountain View, California, a Tesla Model X operating on “Autopilot” collided with a safety barrier resulting in the death of the driver. On May 29, 2018, a Tesla Model S operating on “Autopilot” struck a parked police vehicle in Laguna Beach, California. On August 25, 2018, in San Jose, California, a Tesla Model S collided with a fire truck that was stopped in the far right lane with its emergency lights activated.**

Several crashes involving AVs have revealed the technology’s failure to properly detect and react to stopped emergency response vehicles, a pedestrian walking a

¹⁶ Statement of Dr. Mica Endsley, Press Conference: Safety, Consumer, Law Enforcement & Bicyclist Leaders, and Experts in Tech & Automation Urge Congress to Fix Major Shortcomings with Driverless Car Legislation and Not to Attach it to the FAA Bill (Jul. 2018).

¹⁷ 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).

bicycle and a roadway safety barrier. What should be done to address this problem?

Congress must direct U.S. DOT to require that driverless cars meet a “vision test” to guarantee an AV will properly detect and respond to other vehicles, pedestrians, bicyclists, wheelchair users, interactions with law enforcement and first responders, children, animals, roadway infrastructure and other objects in the operating environment in all conditions. The public supports such action. According a recent public opinion poll which I mentioned in my opening remarks during the hearing, 76 percent of respondents believe driverless cars should be required to pass a vision test to assure they can see and respond to the operating environment.¹⁸ 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, Arizona that killed a woman walking with 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.¹⁹ According to Dr. Cummings’s most recent study, “Self-driving systems, even with their multiple sensors and software advancements, still cannot reliably work in rain and snow conditions (Zang et al. 2019), during time of low sun angles (Dowling 2019), and often where lines on the road are either non-existent or with faded paint (Sage 2016).”²⁰

- 5. On May 7, 2016, in Williston, Florida, a Tesla Model S on “Autopilot” struck and passed beneath a semitrailer killing the driver. The NTSB in their investigation of the fatal crash noted that event data recorders (EDRs) are not required nor would current standards mandate the capturing of data necessary to evaluate the performance of AVs. The NTSB further made recommendations that the U.S. Department of Transportation and the National Highway Traffic Safety Administration (NHTSA) establish the data necessary for understanding crashes involving automated vehicle control systems, establish a benchmark for vehicles with these systems to capture and report this data in a standard format, and for that data to be readily accessible, at a minimum, to NHTSA and NTSB investigators.**

- a. As AVs are developed and deployed, should NHTSA require that all vehicles, including AVs, be equipped with an event data recorder (EDR)?**

Every vehicle should be required to be equipped with an event data recorder (EDR) and the information collected by EDRs needs to be expanded. While there is currently a NHTSA requirement for what data voluntarily-installed EDRs must capture, this information is insufficient to properly ascertain important facts about crashes involving AVs. IIHS also reiterated the need for EDRs in the August 7, 2018, Status Report: “IIHS has asked the agency to

¹⁸ ENGINE’S CARAVAN Survey Public Opinion Poll (Jan. 2020).

¹⁹ 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.

²⁰ Cummings, M.L, "Rethinking the maturity of artificial intelligence in safety-critical settings," AI Magazine, in review.

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 All vehicles, particularly those equipped with an automated driving system, must be required to be equipped with an EDR to capture data regarding the performance of the system before, during and after crashes and safety critical events. Such data as collected by the EDR should be standardized and accessible to law enforcement, safety investigators, insurers, and the public, with appropriate privacy protections.

As Congress considers the data need for AVs, it also will be essential to include these requirements:

- Manufacturers must be required to report all AV safety critical events to NHTSA including crashes and disengagements quarterly, and this information should be made public.
- NHTSA’s crash databases should be updated to capture AV crashes. This includes a revision of Early Warning Data to require manufacturers provide more information about crashes and incidents that could indicate a safety defect and lead to a recall.
- NHTSA should establish a structure to facilitate mandatory sharing of AV failures and vulnerabilities by manufacturers in a timely manner, and the public should be informed of any failures that affect public safety.
- The Vehicle Identification Number (VIN) should be revised to indicate that the vehicle is equipped with an automated driving system.
- The Secretary should be required to conduct research on the benefits of automatic crash data notification systems that can assist emergency personnel in responding to incidents and provide essential crash data to NHTSA in a timely manner.

b. Why would a requirement be beneficial to safety?

With the increasing number of AVs of different automation levels being tested on neighborhood streets and roads and some being sold to the public, standardized recording and access to AV event data are necessary for proper oversight and analysis of crashes. There are many stakeholders who need that data for numerous and varied important reasons including safety. For example, the IIHS studies the safety performance of vehicles. The ratings issued by IIHS are often used by consumers when purchasing a vehicle. Making important data about the on-road performance more widely available and understandable will increase consumer confidence and influence consumer purchasing decisions of vehicles with proven technologies, thereby contributing to safer driving conditions.

In fact, the lack of standardization and collection of data is already hampering investigations of AVs. For example, as a result of the 2016 fatal Tesla crash in Florida, the NTSB recommended that NHTSA implement data collection requirements for all new vehicles equipped with AV

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).

control systems and to define a standard format for reporting this data. No public actions to date have been taken by NHTSA to address the sensible NTSB recommendations.

In addition, during the crash involving the Tesla vehicle in Mountain View, California, first responders were required to contact Tesla engineers to come to the scene of the crash to assist in extinguishing a fire involving the vehicle's ion-battery. Even after such drastic action was taken, the battery reignited six days after the crash.²² The NTSB also called for this data to be readily available, at a minimum, to the NTSB and NHTSA. This data should also be made public. Unfortunately, NHTSA has not yet acted on this critically important recommendation.

- 6. Section 30170 of the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act (Pub. L. 106-414 (2000)) includes a provision that allows for the imposition of criminal penalties in relation to the reporting of vehicle safety defects required under 49 USC 30166. Specifically, an individual is subject to the criminal penalties provision of 18 USC 1001 if the individual specifically intends to mislead the Secretary of Transportation with respect to a motor vehicle or motor vehicle equipment safety related defect that have caused death or serious bodily injury. This includes a failure to file a report as required under 49 USC 30166. Under the TREAD Act provision, an individual is subject to fine and/or imprisonment to not exceed 15 years.**

Congress provided the Secretary of Transportation with criminal penalty authority when an individual specifically intends to mislead the Secretary with respect to a motor vehicle or motor vehicle equipment safety related defect that has caused death or serious bodily injury. Should this authority be extended for cases in which an individual acquires actual knowledge of a critical danger involving a vehicle that could lead to serious injury or death fails to inform NHTSA and warn the public?

Ensuring NHTSA has sufficient and effective 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. History has shown that when automakers place defective vehicles into the marketplace, there are deadly consequences. In 2000, Congressional hearings and the media revealed hundreds of needless deaths and injuries caused by the Firestone/Ford Explorer defective tire fiasco. Again, in 2009, families were put at unacceptable risk due to the Toyota sudden acceleration problem. Only a few years ago, the public learned about the cover-ups and deception by General Motors (GM) which knowingly used faulty ignition switches that have been linked to at least 169 deaths,²³ and many more injuries. Furthermore, the defective air bags manufactured by Takata have resulted in millions of vehicle recalls and has caused far too many deaths and injuries.²⁴ Extending criminal penalty authority, beyond instances involving safety defects to cases in which an individual acquires actual knowledge of a *critical danger* involving a vehicle that could lead to serious injury or death and fails to inform NHTSA and warn the public can serve as an effective deterrent to preventing

²² Mark Gomez, Report: Tesla battery reignited days after fiery crash in Mountain View, Mercury News (May 11, 2018).

²³ Associated Press, *GM ignition switch fund pays out \$594.5 million*, Dec. 20, 2015.

²⁴ Associated Press, *Honda reports 10th U.S. death from Takata air bags*, Apr. 6, 2016.

these tragedies in the future. This authority is given to other federal agencies such as the Consumer Product Safety Commission, Food and Drug Administration and the Securities and Exchange Commission.

7. Under current federal law (49 USC 30113) manufacturers may apply to the U.S. Department of Transportation for an unlimited number of exemptions from the Federal Motor Vehicle Safety Standards (FMVSS). For each exemption granted, manufacturers can sell up to 2,500 exempt vehicles in a 12-month period.

a. In order to facilitate the development of autonomous vehicles, is it necessary to drastically expand the current number of exemptions from the Federal Motor Vehicle Safety Standards a manufacturer may receive from the U.S. Department of Transportation?

Broadening statutory exemptions from the FMVSS is unwise, unnecessary and unsafe. Federal safety standards have been established using thorough objective research, scientific studies and data. They also are 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 necessitates larger volumes of exemptions from federal safety standards which are essential to public safety. In fact, NHTSA released a statement on March 17, 2020 which admitted that the safety potential of automated driving systems is “unsubstantiated and the impacts unknown,” even as it announced it were moving forward with a dangerous proposal to facilitate the deployment of driverless technologies while failing to first determine if these vehicles can safely operate on our Nation’s roads. This action by the Agency is mistaken and misguided.

In addition, allowing exemptions for vehicles being sold under Section 24404 of the Fixing America’s Surface Transportation (FAST) Act (Pub. L. 114-94) excludes test vehicles from having to comply with federal safety standards as long as they are not sold to the public. As a result of this law passed in 2015, manufacturers may test an unlimited number of AVs that do not comply with federal standards as long as they are not sold to the public. For vehicles for sale, current law permits manufacturers to apply for an unlimited number of exemptions from FMVSS. For each exemption granted manufacturers can sell up to 2,500 exempt vehicles. There is absolutely no need to weaken current law and Advocates strongly opposes doing so.

b. What problems could doing so present?

Drastically expanding the exemption process and resultant huge numbers of exempt vehicles permitted on the road (potentially millions) de facto turns everyone -- in and around exempted vehicles -- into unknowing and unwilling human subjects in a risky experiment. Moreover, allowing a massive influx of new vehicles exempt from FMVSS will have serious, costly and potentially deadly ramifications (both those that can be predicted or some that cause unintended consequences).

8. The U.S. Department of Transportation has issued several rulemakings involving passenger motor vehicle safety technologies that have greatly benefited public safety.

a. Is the U.S. Department of Transportation responsible for and capable of completing safety rulemakings in a timely manner when given a deadline by Congress?

The U.S. DOT is certainly capable of completing safety rulemakings in a timely manner when given a reasonable deadline and sufficient resources by Congress. Here are several examples that led to lifesaving technology available as standard equipment:

- In 2008, Congress passed bi-partisan legislation, the Cameron Gulbransen Kids Transportation Safety Act (Pub.L.110-189) sponsored by Chairman Jan Schakowsky, that directed U.S. DOT to issue a rule by 2011 on rearward visibility that resulted in the requirement of rearview cameras in all new passenger motor vehicles beginning May 2018. The following year, in 2009, U.S. DOT issued an Advanced Notice Proposed Rulemaking and a Notice of Proposed Rulemaking (NPRM) in 2010 followed by a public meeting in 2011. The final rule was issued in 2014.
- The rulemaking involving electronic stability control (ESC) that can prevent vehicles from rolling over and has saved thousands of lives every year and prevented crashes was completed expeditiously. Congress included the mandate to issue the rule as part of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005. The following year the U.S. DOT issued an NPRM and a final rule in 2007.
- In 2010, U.S. DOT issued a NPRM to require safety belts on all new intercity motorcoaches. In 2012, Congress included a mandate to require the lifesaving equipment as part of the Moving Ahead for Progress in the 21st Century (MAP-21) Act (Pub. L. 112-141). Shortly thereafter, in 2013, the final rule was issued by U.S. DOT.

However, especially as vehicles become increasingly complex, it is critical that NHTSA be given additional funding and resources. Even without the upcoming enormous challenges AV development and deployment will create, the Agency is chronically underfunded and understaffed; NHTSA's Operations & Research (O&R) budget, for research, development and enforcement of vehicle safety standards, is meager (only about \$350 million annually in the past two years). 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.

NHTSA's current budget pales in comparison to the funding provided to the Federal Aviation Administration (FAA). For example, in 2020, NHTSA's total budget was \$989 million²⁵ while the FAA received over \$17 billion.²⁶ However, the agencies' responsibilities of protecting

²⁵ Excluding monies transferred from the Federal Highway Administration.

²⁶ <https://www.transportation.gov/sites/dot.gov/files/2020-02/BudgetHighlightFeb2021.pdf>

travelers are similar and transportation on our Nation's roads far exceeds air travel. According to the U.S. DOT, there were 777.9 million passengers in 2018 on domestic flights²⁷ and 2.79 million passengers flew in and out of U.S. airports every day.²⁸ This pales in comparison to the more than 300 billion trips taken on our roads each year, amounting to nearly a billion passenger trips every day.²⁹ More people take car trips every day than fly in a year. This is not at all surprising since over 272 million motor vehicles are registered in the U.S., compared to 219,000 aircraft in 2017.³⁰ Lastly, the comparative fatality rate for the two modes of travel are startling with over 37,000 people killed on our Nation's roads in 2017, compared to 347 in air travel (latest date available).³¹ As the FAA notes in its FY21 budget request, "With the growth in commercial space, the development of autonomous and unmanned aircraft systems (UAS), the development of vertical-takeoff urban air mobility aircraft, and the possibility of the return of supersonic flight, aviation in the United States is facing fundamental change. It is a new era in aviation, and the Budget request gives FAA the resources it needs to keep pace with this innovation."³² NHTSA is facing similar challenges with the development of autonomous vehicles, yet the agency remains chronically underfunded.

b. Why is it important for Congress to direct the U.S. Department of Transportation to issue safety rules by a date certain?

Unfortunately, without Congress providing a deadline for issuance of safety rules, U.S. DOT can and will delay lifesaving actions resulting in lives needlessly lost. Historically, rulemakings initiated by the agency which are not subject to Congressional mandate have languished or been ignored at U.S. DOT for years. For example, consumer groups began petitioning NHTSA in the 1980s for a safety standard to help prevent vehicles from rolling over. Yet, it was not until Congress required U.S. DOT to issue a safety standard in 2005, as part of Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, Pub. L. 109-59), that the Department finally acted. This unnecessary delay and inaction by U.S. DOT resulted in numerous preventable deaths during this extended time period. In addition, NHTSA granted a petition for rulemaking filed by several safety groups in 2011 to require speed limiting technology on commercial motor vehicles. The Agency has yet to finalize the regulation nearly a decade after granting the petition. The general public has little power and limited resources to compel U.S. DOT to move forward no matter how unconscionable the delay and urgent the need. However, with a Congressional mandate the Agency is legally bound to act and the public may seek redress in a court of law, as was the case with the rule requiring rearview cameras in all passenger motor vehicles. Cameron Gulbransen's father, Dr. Greg Gulbransen, along with other interested parties were able to file a suit in federal court seeking to compel the issuance of the rule after U.S. DOT failed to meet the deadline set by Congress. During the course of the litigation, U.S. DOT finally abided by the Congressional mandate and issued the lifesaving

²⁷ <https://www.bts.dot.gov/newsroom/2018-traffic-data-us-airlines-and-foreign-airlines-us-flights>

²⁸ https://www.faa.gov/air_traffic/by_the_numbers/

²⁹ <https://nhts.ornl.gov/person-trips>

³⁰ <https://www.bts.gov/content/number-us-aircraft-vehicles-vessels-and-other-conveyances>

³¹ <https://www.bts.gov/content/transportation-fatalities-mode>

³² <https://www.transportation.gov/sites/dot.gov/files/2020-02/FY%202021%20FAA%20President%27s%20Budget.pdf>

regulation after the final rule was held at the Office of Information and Regulatory Affairs (OIRA) for an extended period of time.

The realistic deadline for the development and deployment of AVs, as validated by industry leaders and experts, allows sufficient time for DOT to act and issue needed safety standards. A Congressional mandate will guarantee Agency action in a timely fashion and guarantee public protections before vehicles are put in the marketplace.

9. Many in the industry frequently cite that AVs will be safer than human drivers. What evidence have AV manufacturers provided to support this claim?

By NHTSA's own admission in the statement released on March 17, 2020, the safety potential of automated driving systems is "unsubstantiated and the impacts unknown." Stuningly, this acknowledgement was included as agency leaders announced they were moving forward with a dangerous and unnecessary proposal to facilitate the deployment of driverless technologies while failing to first determine if these vehicles can safely operate on our Nation's roads.

In 2018, the year that the Uber test vehicle was involved in the fatal crash in Tempe, Arizona, the fatality rate in America was 1.13 per 100 million vehicle-miles traveled for human driven vehicles. That equals one fatality every 88.5 million miles. Therefore, at the time of the fatal crash, the Uber AV fatality rate of 1 in 3 million miles was 29 times the average fatality rate for the same year for human driven vehicles. Undoubtedly, automated vehicle technology will not prevent every crash and will not be infallible. While we are endeavoring to improve safety, we must not replace human driver error with human coding errors – mistakes that could have widespread unintended consequences.

Moreover, companies themselves have not put forth any meaningful evidence, data or research proving the safety of the AVs they are developing. Notably, while there are over 80 companies testing AVs, less than 20 have submitted safety self-assessments voluntarily solicited by NHTSA. And, the ones that have been submitted amount to little more than glossy marketing brochures that fail to contain the necessary data elements and documentation to verify they will be safe and reliable.

Furthermore, it is important to reiterate that numerous industry leaders and technical experts have stated that the technology is not ready now and may not be ready for years ahead. In June of 2019, Gill Pratt, Director of the Toyota Research Institute said, "None of us have any idea when full self-driving will happen."³³ Bryan Salesky, CEO of Argo AI, said in July of 2019, "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."³⁴ John Krafcik, CEO of Waymo, said in late 2018, "This is a very long

³³ Lawrence Ulrich, Driverless Still a Long Way From Humanless, N.Y. Times (Jun. 20, 2019).

³⁴ Level 5 possible but "way in the future", says VW-Ford AV boss, Motoring (Jun. 29, 2019).

journey. It's a very challenging technology and we're going to take our time. Truly every step matters."³⁵

AVs are being developed and tested on public roads now without sufficient safeguards to protect both those inside the AVs and those outside of the AVs sharing the roadways with them, and without express consent. An unfounded and artificial rush to pass federal legislation, fueled by the economic interests of AV manufacturers to accelerate market sales 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. At least nine serious crashes resulting in far too many fatalities involving vehicles equipped with autonomous technology have already occurred.

Several of these crashes are the subject of NTSB investigations that have revealed serious shortcomings with the current state of this technology. These include: the misidentification of other vehicles, common roadway infrastructure and pedestrians crossing into the vehicle's course of travel; the failure to properly monitor driver engagement; and, the operation of AVs outside of the intended geographic area or operational design domain (ODD).

These known problems must be addressed by NHTSA and the industry before the widespread deployment of AVs to help prevent any further needless tragedies. It is also possible that AVs could have negative consequences that both directly and indirectly impact safety. For instance, AVs may bring about so-called "hyper-commuters" who work from their vehicles on long commutes to enable living further from offices and/or city centers. They may also tempt parents or caregivers to inappropriately use an AV as a means of transportation for a child traveling without an adult, which should be prohibited.

Likewise, the possibility of empty AVs adding substantial miles on the roads as they re-position autonomously after dropping off riders could undermine many of the benefits claimed. Significant consideration must be given to how AV driving could change wear patterns on roadways. The lower variance of an AV's position within a lane could lead to accelerated wear in lanes, and condensed convoys of automated trucks, commonly known as platooning, could place further strain on roads and bridges. Additionally, AVs could divert ridership from public transit, one of the safest forms of transportation. In fact, it was concluded by the American Public Transit Association that transit trips are 10 times safer per mile than car trips and "a person can reduce his or her chance of being in an accident by more than 90 percent simply by taking public transit opposed to commuting by car."³⁶

The Honorable Bobby Rush (D-IL)

- 1. Ms. Chase, as you know, NHTSA does not currently test Advanced Driving Assistance Systems with targets that represent people of different genders, races, and ethnicities or targets that represent people with disabilities with the reason being that it is too expensive to do this. Recent studies from the Georgia Institute of**

³⁵ WSJ Tech D.Live Conference (Nov. 13, 2018).

³⁶ American Public Transit Association (APTA), News-Publications, Public Transportation Facts.

Technology, however, have suggested that autonomous vehicles have more difficulty detecting pedestrians with darker skin tones than those with lighter skin tones. Do you think NHTSA should be required to test all driving assistance technology with targets that resemble the diversity of users and pedestrians on our streets? Please explain why.

Yes, NHTSA should be required to test all driving assistance technology for a diversity of users and pedestrians on our streets. This is precisely the reason that Advocates strongly supports legislation that includes regulatory mandates requiring DOT to set minimum performance requirements. Driverless cars must be able to pass a “vision test” to guarantee an AV will properly detect and respond to all other vehicles, pedestrians, bicyclists, wheelchair users, children, animals, interactions with law enforcement and first responders, roadway infrastructure and other objects in the operating environment in all conditions. A failure to properly detect and react to any of these road users or conditions could have tragic results, as demonstrated by the March 2018 crash in Tempe, Arizona that killed a pedestrian walking with 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 misinterpret it as a 45-mile-per-hour speed limit sign. Instead of stopping at an intersection, a self-driving vehicle could, in fact, be accelerating. Again, this endorses the need for enhanced NHTSA resources and adoption of a minimum performance standard for an AV’s “vision” and response.

According to a study conducted by the Georgia Institute of Technology, vision systems were trained largely on a population of Caucasians and may have trouble identifying pedestrians and other vulnerable road users with darker skin tones.³⁷ NHTSA and AV developers must conduct testing to address this critical safety issue and the Agency must issue a minimum performance requirement that addresses this concern. Furthermore, NHTSA must also establish consistent testing protocols to ensure these systems can detect bicyclists. The European, Australian, Japan and ASEAN NCAP programs conduct this testing.

This is yet another example of a critical safety issue where NHTSA is once again falling behind instead of leading. Every person of every ethnicity, age and stature, including those with disabilities, as well as mode of travel must be safe when self-driving vehicles are operating in urban, suburban and rural areas of the country.

2. Ms. Chase, what role does NHTSA’s lack of appointed leadership play in the amount of time it takes to issue necessary safety regulations?

The U.S. Department of Transportation (U.S. DOT) is certainly capable of completing safety rulemakings in a timely manner when given a reasonable deadline by Congress. Unfortunately, without Congress providing a deadline for issuance of safety rules, U.S. DOT can and will delay lifesaving actions resulting in lives needlessly lost. Rulemakings initiated by the agency which are not subject to Congressional mandate have languished at U.S. DOT for years. For example,

³⁷ B. Wilson, J. Hoffman, J. Morgenstern, Predictive Inequity in Object Detection, Georgia Institute of Technology (Feb. 2019).

NHTSA granted a petition for rulemaking filed by Advocates and other safety groups in 2015 to require automatic emergency braking (AEB) on commercial motor vehicles. The Agency has yet to finalize the regulation five years after granting the petition. For this reason, Advocates and other safety groups have endorsed legislation requiring a final rule be issued on AEB for both passenger and commercial motor vehicles including the Protecting Roadside First Responders Act (S. 2700/H.R. 4871) and the Safe Roads Act (H.R. 3773).

Without a date certain issuance requirement, the public has little power and limited recourse to require U.S. DOT to move forward no matter how unconscionable the delay or urgent the need. However, with a Congressional mandate the public may seek redress in a court of law as was the case with the rule requiring rearview cameras in all passenger motor vehicles. Cameron Gulbransen's father, Dr. Greg Gulbransen, along with other interested parties were able to file a suit in federal court seeking to compel the issuance of the rule after U.S. DOT failed to meet the deadline set by Congress. During the course of the litigation, U.S. DOT finally abided by the Congressional mandate and issued the lifesaving regulation after it was held up at the Office of Information and Regulatory Affairs (OIRA) for an extended period of time.

Ensuring NHTSA has adequate resources, funds, staff and enforcement authority is also 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 two years). 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.

The Honorable Lisa Blunt Rochester (D-DE)

1. Crashworthiness standards may affect people differently, including people with disabilities.

a. Can you please describe some of the crashworthiness and safety issues that may impact the disability community?

According to the Centers for Disease Control and Prevention (CDC), in 2016, 25 percent of adults in the U.S. (61 million Americans) have a disability. While we are hopeful that AVs may bring about increased access to mobility for individuals with disabilities, it is imperative that AVs are both accessible to everyone and safe for everyone. If an AV transporting a disabled person is in a crash, sufficient crashworthiness and occupant protection standards must in place to prevent the people inside from dangerous or even deadly outcomes. Additionally, simply equipping a traditional vehicle with an automated driving system will do little to improve mobility access for certain segments of the disability community. For example, accommodations for people who are blind will be different than for those who use wheelchairs. Additionally,

exemptions from FMVSS may jeopardize safety for all occupants, particularly those with disabilities. As the interior seating configurations of AVs may be redesigned, it will be essential that these vehicles are designed to accommodate individuals with disabilities. For example, AVs should allow for the easy loading and unloading as well as securement of wheelchairs.

The diverse needs of the disability community also must be taken into account for systems that require human engagement as well as when developing a system that allows the occupants of a driverless car to have the ability to assume control or shut the system down and get to a safe location when the AV malfunctions. 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 physical abilities.

As novel seating configurations such as rear facing front seats are implemented in AVs, crashworthiness standards must be established for these modifications and must take into account the needs of all people especially all people with disabilities, including wheelchair users. This is but one, very large and all encompassing, example of how the needs of the disability community can be left behind. Considering the needs of the disability community from the beginning of a design is the best way to ensure that all individuals are provided safety benefits, whether that is in crashworthiness, crash avoidance, infrastructure design, or other aspects of transportation. These issues need to be resolved now, as they will be costly and time consuming to fix in the future.

b. Should our crashworthiness standards give specific consideration to people with disabilities, including those in wheelchairs?

NHTSA does not conduct crash testing specifically for passengers with disabilities as part of the FMVSS. However, crashworthiness standards for AVs definitely should give specific consideration to people with disabilities. Current federal occupant protection standards are likely to be modified and it is critical to ensure that an AV provides sufficient protection to all of its occupants in a crash, particularly those with disabilities. Therefore, it is paramount that during the design and development of AVs, the needs of people with sensory, cognitive and physical disabilities, including wheelchair users, and people with neurological conditions are given serious consideration to make certain this new technology will increase their mobility and do so safely.

c. Since we are still testing and developing self-driving cars, what can we do to ensure that the federal government properly considers the disability community?

It is necessary that federal law ensures AVs are accessible and safe to meet the needs of all people, especially those with sensory, cognitive, and physical disabilities, including wheelchair users, and people with neurological conditions, during their design and development. This will be critically important for those vehicles that will serve as an alternative mode of public transportation.

Research and testing of AVs to ensure fully accessible human machine interface (HMI) systems, ramps, and wheelchair securement should be completed expeditiously, and people with expertise in universal design should be consulted to ensure accessibility and usability.

Additionally, problems with transportation network companies (TNCs) not providing enough accessible traditional vehicles raise a flag about whether this pattern will perpetuate with their deployment of AVs. Therefore, TNCs should be required to have a certain percentage of safe, accessible AVs if used as public transportation.

The U.S. DOT needs additional resources to effectively oversee the development of safe, accessible AVs and standards, including vehicle safety and crashworthiness standards. The U.S. DOT should hire adequate full time and specialized employees to develop accessible vehicle standards and conduct necessary testing.

2. We ought to make sure these cars are usable for every passenger, regardless of auditory, visual, or other impairments. This necessity is perhaps most obvious when the car is communicating emergencies to its passenger, such as evacuation notices and other critical warnings.

a. Do you believe enough attention has been paid to addressing these concerns?

Based on public information there certainly has not been enough attention paid to this critical issue. The latest Notice of Proposed Rulemaking regarding revisions to the FMVSS to accommodate the deployment of AVs fails to address this issue. Unless the needs of the disability community are considered throughout the development of AVs, the benefits assured by industry and others to this segment of the population may never be realized. This includes the ability to hail a ride, gain access to the vehicle, interact with the AV system when it is operating properly (such as entering a destination), be alerted in emergency situations and assisted when necessary to ensure safety (not stranded when a tire fails, the operating conditions change, or after a collision), and be safe when riding in or sharing the road with the AV. In addition, manual override equipment that allows a human passenger to take control of an AV when it malfunctions must be accessible to all occupants and designed to accommodate all individuals including those with disabilities.

b. What can Congress do to ensure these concerns are addressed?

Autonomous driving technology has the potential to increase access and mobility for individuals with disabilities who have varying needs. However, NHTSA has been largely silent in addressing the needs of people with disabilities to access AVs despite years of laudatory pronouncements about the potential of the technology, the release of four versions of voluntary industry guidelines and an announcement on March 17, 2020 revealing proposals to weaken and waive current safety standards to accommodate the introduction of AVs. To guarantee the concerns of members of the disability community are met, it will require Congress to direct the Agency to ensure that issues are addressed and access is available.

Not all members of the disability community will have the same 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 ensured for all types of common and public use AVs.

Allowing AVs to be exempt from safety standards is dangerous for all road users but could pose even more serious problems for people with 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.

The diverse needs of the disability community must be taken into account for systems that require human engagement as well as when developing a system that allows the occupants of a driverless car to have the ability to assume control or shut the system down and get to a safe location when the AV malfunctions. 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 physical, cognitive or neurological abilities.

In addition, NHTSA should collect crash data specific to passengers with disabilities and pedestrians with disabilities to identify needed vehicle and infrastructure improvements and ensure safety. An example of how this data is particularly relevant is U.S. DOT's issuance of certain exemptions for Nuro autonomous delivery vehicles in February 2020. This application for exemption, which includes the windshield, rearward visibility and mirrors, raises safety implications for all pedestrians including people with disabilities. Nuro is already testing in multiple locations and is now advancing toward deployment. Of concern is the fact that Nuro has not provided evidence that the autonomous delivery vehicles will be able to properly identify and respond to pedestrians with disabilities or if pedestrians with certain disabilities will be able to identify and respond to them.

The Honorable Tom O'Halleran (D-AZ)

- 1. Tragically, in 2018, a self-driving vehicle killed a pedestrian in Tempe, Arizona. The National Transportation Safety Board found that, at the time, the vehicle did not have the necessary mechanisms in place to maintain the driver's engagement.**

Ms. Chase, over 1000 self-driving cars are being tested in the U.S. today, including some in my district. What lessons has the industry learned from this crash?

The lack of industry accountability coupled with NHTSA's complacent approach to overseeing the development and deployment of AVs and ensuring public safety are major concerns for Advocates, other consumer groups, law enforcement, local governments that allow these vehicles on their streets and roads and, most importantly, the general public. In fact, Advocates commissioned an opinion poll by ENGINE INSIGHTS in January 2020 which revealed 85 percent of the public is deeply concerned about sharing the road with AVs. The poll also found

that 68 percent of those surveyed would feel more comfortable with AVs if the federal government issued safety standards for them. This result is unsurprising considering past fatal mistakes and mishaps of self-driving technologies and an alarming lack of transparency by AV manufacturers currently testing on public roads. It is therefore incumbent upon Congress to enact comprehensive legislation that does not allow industry to introduce AVs into the marketplace that fail to meet minimum safety standards that encompass these new technologies. Basic and essential consumer information must also be required. And, NHTSA must be provided with sufficient enforcement authorities to ensure industry responsibility and honesty.

Companies rushing new technology into the marketplace and a laissez faire government regulator led to the tragic and preventable deaths of 346 people in two crashes involving the Boeing MAX. There is a unique opportunity to avoid similar mistakes in the introduction of self-driving technology on our streets and highways, and Congress must play a crucial role in determining whether DOT is protecting private investment over protecting the public.

Several serious crashes involving cars equipped with autonomous technology have already occurred, many of which have been subject to investigation by the NTSB. These investigations have, and will continue to identify safety deficiencies, determine contributing causes, and recommend government and industry actions to prevent future deadly incidents. Advocates urges Congress to heed critical information from our Nation's preeminent crash investigators. Findings from all these investigations should be released and incorporated as applicable into any proposed legislation. The findings are essential to developing sound and safe public policies. As stated by NTSB Chairman Robert Sumwalt during a November 19, 2019, meeting, "our entire purpose for being here is to learn from tragic events like this so that they can be prevented in the future... This investigation has the ability to have far reaching implications down the road."³⁸

During this meeting, the NTSB considered 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. Among the key issues the NTSB identified was the glaring need for sensible safeguards, protocols and regulations for AVs which are not yet being sold but are being tested on public roads. Basic safeguards are urgently needed as the NTSB also emphasized that a dearth of a safety culture at Uber contributed to this tragic outcome. Although Uber may have taken some responsive actions following the Arizona crash, it is unclear whether they are sufficient to prevent another fatal crash. Additionally, there is absolutely no assurance about the adequacy of the safety culture of numerous other companies developing and testing AVs on public roads. Some relevant and compelling quotes from the NTSB hearing buttress the views of consumer and safety groups:

The lessons of this crash do not only apply to Uber ATG [Advanced Technologies Group] and they're not limited to just simply something went wrong and now it's fixed. Rather, it's something went wrong and something else might go wrong unless its prevented... This crash was not only about Uber ATG test drive in Arizona, this crash was about testing the development of automated driving systems on public roads. Its

³⁸ NTSB Board Meeting: Collision Between Vehicle Controlled by Developmental Automated Driving System and Pedestrian (Nov. 19, 2019).

lessons should be studied by any company testing in any state. If your company tests automated driving systems on public roads, this crash, it was about you. If you use roads where automated driving systems are being tested, this crash, it was about you. And if your work touches on automated driving systems at the federal or state level, guess what, this crash, it was about you.

- NTSB Chairman Robert Sumwalt³⁹

NHTSA's mission is to save lives, first and foremost, to prevent injuries and to reduce economic costs due to road traffic crashes through education, research, safety standards, which we are lacking here, and enforcement activity but first and foremost it's to save lives...In my opinion, they have put technology advancement here before saving lives.

- NTSB Board Member Jennifer Homendy⁴⁰

Moreover, this void may be contributing to the public's skepticism and skittishness about AVs. Numerous public opinion polls show a high skepticism and fear about the technology, and for good reason. For example, according to a January 2020 public opinion poll conducted by ENGINE INSIGHTS, an overwhelming majority of respondents expressed concern about their safety when sharing the road with driverless vehicles as a motorist, bicyclist and pedestrian.⁴¹ In addition, an April 2019 Reuters/Ipsos opinion poll found that 64 percent of Americans said they would not buy a self-driving car.⁴² Further, 71 percent of U.S. drivers surveyed by the American Automobile Association (AAA) in March of 2019 would be afraid to ride in a fully self-driving vehicle.⁴³ As Congress moves forward with legislation addressing the development and deployment of driverless cars, these critical findings about public attitudes should be informative, illuminating and instructive, and most certainly not ignored.

Nonetheless, the similar circumstances involving several of the fatal crashes involving AVs seem to indicate that industry, or at least segments of it, has not learned enough from these preventable tragedies. In fact, the NTSB concluded during its investigation of the crash involving an Uber test vehicle in Tempe, Arizona in March of 2018 that struck and killed a pedestrian that the company's inadequate safety culture contributed to the tragedy.

Sensible safeguards put in place by Congress for the testing of AVs are essential to protecting public safety. Such measures include to:

- 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 must be in place until the vehicle and testing procedures can be evaluated by NHTSA and corrective measures have been taken by the manufacturer.
- Require any entity that is testing or evaluating an AV to agree to provide to the Secretary any and all documentation provided to state authorities.

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ ENGINE'S CARAVAN Survey Public Opinion Poll (Jan. 2020).

⁴² Americans still don't trust self-driving cars, Reuters/Ipsos poll finds, April 2019.

⁴³ AAA Annual Automated Vehicle Survey, March 2019.

- 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.
- Significantly restrict the expansion of those entities eligible to test, evaluate or demonstrate the motor vehicles by providing clear and precise criteria on eligibility.
- Provide NHTSA with imminent hazard authority to take immediate action when the Agency determines a defect substantially increases the likelihood of death and injury.
- Remove the current cap on civil penalties.⁴⁴
- 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.

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, reading, watching a movie), that delay will be longer because the driver must first be effectively alerted to re-engage, understand and process the situation, and then take control of the vehicle before taking appropriate action. Dr. Mica Endsley, former Chief Scientist of the U.S. Air Force and an expert on situation awareness, decision-making and automation, has remarked, “Automation actually causes drivers to lose the situation awareness that is required for safe driving and taking over control when needed.”⁴⁵ Additionally, 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*, “Drivers 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.”⁴⁶

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 as well as the fatal crash in Mountain View, California in 2018. 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.” In order to address this critical safety issue, NHTSA must issue a federal safety standard that ensures a driver remains engaged and ready to assume the driving task when traveling in a vehicle equipped with an autonomous driving system that requires a human operator to assume the driving task at any point during operation of the vehicle.

⁴⁴ 49 USC 30165(a).

⁴⁵ Statement of Dr. Mica Endsley, Press Conference: Safety, Consumer, Law Enforcement & Bicyclist Leaders, and Experts in Tech & Automation Urge Congress to Fix Major Shortcomings with Driverless Car Legislation and Not to Attach it to the FAA Bill (Jul. 2018).

⁴⁶ 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).

The Honorable Tony Cardenas (D-CA)

- 1. Ms. Chase, in regard to the incident of March 2018, the NTSB found that a human driver would have been able to identify Ms. Herzberg nearly six seconds prior to the collision, enough time to take evasive action and avoid the collision. In your testimony, you advocate for the creation of a “vision test,” a safety standard ensuring that AVs can detect and respond to objects at a level superior to humans. Please explain why such a safety standard is important and how it could help protect pedestrian, bicyclists, and other vulnerable road users?**

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 in all conditions. When a person applies for a driver’s license, s/he must pass a vision test. With AVs taking over the ability of “seeing” from a human driver, a minimum performance standard is essential to ensure the AV will function as expected and needed. A failure to properly detect and react to any of these road users or conditions could have tragic results, as demonstrated by the March 2018 crash in Tempe, Arizona that killed a pedestrian walking with 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.⁴⁷ According to a recent study by Dr. M.L. Cummings of Duke University, “Self-driving systems, even with their multiple sensors and software advancements, still cannot reliably work in rain and snow conditions (Zang et al. 2019), during time of low sun angles (Dowling 2019), and often where lines on the road are either non-existent or with faded paint (Sage 2016).”⁴⁸

In summary, AVs should be able to operate on all roads, in all weather conditions, with all built environment scenarios and with all other modes of transportation and road users. This can only be accomplished if Congress mandates that NHTSA require AV manufacturers to comply with a “vision test” for AVs, among other needed safety standards.

⁴⁷ Ivan Evtimov, Kevin Eykholt, Earlece 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.

⁴⁸ Cummings, M.L, "Rethinking the maturity of artificial intelligence in safety-critical settings," AI Magazine, in review.