



July 29, 2019

Docket Management Facility
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Room W12-140
Washington, DC 20590

Re: Docket Number NHTSA-2019-0036

Dear Docket Officer:

Thank you for allowing the National Safety Council (NSC) the opportunity to provide comments on identifying potential changes to the existing Federal Motor Vehicle Safety Standards (FMVSS) to the testing, compliance certification and compliance verification of motor vehicles with Automated Driving Systems (ADS) and certain unconventional designs.

NSC is a 100-year-old nonprofit committed to eliminating preventable deaths in our lifetime by focusing on injuries in workplaces, in homes and communities, and on the road. Our more than 15,000 member companies represent employees at more than 50,000 U.S. worksites. We also educate more than one million drivers each year in defensive driving.

Changes to FMVSS should not degrade crash avoidance, crashworthiness and post-crash protections and survivability.

Even as new level 2 safety features are developed and implemented, the national fleet will be slow to turn over, and it may be decades before the majority of vehicles on the road will have ADS level 2, 3 or 4 on board. During the development and rollout period for more advanced technologies, tens of millions of vehicles will lack many of the promised capabilities of higher-level automated cars. Additionally, the selling of vehicles without full ADS capabilities will likely continue for many years. Without the adoption of new, more advanced occupant protection standards, we do not see any merit in wholesale changes to the existing post-crash protections established in the FMVSS. In the near term, critical life-saving features in crashes will continue to be seat belts, air bags, and energy absorbing design and materials not related to the SAE level at which a vehicle operates. These important safety systems may need to be adjusted, but they should not be removed from vehicles, especially as all experts predict a mixed fleet of vehicles for decades to come.

NHTSA should examine the impact of FMVSS in saving lives on our roadways, in order to prioritize inclusion of those technologies in advanced vehicles and consider additional requirements in newer vehicles that have the greatest life-saving potential. For example, we know seat belts have saved tens of thousands of lives, but Americans do not buckle up at the same rate in the back seats as they do in front seats. Rear seat belt reminders have been required in cars sold in Europe. EU countries buckle up at a higher rate than the U.S. and their fatality rates are consistently lower compared to ours. We could reduce fatalities involving



unbelted passengers if rear seat belt reminders were installed in all cars sold in the U.S. NHTSA has pending rulemaking regarding this technology.

Like NHTSA, NSC believes advanced vehicle technology, up to and including fully automated vehicles, can reduce roadway fatalities and injuries, improve mobility for underserved populations and provide additional benefits to society. We are particularly supportive of policy efforts that encourage the inclusion and adoption of vehicle automation as we believe these technologies will be vital to improving safety on our nation's roads.

Unintentional injuries have recently become the third leading cause of death for Americans.¹ Motor vehicle crashes remain the leading cause of unintentional death for people 1 to 24 years of age and are a leading killer in all age groups.² Driver behavior, specifically distracted driving, is one contributor to motor vehicle crashes and has proven to be the hardest problem to solve. A study performed by David Strayer of the University of Utah, concluded driver distraction from secondary in-vehicle activities is increasingly recognized as a significant source of injuries and fatalities on our roadways.³ If we are to eliminate preventable deaths in our lifetime, we must realize massive, near-term gains in roadway safety. NSC believes that as more crash prevention safety systems are introduced into the fleet, more lives will be saved.

However, as innovative technology enters the marketplace, we should not rush to remove federal motor vehicle safety standards (FMVSS), especially occupant protections, from vehicles. NHTSA should use existing authority to allow for exemptions, but only when there is transparency around the allowed exemptions, including their purpose and the operational design domain (ODD) in which these vehicles will operate.

Already, there is great confusion among the American public around the ability or inability of these advanced systems to operate effectively. This confusion leads to increasing concern about the safety of the vehicles. Driver requirements to take over systems operation in levels 2, 3 and 4 are particularly problematic. Communicating the appropriate operation of these systems may prove difficult without consistent education. Marketing is not education. With greater system complexity, greater knowledge and understanding of the system is required. NSC strongly recommends a robust and widely-accessible consumer education and training effort around level 2, 3 and 4 vehicles.

NSC also urges NHTSA to provide education throughout the life of vehicles, as software and hardware updates in turn modify the operational parameters for vehicle systems. NSC created the nation's premier research-based vehicle automation education program – [MyCarDoesWhat](#) and is a founding member and manager of [PAVE](#) – Partners for Automated Vehicle Education.

¹ <http://www.nsc.org/Connect/NSCNewsReleases/Lists/Posts/Post.aspx?ID=263>

² Injury Facts 2017

³ Strayer, D. L., Turrill, J., Cooper, J. M., Coleman, J. R., Medeiros-Ward, N., & Biondi, F. (2015). Assessing Cognitive Distraction in the Automobile. *Human Factors*, 57(8), 1300–1324. <https://doi.org/10.1177/0018720815575149>



The need for education and training arises from a lack of knowledge or confusion because:

- Many of today's drivers did not learn to drive on vehicles equipped with ADAS features (automation levels 1, 2 or 3), and thus have no background in how to interface with or properly operate them.
- ADAS safety features have different generic names and brand names that vary among manufacturers. These names may contain phrases that give the impression that systems have more capabilities than they truly do, potentially resulting in driver over-reliance. NHTSA should consider standardizing generic nomenclature and/or taxonomy. For instance, depending on the manufacturer, Automatic Emergency Braking is also referred to as forward collision mitigation, front crash protection or auto-braking, among others.
- Warning and icon standardization issues persist, resulting in confusion for the driver.
- Not all systems clearly indicate if safety features have been disabled.
- Safety features have different operational parameters and limitations across manufacturers, potentially even within the same manufacturer's varying models or trim levels.
- Safety features may change over time – as software is updated, for example – and drivers need to be properly educated on how these changes affect the operation of their vehicle.
- Safety feature operational parameters and limitations may not be intuitive or obvious, particularly if drivers use different vehicles.
- Operational Design Domain or Object Detection and Response Characteristics are not explicitly and succinctly communicated to the driver, so they can be aware of limitations, shortcomings or differences in systems.

We appreciate the difficult task of ensuring a safe roadway system as we move into the future. For the foreseeable future, tens of millions of vehicles will be sold to the American public that are not levels 3, 4 or 5. How the public experiences the introduction and safe operation of higher levels of automation in vehicles will directly impact safety on the roads, the rate of adoption of these technologies and how rapidly the vehicle fleet turns over to more advanced levels of automation. A strong federal presence in preserving safety protections will go a long way to help speed adoption.

10 a. Are there any barriers in the FMVSS or NHTSA's test procedures that could be addressed by altering or removing references to manual controls in the test procedures without substantively changing the FMVSS performance requirement?

NHTSA's self-stated focus in seeking these comments is on the narrow question of how to amend the FMVSS to safely permit Automated driving System-Dedicated Vehicles (ADS-DVs) without traditional manual controls. NSC believes that attempting to answer this question is premature at this time. The more fundamental question which NHTSA should be consider is: what new FMVSS standards are required to ensure that the ADS-DV "driver or operator" has been programmed and outfitted to ensure full control and a safe trip, for occupants and all other road users, from trip departure to trip arrival in the intended ODD.



Once this basic operational understanding has been developed and demonstrated successfully, NHTSA can consider reducing the need for human control and interaction in these vehicles. Until that time, it would seem that ADS-DV developers and manufactures can meet their testing and limited deployment objectives by applying for exemptions or exceptions to existing FMVSS. During this process, operators must demonstrate to NHTSA an ability to perform safely on a case-by-case basis.

Further, we outline additional issues for NHTSA to study, below:

Infrastructure requirements

There have been various claims among ADS developers about the need for infrastructure upgrades or modifications to improve machine and sensor recognition. However, there is a lack of consensus in defining minimum requirements. Given there will be mixed traffic with all levels of vehicles for the next several decades, NHTSA should coordinate with DOT colleagues on repairing and rebuilding deteriorating infrastructure to at least current standards for the safety of all vehicles on the road.

Dedicated Short Range Communication (DSRC)

Additionally, NSC supports ongoing development of V2V and V2I technologies. NHTSA estimates that just two potential V2V applications (intersection movement assist and left turn assist) could prevent up to 50% of crashes, injuries and fatalities— and this is only a glimpse into the life-saving potential of this new technology.⁴ The additions of interoperable aftermarket devices and future vehicle-to-infrastructure (V2I) devices may greatly enhance the lifesaving potential of this technology as well as achieve greater efficiency in roadway operations by managing traffic around acute events such as crashes, power outages affecting traffic control devices and infrastructure affected by severe weather.

Unlike ADAS sensors on vehicles, such as radar, Lidar and cameras, DSRC has the safety benefit of allowing the vehicle and the driver to discover potential hazards through and around vehicles, buildings and other objects. This capability potentially provides another level of awareness and introduces an important level of redundancy. V2V and eventually V2I enables a “safe system” environment on roadways which we have not experienced before and it is a technology consumers may add as an aftermarket safety device.

We will experience the biggest gains from V2V/V2I and similar technologies as more vehicles include them. The absence of a standard in this area has slowed deployment and resulted in fatalities that could have been prevented. Over half of state DOTs are already incorporating the technology in infrastructure. It is imperative that the federal government take a leadership role in establishing appropriate vehicle and infrastructure standards that have national and international implications.⁵ NSC believes the rulemaking requiring this technology in vehicles should move forward immediately.

⁴ https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/v2v_fact_sheet_101414_v2a.pdf

⁵ <https://news.transportation.org/Documents/spectrum%20letter.pdf>



15. How would NHTSA ensure that the performance of the ADS-DV during testing is consistent with how the vehicle would perform during actual normal use?

Data collection and evaluation is key. Acquiring an understanding of what happens when systems perform as intended or fail, either expectedly or unexpectedly, will yield valuable information for manufacturers—some of whom have common suppliers. Data will help resolve new and unforeseen problems that may arise. Further, in-service data, as well as near miss and post-crash information sharing, can help engineers and planners design better and safer roadways helping safety and health professionals design better interventions to discourage risky driving and modifying the behavior of other roadway users.

Making sound decisions about appropriate technologies will require data about actual ADS operation. NHTSA should establish a database of vehicle technologies and provide objective assessment regarding whether those technologies were involved in or prevented crashes to determine their effectiveness. Those systems that are deemed highly effective should be required on all vehicles or at the very least identified and promoted as part of the five star crashworthiness rating system.

De-identified data sharing has been in existence in the aviation industry for many years and proven highly successful. The Aviation Safety Information Analysis and Sharing (ASIAS) system allows for sharing of de-identified data across the aviation industry, making it possible to identify trends and act on them. Analysis of de-identified data will provide windows into leading indicators in the motor vehicle industry. Leading indicators are “proactive, preventative and predictive measures that monitor and provide current information about the effective performance, activities and processes of a ... system that drive the identification and eliminate or control of risks.” The NSC Campbell Institute™, a leader in workplace safety, health and sustainability, states that tracking leading indicators allows world-class safety organizations to make further improvements to their safety records.

The FMVSS provide and ensure minimum levels of protection and safety for drivers and vehicle occupants as well as other roadway users. As such, NHTSA and the DOT should not degrade the crash avoidance, crashworthiness, survivability and post-crash survivability of motor vehicles in an effort to encourage deployment of ADS. While there are great benefits in higher levels of automation, the gains achieved through new technology could be lost if the basic standards and protections NHTSA has provided to the driving public, states and vehicle manufacturers for the past 50 years are turned back. To ensure safe deployment of ADS, NHTSA should ask vehicle manufacturers to provide the equivalent or greater evidence-based crash protection and survivable space as current requirements, as seating configurations or cabin configurations change.



29. Are there other considerations NHTSA should be aware of when contemplating the viability of using an external controller-based vehicle certification?

Artificial Intelligence (AI)/cyber issues

NHTSA should consider cyber and data protections for the electronic infrastructure in a vehicle and maintain them externally in the cloud. As vehicles become more dependent on artificial intelligence for safety and critical operational elements, including over-the-air updates to operating systems, such protections should be required and enhanced. Regarding the specific question of using an external controller-based vehicle certification, the following broad issues should be considered:

Latency minimum requirements: Vehicle sensor fusion tasks and communication with the cloud has to occur with minimum latency to ensure that ADS vehicles have the information they need at the right time to make the right decision(s). Additionally, some systems contemplated may require remote human or AI monitors. The effective control parameters in such a deployment need to be defined. NHTSA should evaluate minimum requirements with significant input from manufacturers and the industry, to enable onboard and remote ADS to make the best decisions at the right time.

AI: As vehicle manufacturers and suppliers start deploying artificial intelligence in ADS, critical software assumptions, validation techniques and verification procedures should be made explicit and public to ensure safety and transparency.

Cybersecurity: NHTSA should require that each automaker and software supplier have a coordinated hacking/electronic infrastructure recovery plan in place to mitigate damage to individual, fleet-wide, and system-wide breaches.

Recall and update compliance: U.S. compliance with recalls is woefully low; the latest numbers indicate there are approximately [52 million](#) open vehicle recalls equating to 1-in-4 vehicles on the road. NHTSA should consider how to address vehicles that do not comply with latest patches and/or software and hardware updates. If safety critical updates are not installed, NHTSA should allow a manufacturer to take actions up to and including automatically shutting down the technology or vehicle until the update is complete.

30. How can simulations be used to assess FMVSS compliance?

Simulations can be part of the research arsenal to assess FMVSS compliance. However, we believe that relying solely on simulation may be short sighted. That said, researchers currently using crash datasets to investigate the effectiveness of new advanced safety features face two hurdles. First, it is difficult to identify which vehicles are equipped with which advanced safety features. Second, some of these features can be disabled by the driver, and while they are present in the vehicle, they may have been unavailable at the time of the crash. In order to assess the lifesaving effectiveness of these new safety features, it is critical to have data about each feature and whether it was in use at the time of a crash included in the report.



Researchers can use this data to validate the safety benefits. We understand this would require an investment in training law enforcement and crash investigators to recognize and assess these technologies.

Auto manufacturers should use event data recorders (EDRs) to gain a better understanding of how human operators engage with advanced technology. More sophisticated EDRs connected to the cameras and other technology can better record and allow for greater understanding of how ADS vehicles react in the real world. This knowledge will allow manufacturers to be more nimble and make adjustments in near real-time based on what is actually occurring in the driver's seat, rather than assumptions and estimations that must be accommodated in a later model year. Collecting and sharing de-identified data about near misses and other relevant problems could aggregate useful information for the automotive industry, allowing them to take proactive steps based on leading indicators, rather than waiting for crashes to occur. Finally, this data would be useful to researchers in analyzing the safety benefits—and potential drawbacks—of these technologies as they continue to mature.

While there are competing priorities regarding protecting personal privacy and proprietary systems, NSC believes that safety should be the ultimate priority. NHTSA should facilitate data sharing as widely as possible and require that manufacturers provide accessible, standardized data to law enforcement, state highway safety offices, investigators, insurers, and other relevant stakeholders.

Just as the National Safety Council educated the driving public about the benefits of seat belts and airbags 20 years ago, NSC stands ready to work with NHTSA, auto manufacturers and dealers, technology suppliers and developers, regulators, state government, law enforcement, first responders, educators and highway safety advocates to develop training materials and platforms that will address the requirements of this policy.

NSC believes that fully automated vehicles have the potential to save lives and prevent injuries and ADAS and Automated Driving Systems are an essential component of the Road to Zero vision to eliminate roadway fatalities by 2050.

NSC applauds both NHTSA and the DOT for your continued efforts to promote safe and appropriate use of driving automation, while encouraging innovation and improvement among automakers and suppliers. We support research and development to achieve fully automated vehicles and investment in the infrastructure needed to support such a mobility option.

Thank you for your leadership role in integrating these vehicles in our fleet. I appreciate your ongoing consideration of NSC input.

Sincerely,

A handwritten signature in black ink that reads "Lorraine Martin".

Lorraine Martin
President & CEO