



December 9, 2019

Mr. James Owens
Acting Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, S.E., West Building
Washington, DC 20590

Re: **49 CFR Part 571: Federal Motor Vehicle Safety Standard No. 111 Rear
Visibility**

Ref: **84 Fed. Reg. 54533; October 10, 2019 (Docket No. NHTSA-2018-0021)**

Dear Mr. Owens:

On behalf of the members of the Alliance of Automobile Manufacturers, Inc. (Alliance), the Association of Global Automakers (Global Automakers), and Tesla, Inc. (collectively, “the parties”), this comment responds to the National Highway Traffic Safety Administration (NHTSA or agency) Federal Register notice referenced above on an Advance Notice of Proposed Rulemaking (ANPRM) to permit camera-based rear visibility systems as an alternative to inside and outside rearview mirrors.

As indicated in a petition submitted in 2014 (Attachment A), the parties are strongly supportive of NHTSA modernizing FMVSS No. 111 to provide additional compliance options that permit camera monitoring systems (CMS) as an alternative to inside and outside rearview mirrors. The parties also support the use of CMS in combination with (or integrated within) conventional rearview mirrors. The integration of CMS is consistent with the intent of the standard in reducing the number of deaths and injuries that occur when the driver of a motor vehicle does not have a clear and reasonably unobstructed view to the rear. With continued evolution in advanced driver assistance systems, the agency must work to implement a more technology-neutral approach that embraces innovation and provides a foundation for advancement in safety.

We strongly recommend that the agency adopt the current ISO/UNECE R46 requirements within FMVSS 111 where applicable. As discussed in more detail below, the ECE and ISO standards already set a clear and objective performance basis for evaluating CMS. Additionally, we anticipate that the forthcoming SAE Standard (J3155) will provide additional clarification regarding certain technical parameters not fully addressed in R46, and industry may provide supplemental comments as recommendations to the agency on these matters, once J3155 is finalized.

With this submission, we provide consensus industry recommendations regarding the ANPRM. In addition, without seeking to cause undue delay in advancing a notice of proposed rulemaking (NPRM) on this issue, we urge the agency to also accept supplemental comments following completion of a technical report by SAE International that will provide additional data, which we expect will be completed by the end of December 2019.

Background

Though injuries and fatalities resulting from motor vehicle crashes have declined significantly in the last ten years, 36,560 lives were still lost in 2018. There has been a disproportionate increase in the injury and fatality numbers in relation to miles travelled.¹ Research shows that 94% of crashes are caused by human error, which may include speeding, driver distraction or inattention, impairment, fatigue, or driver inexperience.² To help address these challenges, the auto industry continues to be proactive in its efforts to identify new opportunities for improving safety and advancing new technologies.

The mobility provided by the motor vehicle industry is essential to our nation's economy and our individual freedom of movement. Innovation plays an important role in improving safety, while increasing mobility and reducing emissions. All of these benefits can help result in improved quality of life.

After several decades of improvements designed to help protect occupants and other road users in the event of a crash, there is a growing emphasis on the need for crash avoidance. Indeed, while advanced driver assistance systems (ADAS) – such as automatic emergency braking (AEB) and lane keeping assist (LKA) – can help mitigate or avoid certain types of crashes, there is still an important role for ensuring that drivers have the ability to effectively maintain awareness of their surroundings within the roadway environment.

Rear view mirrors, as prescribed within regulation, have played an important role in improving safety. However, advancements in vehicle technology present new opportunities to both meet and exceed the existing requirements through the exclusive use of CMS – an approach that is not currently permitted within the standard. It is therefore important that NHTSA seek to modernize FMVSS No. 111 to ensure that these systems can be deployed as an alternative to the status quo.

¹ NHTSA “2018 Fatal Motor Vehicle Crashes: Overview”, DOT HS 812 826 (October 2019).

² NHTSA “Traffic Safety Fact Sheet: Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey”, DOT HS 812 115 (February 2015).

Benefits of CMS

Conventional rearview mirrors provide a simple and effective means for supplementing the driver's view of the surrounding environment, and can be adjusted to help reduce or eliminate blind spots.³ While current field of view (FOV) requirements for mirrors provide a high level of safety, the capabilities of camera-based systems seek to provide further opportunities in terms of how this information can be displayed and accessed by the driver.

Alternative Display Placement - Conventional mirror placement (per the existing standard) requires drivers to move their head away from the forward field of view in order to access reflected images rearward of the vehicle. Display images for CMS can be configured to provide equivalent or better placement as it relates to the driver's focus on the forward roadway. Providing an external view of the vehicle within the occupant compartment can also help address circumstances where the driver's view of the exterior mirrors is obstructed by rain, snow, etc. that has accumulated on the glass of the driver or front-passenger side windows.

Additionally, as the population of older drivers on our roadways increases, camera-based systems are beginning to be recognized as helpful technology for this demographic. For example, the American Automobile Association recommends "Smart Features for Older Drivers," which highlights rear cameras as "beneficial to older drivers with difficulty with mobility and neck movement."⁴

Field of View Capabilities – By including compliance options for FMVSS No. 111 to be met with CMS, an expanded FOV is possible. Today, despite the standard, blind spots may still necessitate drivers to rotate their heads during lane changes and while merging with traffic. By adapting the optics and positioning, a camera-based system can potentially deliver an unobscured view to the horizon in all directions, encompassing all lanes. On-road testing performed by Tesla indicates that a camera-based system has the potential to provide a FOV that eliminates blind spots.⁵

Field of View Alignment Issues – CMS can help address potential mirror alignment issues by providing the driver with a consistent view of the external roadway environment, minimizing or eliminating the need to adjust orientation based on differences in driver height and seat track position.

Environmental Factors – Certain environmental factors can impact the driver's ability to perceive objects in the surrounding roadway. CMS provide potential

³ Platzer, G., "The Geometry of Automotive Rearview Mirrors – Why Blind Zones Exist and Strategies to Overcome Them," SAE Technical Paper 950601, 1995, doi: 10.4271/950601.

⁴ <http://seniordriving.aaa.com/smartfeatures>

⁵ NHTSA Docket No. NHTSA-2013-0076, Entry No. 0019

opportunities to improve driver awareness of objects through image processing, where an image can be manually or automatically enhanced to address limitations with the human eye. For example, the ability to see in low-light conditions (night, dawn, dusk).

Fuel Efficiency – As described in the attached Auto Alliance / Tesla Petition, camera-based systems represent an opportunity to increase vehicle fuel efficiency through improved aerodynamics by eliminating externally mounted mirrors.⁶

In developing recent Corporate Average Fuel Economy (CAFE) standards, NHTSA has assumed the availability of aerodynamic improvements including more aerodynamic side view mirrors.⁷ The elimination of externally mounted mirrors could play a role in achieving the assumed aerodynamic improvements. This consideration has increased in importance over the past several years. In model years 2016 through 2017, for the first time ever in the history of the CAFE program, manufacturers (on average) failed to meet annual compliance targets.⁸ NHTSA projects that this trend will continue through at least model year 2019.⁹

Integration of Crash Avoidance Information - In 2011, NHTSA issued a report which found that approximately 9 percent of police-reported crashes were characterized as “lane change crash.”¹⁰ The agency also noted that these crash scenarios may be addressed through vehicle-based crash avoidance systems including Camera Vision Systems and Blind Spot Detection Systems. Although the report does not differentiate between lane change crashes due to blind spot errors and issues where a driver fails to respond to an external object in the environment (*i.e.* “look-but don’t-see” errors), CMS provide new opportunities for how additional crash avoidance information (from both camera-based and non-camera-based sensors) is communicated to drivers as part of the overall rear visibility system.

Additional Considerations

Because a CMS is different from traditional mirrors, the agency’s focus should be to confirm equivalent safety between the two systems in lieu of replicating the physical properties of mirrors as defined in the current FMVSS 111 standard. Some Industry

⁶ See Attachment [B] at p.2

⁷ 83 Fed. Reg. 43046; August 24, 2018

⁸ National Highway Traffic Safety Administration, CAFE Public Information Center, Fleet Fuel Economy Performance Report, https://one.nhtsa.gov/cafe_pic/CAFE_PIC_fleet_LIVE.html, accessed November 6, 2019

⁹ National Highway Traffic Safety Administration, “Manufacturer Projected Fuel Economy Performance Report,” October 11, 2019, https://one.nhtsa.gov/CAFE_PIC/MY%202018%20and%202019%20Projected%20Fuel%20Economy%20Performance%20Report_v07%20-%20Final.pdf

¹⁰ NHTSA Presentation, 2011 UMTRI Automotive Safety Conference (Feb. 16, 2011), available at <http://www.umtri.umich.edu/content/John.Maddox.Safety.2011.pdf>. This data uses 2007 NHTSA General Estimate (GES) data.

members are working with VTTI to collect naturalistic driving and controlled track data with traditional mirrors and CMS systems. The study will generate comparative data and demonstrate long term usage patterns that can address questions about how drivers adapt to CMS. An initial report on this research is expected in the first quarter of 2020.

Recommendations for FMVSS

We strongly recommend that in developing additional compliance options within FMVSS 111 to accommodate CMS, the agency seeks to harmonize with globally recognized standards, ISO 16505/UNECE R46, as these standards already set clear, objective, and repeatable requirements that address each of the key issue areas above. Harmonization will avoid an unnecessarily lengthy delay in finalizing rulemaking. It will also help reduce regulatory burden in the United States and allow companies to avoid unnecessary product development, testing, and production of region-specific systems.

The benefits for international harmonization can be substantial. A recent Peterson Institute study evaluated the UN ECE 1958 agreement economic benefits and found that joining the 58 agreement (which harmonizes regulations for nations with type-approval certification systems) boosts automotive trade by more than 20 percent.¹¹ While harmonization of a single standard will not achieve this level of benefit, it is a step in that direction. With advanced technology we have the opportunity to minimize unnecessary harmonization issues and ensure greater coordination. This ultimately helps avoid the need for region specific vehicle designs that often require additional research, investment, redesign, and certification, and will help to reduce costs for consumers.

The cost impact may vary significantly depending upon implementation, and it is important that NHTSA ensure the established baseline within regulation does not result in new technology being cost prohibitive due to unreasonable performance standards. ISO 16505 / UNECE R46 provides an appropriate balance.

Additionally, the parties recognize that a number of state laws specify that motor vehicles registered in their states must be equipped with at least a driver's side mirror. These state laws are harmonious with FMVSS No. 111 as currently written. As NHTSA permits optional compliance by means of CMS into the standard, NHTSA should simultaneously make clear that the availability of the compliance option would preempt any state laws mandating mirrors.

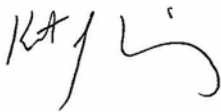
¹¹ "Gains from Harmonizing US and EU Auto Regulations Under the Transatlantic Trade and Investment Partnership", Peterson Institute International Economics, Caroline Freund and Sarah Oliver, June 2015.

In addressing a number of technical questions posed by NHTSA in the ANPRM, we anticipate additional industry comments based upon the SAE International report and results from the VTTI study. This data is expected to provide expanded discussion on each of the key technical considerations.

In conclusion, industry is strongly supportive of NHTSA's intention to modernize FMVSS 111. ISO 16505 / UNECE R46 should be used where applicable as the framework for the development of additional compliance options to permit CMS in FMVSS No. 111. We urge the agency to work expeditiously to address these matters.

The Alliance, Global Automakers and Tesla appreciate the agency's consideration of these comments and would be pleased to provide any additional information if needed.

Sincerely,



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Attachments:

Attachment A: Alliance and Tesla 2014 Petition to NHTSA

Attachment B: Auto Alliance Presentation to NHTSA February 2017