Motor & Equipment Manufacturers Association

Comments to the
National Highway Traffic Safety Administration

RE: Request for Comments; Removing Regulatory Barriers for Vehicles with Automated Driving Systems

Docket No. NHTSA-2018-0009

March 20, 2018

Introduction

The Motor & Equipment Manufacturers Association (MEMA) submits these comments in response to the U.S. Department of Transportation (USDOT) National Highway Traffic Safety Administration's (NHTSA) *Federal Register* request for comments (RFC), 83 Fed. Reg. 2607 (Jan. 18, 2018), on regulatory barriers for vehicles with an automated driving system (ADS). MEMA is the leading international trade association in the fast-changing mobility industry and represents 1,000 vehicle suppliers that manufacture and remanufacture components and systems for use in passenger cars and heavy trucks as new original equipment (OE) and aftermarket parts.[1]

MEMA support policies that enable the introduction of new technologies necessary to facilitate sustainable mobility. In previous comments about ADSs, MEMA commended the leadership from USDOT and NHTSA on their proactive, pragmatic, iterative approach to providing industry guidance and policies. For the near-term, these are the appropriate tactics in the face of rapidly developing technology. Concurrently, there is the burgeoning need for government and industry stakeholders to work together and identify potential challenges and barriers to deployment of these technologies. Such collaboration is vital to achieving the goals envisioned for this ambitious undertaking.

As discussed in the cited Volpe report, the current U.S. Federal Motor Vehicle Safety Standards (FMVSS) could potentially be barriers for vehicles with ADS from entering the marketplace. Regardless of which FVMSSs are identified in this docket and in the agency's own research as potential barriers for vehicles with ADS, ultimately, the integrity of the

[1] MEMA represents its members through four divisions: Automotive Aftermarket Suppliers Association (AASA); Heavy Duty Manufacturers Association (HDMA); Motor & Equipment Remanufacturers Association (MERA); and, Original Equipment Suppliers Association (OESA). The motor vehicle components manufacturing industry is the largest direct employer of manufacturing jobs in the United States directly employing more than 871,000 Americans, generating a total employment impact of 4.26 million jobs, and contributing nearly $435 billion to the U.S. GDP.

regulatory framework must always protect the primary intentions behind these standards, which are the safety and protection of the vehicle occupants and other road users.

Importance of Global Collaboration

Many members of MEMA are global companies that depend on an integrated worldwide network of suppliers and customers for continued viability and growth. There is a great deal to gain and a lot more to lose if U.S. policy-development activities impacting future vehicles are done in isolation or significantly out of step with our global counterparts in Europe and Asia. To that end, we urge the U.S. DOT and NHTSA to explore how existing forums – such as the UNECE World Forum for Harmonization of Vehicle Regulations (WP.29) 1998 Agreement, Insurance Institute for Highway Safety, and EuroNCAP – can be useful bodies in which representatives can to share with and learn from other governments as to how they are evaluating similar issues. In general, opportunities to create harmonized approaches on advanced vehicle technologies increase efficiencies, provide certainty, and reduce costs for both government and industry. With strong leadership and cooperation in addressing ADS, global endeavors to develop aligned standards and regulations have the potential to enable expedited implementation and streamline test development efforts. Overall, these alignments enhance global competitiveness.

Supplier Role in Technology Development

Our members are key developers of the software and components that enable ADS for highly automated vehicles. Suppliers have developed a wide range of advanced driver assistance systems (ADAS), as well as integrated active/passive safety systems that have laid the foundation for ADSs. Widely deployed, automated technologies have the potential to radically improve vehicle safety and enhance mobility. Typically, suppliers take on the initial investments and the associated risks to develop these technologies for their vehicle manufacturer customers (OEMs), who are concurrently planning for their own future vehicle design cycles. Suppliers' product planning and investment costs include: product concept research; engineering development for the part or system; design of the manufacturing process; customer validation of part or system prior to production; production facility updates; and, finally, product manufacturing.

Supplier Input on FMVSS Regulatory Barriers

Because the roll-out of these technologies require major economic resources, research and testing, and significant lead-time, it is important that the federal government agencies provide clarity and certainty about its near-term policy goals and objectives for regulatory modernization. For a task as large as this, MEMA applauds the collaborative approach among the agency, vehicle industry, and other stakeholders.

MEMA reviewed with great interest the Alliance of Automobile Manufacturers' proposed framework for progress, which they discussed at the NHTSA public meeting on March 6. Their suggested near, medium- and long-term approach. While ambitious, the approach fosters the appropriate collaboration among government, industry and key stakeholders that is imperative in order to address potential barriers to deployment.

MEMA – and some of our member companies – are participating as stakeholders and peer reviewers in the NHTSA-commissioned research by Virginia Tech Transportation Institute (VTTI) on "Assessment, Evaluation, and Approaches to Modification of FMVSS that may Impact Compliance of Innovative New Vehicle Designs Associated with Automated Driving Systems." The same is true for suppliers' input in other industry working groups and standards organizations, like SAE International, that are diligently working out how to address these complex questions about which FVMSSs pose potential barriers to deployment of highly automated vehicles. These questions become further complicated when thinking about executing compliance test procedures on vehicles without these traditional equipment, configurations, and applications.

A great deal of our members' resources and time are going toward the VTTI project and related endeavors. Please note that most of the detailed technical input and feedback of our members will be by way of those pathways. For the purposes of input to NHTSA's RFC, MEMA presents the following comments on broad areas of consideration as it relates to ADSs and highly automated vehicles without traditional driver controls (no steering wheel, accelerator/brake pedals).[2] Furthermore, MEMA anticipates further technical input may be submitted directly to this RFC's docket by suppliers who either manufacture ADSs, related components, and/or have products that are impacted by various FMVSSs.

Barriers Across Most FMVSSs – Many of the FMVSSs identified have universal challenges for ADSs and highly automated vehicles. At a high level, the procedures and equipment needed for today's tests using conventional equipment either is not relevant, not available, or would require significant modification to perform the test. Also, the ADS may inhibit the test from being performed at all.

Driver and Driver Input – One of the bigger challenges of most FVMSS standards and their corresponding test procedures is the reliance on driver and pedal input – whether from a human test driver or a steering robot. As it is widely understood, as vehicles move toward higher levels of autonomy, the traditional FMVSSs used to self-certify no longer apply. As a key first step, MEMA believes the agency must focus on and assess those existing standards that require driver and pedal input. In an automated system, these inputs will not be readily available, so alternatives must be developed. Examples include "steering wheel rate" (FMVSS No. 126) and "pedal force limits" (FMVSS Nos. 105 and 135.)[3]

Heavy Vehicle Braking – Current FMVSS No. 121 provides performance and equipment requirements for trucks, buses, and trailers with air brake systems.[4] As discussed above, similar requirements under 121 for heavy vehicle stopping distance will face other challenges. For consideration, the following points:

- For stopping distance tests: initial brake pedal movement starts the response time tests and starts the measurement for distance. Also, the vehicle is required to stay in the lane, thus needing steering input.

[2] Some exceptions include considerations MEMA notes for the agency when considering heavy vehicle ADS applications where a human operator may still be utilized.
[3] Electronic Stability Control; Hydraulic and Electric Brake Systems; and, Light Vehicle Brake Systems
[4] Air Brake Systems

- For ABS tests: the stability and control test use a definition of full-treadle brake application as maximum treadle travel to be achieved within 0.2 seconds after application is initiated. (There is also a minimum pressure requirement that can be used; but, again, time starts after the application is initiated.) Also, there is a stay-in-lane requirement where the curve (500-foot radius) and stability adjustments will require steering input.

Also, for further consideration, MEMA notes that as currently worded FMVSS No. 121 and its test procedure (TP-121V) may present impediments to braking systems, such as electronic brake systems (EBS).

Unconventional Seating Configurations – While the Volpe report adequately identifies the traditional seating positions and the FMVSS barriers for unconventional seating, MEMA notes some issues that should be further considered by the agency. Consider the following regarding a highly automated vehicle with "novelty" seating positions such as –

- Forward and rearward adjustable seats capable of a wide range longitudinal adjustment
- Rearward seats with ability for partial or full swivel – ranging between forward/sideward or sideward/rearward
- Seats designed with torso angles greater than today's requirements – 35 degrees and higher
- Seats in the first row that are permanently rearward facing.

Under FMVSS No. 208,[5] the specific references include: driver and right front passenger positions; "out of position" depends on a forward-facing arrangement; driver "belt reminder" requirement; seat belt configuration intended for forward-facing occupants. Additionally, FMVSS Nos. 202 and 225[6] will have to be assessed for how unconventional design and seating positions will impact its performance requirements and test procedures. Since current requirements are all based on front-facing positions, injury criteria for novelty seating positions will have to be researched and evaluated. The agency should consider utilize modeling and simulation to evaluate a wide variety of scenarios and potential configurations for crashworthiness and occupant protection.

Visibility & Conspicuity – For a fully automated vehicle with no driver/operator or manual controls, the mirror requirements under FMVSS No. 111[7] would not be necessary or could be replaced by cameras with varying fields-of-view to supplement information provided to the occupants. However, for an ADS highly automated vehicle that may still require an on-board operator (e.g. a commercial vehicle tractor-trailer), the vehicle design may have cameras and other sensors in place of the conventional rearview mirrors. These camera systems provide the operator with the field of view necessary for them to operate the vehicle. Additionally, the lighting requirements under FMVSS No. 108[8] would also require modification as these vehicles would still need to be conspicuous to other vehicles,

[5] Occupant crash protection
[6] Head restraints; Child restraint anchorage systems
[7] Rear visibility
[8] Lamps, reflective devices, and associated equipment

pedestrians, and other road users. As this is among the oldest of the FMVSSs, this standard could benefit from modifications to accommodate not only current advanced lighting technologies used in today's vehicles (but not permitted under the current 108), but also future lighting systems for vehicles with ADS.

Dashboard Telltales & Displays – Telltales and other dashboard displays are intended to convey key information to the driver about the operating condition of the vehicle. Safety-critical information and other operational information will still be necessary for occupants' knowledge, even in an automated vehicle without manual controls and with an "emergency stop" feature. Another example is tire pressure monitoring systems (TPMS),[9] where today, the driver receives the TPMS telltale that indicates a low-pressure detection. However, in a highly automated vehicle, that TPMS information will still need to inform the ADS. Certainly, it will be necessary to evaluate and determine which telltales and displays under FMVSS No. 101[10] might be considered for retention, elimination, or modification.

Data Privacy – Many emerging technologies are increasingly becoming more connected; vehicle sensing systems are becoming more advanced. The data collected by these features may utilize personal data in order to operate and successfully fulfill the systems' respective functions. Examples may include biometrics, images, and data profiles. MEMA raises this point for the agency's awareness and understanding for future consideration. For future research, development, and system modifications, suppliers need access to data. To be clear, we strongly agree that it is important to protect privacy. At the same time, we also believe that there will need to be a balance of how advanced sensing data is utilized and restricted for functions and performance.

Other Examples – Below is a non-exhaustive list of other FMVSS requirements that may not be applicable or pose a barrier to how a highly automated vehicle with an ADS no driver/operator or manual controls are tested and self-certified:

(571.102)	transmission shift position sequence and interlock
(571.103)	windshield defrosting and defogging
(571.104)	windshield wipers
(571.105)	foot-actuated service brake control, brake system warning indicator, and warning device for lining replacements
(571.110)	tire/rim retention requirement for driver
(571.114)	key must be in position before moving out of park position, and park position interlock with the service brake
(571.118)	powered windows and roof panels
(571.121)	foot-actuated service brake control, low-pressure brake system warning indicator, and brake adjustment indicators
(571.122)	motorcycle brake systems
(571.124)	accelerator pedal must return to neutral when released by the driver
(571.126)	a steering wheel (required for test) and certain controls and displays

[9] FMVSS No. 138
[10] Controls and displays

(571.135)	foot-actuated service brake control, brake system warning indicator, and warning device for lining replacements
(571.138)	TPMS telltale for low tire pressure to warn driver
(571.201)	occupant protection in interior impact
(571.206)	door locks and door retention components
(571.207)	a designated seating position for the driver
(571.208)	occupant protection and warning system for non-buckled seat belt
(571.210)	seat belt anchorages
(571.214)	side impact protection
(571.219)	windshield zone intrusion
(571.225)	child restraint anchorage systems
(571.226)	readiness monitor for ejection mitigation countermeasures visible to the driver

Summary

MEMA appreciates the opportunity to offer input for NHTSA's consideration and reiterates its support for the agency's ongoing efforts to evaluate the impacts our current regulations may have on inhibiting future innovative technologies like Automated Driving Systems. Our members will continue to provide more in-depth feedback If you have any questions, please contact MEMA's Chief Technology Officer Brian Daugherty at bdaugherty@mema.org or Senior Director of Regulatory Affairs Leigh Merino at lmerino@mema.org.

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