



September 5, 2023

Robin Hutcheson  
Administrator  
Federal Motor Carrier Safety Administration  
U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
Washington, D.C. 20590

Ann Carlson  
Acting Administrator  
National Highway Traffic Safety Administration  
U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
Washington, D.C. 20590

**Re: Docket No. FMCSA-2022-0171 and NHTSA-2023-0023, “Heavy Vehicle Automatic Emergency Braking; AEB Test Devices”**

Dear Administrator Hutcheson and Acting Administrator Carlson,

The Autonomous Vehicle Industry Association (“AVIA”) writes in response to the Federal Motor Carrier Safety Administration (“FMCSA”) and National Highway Traffic Safety Administration’s (“NHTSA”) Notice of Proposed Rulemaking (“NPRM”) for “Heavy Vehicle Automatic Emergency Braking; AEB Test Devices.” AVIA supports the continued adoption of automatic emergency braking (“AEB”) systems as an important tool for roadway safety, and recently provided comments addressing considerations for autonomous vehicles (“AVs”) in NHTSA’s NPRM for AEB and Pedestrian AEB systems.<sup>1</sup> While our comments below focus on the relationship between this NPRM and AV technologies, AVIA shares the concerns of truck manufacturers and other industry partners that AEB mandates for heavy vehicles, as proposed in this rulemaking, present implementation and compliance challenges for certain classes of vehicles. As FMCSA and NHTSA take steps to promulgate safety standards for AEB systems in heavy vehicles, we encourage the Agencies to ensure that the requirements are appropriate and practicable for the regulated vehicle classes.

As an organization, AVIA is committed to bringing the tremendous safety and mobility benefits of AVs—otherwise known as SAE Levels 4- and 5-capable vehicles—to consumers in a safe, responsible, and expeditious manner. AVIA’s membership is comprised of the world’s

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<sup>1</sup> Autonomous Vehicle Indus. Ass’n, Comment Letter on Notice of Proposed Rulemaking for Fed. Motor Vehicle Safety Standards: Automatic Emergency Braking Systems for Light Vehicles (Aug. 14, 2023), <https://www.regulations.gov/comment/NHTSA-2023-0021-0953>.

leading technology, automotive, ridesharing, trucking, and transportation companies.<sup>2</sup> Vehicles operated by AVIA members have driven more than 44 million autonomous miles on U.S. public roads, a distance roughly equivalent to 184 trips to the moon.<sup>3</sup>

While the adoption of advanced driver assistance systems (“ADAS”) like AEB is a step toward vehicle automation, such systems do not offer all of the safety benefits provided by Level 4 and 5 automated driving systems (“ADS”). According to NHTSA statistics, in 2022, 42,795 people lost their lives on America’s roads, a slight reduction in deaths from 2021, but still representing near-record fatalities.<sup>4</sup> Tragically, data from the Governors Highway Traffic Safety Association shows that 2022 saw the highest number of pedestrian deaths since 1981, with 7,508 people killed.<sup>5</sup> While the wider deployment of AEB systems will likely reduce those numbers, the widespread adoption of AVs is poised to significantly reduce fatalities.

AVs remove the potential for human driving error, such as driver distraction or impairment by fatigue or alcohol. AVs leverage a suite of sensor systems with sensitivities and capabilities beyond those included in AEB systems, including lidar, radar, and cameras—that all work together to inform the ADS as it navigates the world. These sensors have a 360-degree field of view which can detect, track, and react to objects and people even when hidden from human perception due to vehicles, buildings, and other obstructions. Given this potential, and the growing number of AVs operating nationwide, FMCSA and NHTSA should ensure that any proposed modifications to the Federal Motor Carrier Safety Regulations (“FMCSR”) or Federal Motor Vehicle Safety Standards (“FMVSS”) include applicable considerations for AVs.

### **Any FMVSS or FMCSR Mandating AEB Systems Should Include Considerations for Autonomous Vehicles**

Many of the concerns we raised in our earlier comments responding to NHTSA’s recent NPRM to require AEB and PAEB systems in light vehicles are equally relevant to this NPRM.<sup>6</sup> As discussed in those comments, ADS technology is designed to operate beyond the AEB system performance requirements found in both NPRMs but may use different mechanisms to do so. Further, the structure and design of AVs can be functionally different from traditional, human-driven vehicles in ways that could complicate their ability to demonstrate compliance with the

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<sup>2</sup> Our members include Aurora, Cavnu, Cruise, Ford, Gatik, Kodiak, Lyft, May Mobility, Motional, Nuro, TuSimple, Uber, Volkswagen Group of America, Volvo Cars, Volvo Autonomous Solutions, Waabi, Waymo, and Zoox. See *Our Mission and Members*, AUTONOMOUS VEHICLE INDUS. ASS’N, <https://theavindustry.org/> (last visited Aug. 30, 2023).

<sup>3</sup> AVs Have Driven 43.9 Million Miles on Public Roads, AUTONOMOUS VEHICLE INDUS. ASS’N (July 24, 2023), <https://theavindustry.org/resources/blog/data-44million-miles>.

<sup>4</sup> NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP’T OF TRANSP., DOT HS 813 428, EARLY ESTIMATES OF MOTOR VEHICLE TRAFFIC FATALITIES IN 2022, 1 (2023), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813428>.

<sup>5</sup> GOVERNORS HIGHWAY TRAFFIC SAFETY ASS’N, PEDESTRIAN TRAFFIC FATALITIES BY STATE 2022 PRELIMINARY DATA (JAN.- DEC.) (2023), <https://www.ghsa.org/sites/default/files/2023-06/GHSA%20-%20Pedestrian%20Traffic%20Fatalities%20by%20State%2C%202022%20Preliminary%20Data%20%28January-December%29.pdf>.

<sup>6</sup> See Autonomous Vehicle Indus. Ass’n, *supra* note 1.

FMVSS proposed in the NPRM, even if the ADS is capable of performing the same functions as an AEB system, thereby providing an equivalent or an even higher level of safety. While both technologies may take action to avoid or mitigate collisions, they may do so using different methods. An ADS receives forward-collision warning information, for example, through its suite of sensors. Moreover, upon detecting a potential collision, an ADS may be capable of a wider array of evasive maneuvers, including lane changes, unlike AEB systems, while still being able to match those systems' ability to stop the vehicle when needed.

The proposed AEB mandates found in this NPRM could also cause difficulties for vehicles converted into AVs by the addition of an ADS to an existing FMVSS- and FMCSR-compliant vehicle. For such vehicles, the integration of the ADS could require disabling existing AEB systems to avoid potential confusion between the two systems when the ADS is engaged. Under an FMVSS that requires the installation of an AEB system, even if the ADS demonstrates equal or greater emergency braking capabilities as compared to those systems, such an action may be interpreted as running afoul of the "make inoperative" prohibition found in 49 U.S.C. § 30122. This would place AV developers in a precarious situation, potentially limiting their ability to use new vehicles once the mandate is in place or risking the introduction of unintended safety consequences if they keep the original AEB system enabled.

Given these potential complications, AV developers need regulatory clarity with respect to the application of the requirements proposed in the NPRM. When applied to AVs, any AEB system mandates should balance innovation with the prescriptive requirements necessary to provide repeatability during human-operated tests, allowing for greater flexibility for ensuring vehicle safety while reaching the same ends. To better support AVs, any final rule should provide a clear pathway for AVs to demonstrate compliance with the requirements of the AEB system standards while avoiding such vehicles being locked into unnecessary equipment or warning requirements built around the presence of human operators. NHTSA has already begun to adapt the FMVSS to reflect the design needs of AVs, as seen in last year's occupant protection rule.<sup>7</sup> FMCSA has similarly advanced efforts to identify and develop an appropriate regulatory framework for AVs operating in motor carrier fleets.<sup>8</sup> It would be an efficient use of Agency resources to continue the effort to adapt the FMVSS to reflect the realities of AV technologies now, at the proposed rule stage, rather than later, which would require the Agency to promulgate a modified or new rule to achieve this objective. With this in mind, AVIA recommends the following modifications to the proposed rules to provide clarity for ADS-equipped vehicles.

### *Application*

Some of AVIA's concerns could be addressed by spelling out clearly in S3 (Application) of the proposed FMVSS No. 128 exactly how the standard would apply in the context of AVs. We suggest below how that might be accomplished:

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<sup>7</sup> Occupant Protection for Vehicles With Automated Driving Systems, 87 Fed. Reg. 18560 (Mar. 30, 2022).

<sup>8</sup> See Safe Integration of Automated Driving Systems (ADS)-Equipped Commercial Motor Vehicles (CMVs), 88 Fed. Reg. 6691 (Feb. 1, 2023).

### *S3. Application.*

- (a) Except as otherwise provided in subsections (b), (c), and (d), [t]his standard applies to multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating greater than 4,536 kilograms (10,000 pounds) that are subject to §§ 571.105 or 571.121 of this part.
- (b) The requirement of S5.1.1 to have a forward collision warning system does not apply to vehicles referred to in subsection (a) that are manufactured with an automated driving system and without manually operated driving controls. In an automated driving system-equipped vehicle with manually operated driving controls, the forward collision warning system need not be operative when the automated driving system is engaged.
- (c) The requirement of S5.1.2 to have an automatic emergency braking system may be satisfied if a vehicle referred to in subsection (a) is equipped with an automated driving system that, when engaged, meets the performance requirements of this standard for automatic emergency braking systems.
- (d) The addition of an automated driving system to a previously certified vehicle referred to in subsection (a) with an automatic emergency braking system does not constitute a violation of 49 U.S.C. 30122 if the automated driving system is capable of meeting the performance standards applicable to automatic emergency braking systems as set forth in this standard.

#### *Modifications to the FCW Mandate to Reflect the Presence of an ADS*

Currently, S5.1.1 of the proposed FMVSS No. 128 requires an FCW system “that provides an auditory and visual signal to the driver of an impending collision with a lead vehicle [...]”<sup>9</sup> However, S5.1.3 provides that such a system is not required if adaptive cruise control is engaged.<sup>10</sup> AVIA proposes adding the following clause to the existing adaptive cruise control exemption:

*S5.1.3. Performance Test Requirements.* [...] The forward collision warning is not required if adaptive cruise control **or an automated driving system** is engaged.

#### *Modifications to S5.3 Malfunction Detection to Include Communications with an ADS*

AVIA also proposes making a similar modification to S5.3’s requirement that a malfunction detection system “provide the vehicle operator with a telltale notification that the malfunction exists.”<sup>11</sup> In line with the proposed modifications above, AVIA suggests adding language that allows a malfunction detection notification to be directly communicated to the ADS itself or communicated to a remote assistant or to service personnel when the ADS is engaged, while retaining the existing telltale notification for the use of any human operator who might at some point take over vehicle control. This would provide clarity for manufacturers of ADS-

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<sup>9</sup> Heavy Vehicle Automatic Emergency Braking; AEB Test Devices, 88 Fed. Reg. 43174, 43240 (July 6, 2023) [hereinafter Heavy Vehicle AEB NPRM].

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

equipped vehicles while still ensuring either the human operator of the AV, an individual otherwise involved in the AV operation, or the ADS itself is alerted to the situation.

### *Modifications to Proposed Test Procedures to Accommodate Autonomous Vehicles*

As written, some of the testing procedures described in the NPRM do not consider AVs, especially those AVs designed without human controls. Although manufacturers may use alternative methods and tests to assess and certify their products' compliance with applicable FMVSS, the test procedures are the means by which NHTSA will evaluate compliance with the performance requirements described in the NPRM. For example, S7.3.3 of the proposed standard addresses test conduct after a FCW onset.<sup>12</sup> Within that procedure, S7.3.3(a) requires the release of a vehicle's accelerator pedal within 500 milliseconds, unless the vehicle is tested with cruise control active.<sup>13</sup> As we proposed for telltales above, test procedures like these, and others requiring the application of force to a control, should be modified to include an exemption from such applications when an ADS is active.

Additionally, ADS-equipped vehicles should be exempted from any testing conducted with manual brake application, to ensure AVs of all designs can perform the testing parameters. Specifying service brake application timing and force is not appropriate when testing an ADS-equipped vehicle. An ADS-equipped vehicle is a fully integrated driver-vehicle system and it should be evaluated as such. Dictating specific service brake application artificially evaluates the system by potentially overriding the ADS vehicle performance. Finally, some ADS-equipped vehicles have top speeds below those required in the Lead Vehicle AEB Collision Avoidance test parameters. We propose modifying the test parameters such that they can be met when an ADS-equipped vehicle operates at its highest speed, if that speed is lower than the originally proposed subject and lead vehicle speeds.

One additional area of concern when applying the NPRM's performance requirements and test completion criteria is the possibility of conflict between the intent of a given test and the capabilities of an ADS-equipped vehicle. As noted above, an ADS-equipped vehicle may have a diverse set of options for responding to the testing scenarios laid out in the NPRM, and depending on the situation at hand, may rely on evasive maneuvers other than braking, in contrast to an AEB system. As such, an ADS may require modifications to its normal operation beyond the pre-test conditions specified in the proposal to ensure a test is conducted as specified. This raises an important question – in order to meet the performance requirements found in the NPRM, would ADS developers be asked to place artificial limits on a system's behavior or otherwise force specific behaviors? If the purpose of the test is to ensure the vehicle will avoid collisions, such modifications would not be necessary, but would seem to be required to ensure compliance with the test completion criteria (S7.3.4, S7.4.4, S7.5.4, S8.2.3, and S8.3.3) of slowing or coming to a stop. This issue provides further support for the need to modify testing requirements to accommodate ADS-equipped vehicles. Such modifications should add flexibility to the testing

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<sup>12</sup> Heavy Vehicle AEB NPRM at 43242.

<sup>13</sup> *Id.*

regime. One way to accomplish that would be to add this language in S6 of the proposed FMVSS 128:

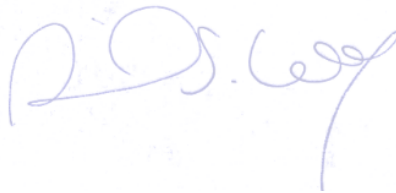
Vehicles equipped with an automated driving system. **In determining compliance with this standard in a vehicle in which the automated driving system is required to meet the performance requirements of this standard, a manufacturer may make any modifications necessary to its automated driving system or the vehicle to ensure that the vehicle will follow a trajectory and vehicle speed profile aligned with the test procedure prescribed in this standard (e.g., by maintaining its heading toward the target object rather than making an evasive maneuver that the ADS might execute otherwise).**

## **Conclusion**

The modifications proposed above offer a reasonable framework for making the NPRM's AEB mandate more inclusive of ADS-equipped vehicles. Incorporating these modifications would more clearly instruct the AV industry on the regulatory requirements for ADS-equipped vehicles, avoiding the need for future requests for interpretation or potentially unnecessary or time-consuming exemption requests. It would also avoid requirements that do not meet the need for motor vehicle safety, such as unnecessary warnings intended for human drivers that AVs lack. Making these modifications at this stage would also free NHTSA and FMCSA from having to undertake additional rulemaking in the future to provide for ADS-related considerations related to these proposed rules.

AVIA is grateful for the opportunity to provide feedback on the NPRM and for our continuing conversations with FMCSA and NHTSA on creating a safe and thoughtful approach to the deployment of vehicle automation technologies. We stand ready to engage with the Agencies to further discuss the proposed rules for heavy vehicle AEB systems and how those rules may overlap or touch on considerations for AV adoption. If there is anything further we can do to assist you or your staff on these or related matters, please do not hesitate to reach out.

Sincerely,



Ariel S. Wolf  
General Counsel  
Autonomous Vehicle Industry Association