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U.S. Department of Transportation
Docket Management Facility
1200 New Jersey Avenue, SE
West Building, Ground Floor, Room W12-140
Washington, DC 20590-0001

RE: Safe Integration of Automated Driving Systems-Equipped Commercial Motor Vehicles [Docket No. FMCSA-2018-0037]

The American Association of Motor Vehicle Administrators (AAMVA) welcomes the opportunity to provide comments on the Federal Motor Carrier Safety Administration's (FMCSA) request for comments on existing Federal Motor Carrier Safety Regulations (FMCSRs) that my need to be updated, modified, or eliminated to facilitate the safe introduction of commercial automated driving systems (ADS) on our nation's roadways. Commercial motor vehicles (CMVs) carry the potential to lead global deployment of advanced ADS technologies. AAMVA looks forward to continued federal-state collaboration as the modern commercial motor vehicle fleet takes shape.

AAMVA emphasizes that the retention of regulations regarding the operational performance of any vehicle are essential, and encourages FMCSA to use discretion in the consideration of the removal or modification of a Federal Motor Carrier Safety Regulation that may have secondary or tertiary impacts on the crashworthiness, operational safety, or performance standards of the vehicle when considered in its entirety.

AAMVA recognizes the essential role that ADS technologies will serve in saving lives and applauds its integration into vehicle fleets. As these technologies are deployed to vehicles, it is essential for each ADS contribution towards vehicle performance to be readily available. AAMVA notes that the integration of FMCSRs and Federal Motor Vehicle Safety Standards (FMVSS) exists to standardize performance aspects of the vehicle. Removal of standardized performance or application of regulations may complicate universally applied regulations that apply important safety benchmarks to all vehicles (ADS equipped or not). While AAMVA understands that no responsible manufacturer would use regulatory removal as a platform for testing questionable vehicle performance technologies, the advent of autonomous features will attract a

much larger swath of technology from developers that may or may not be acclimated to the standard protocol for compliance with FMCSRs. It is the uniform application of a federal regulatory model that the states rely on for making determinations regarding vehicle safety.

Intersection with State Policies and Law

Careful consideration must be given to how the removal or modification of FMCSRs will affect underlying state law and administrative policies. Given that some state vehicle and licensing code is directly related to the ability of a state to meet applicable FMCSRs, the potential to disrupt state law and standing administrative policies is significant and widespread. AAMVA recommends that FMCSA consider the continued inclusion of state governments in the FMCSR modification process, so that avoidance of unnecessary legal complications can be avoided and so that disruption to current administrative practice is minimized.

AAMVA refers FMCSA to its previous comments in this docket to address the broader impacts associated with modification of the FMCSRs to accommodate automated vehicle technologies.

Questions:

1.1 How should FMCSA ensure that an ADS-equipped CMV only operates consistent with the ODD for the ADS equipped on the vehicle?

In order for FMCSA to be able to enforce the ODD of a specific vehicle that may carry numerous permutations of ADS capabilities, it will be important for FMCSA to first require the submission of clearly described ODD from the vehicle manufacturer. Only those with design oversight of the vehicles are equipped to properly analyze and describe the sufficient areas of safe operation. Once that ODD has been described and documented with appropriate federal authorities, FMCSA must develop a capability to classify and assign the ODD of the vehicle by individual vehicle identifier (most likely a VIN). Because FMCSA enforcement is limited, the ability to communicate the described ODD with state and local authorities will also play an important factor. Given that ODD may evolve alongside the vehicle through over-the-air updates and other contributing factors, the ability to locate and utilize real-time data on the described ODD will play an important role in ensuring intended ODD aligns with actual vehicle operation.

1.2 What are manufacturers' and motor carriers' plans for when and how Levels 4 and 5 ADS-equipped CMVs will become commercially available?

AAMVA defers to the expertise of the manufacturer and motor carrier community.

1.3 Should FMCSA consider amending or augmenting the definition of "driver" and/or "operator" in 49 CFR 390.5 or define a term such as "ADS driver" to reduce the potential for misinterpretation of the requirements.

Yes. A holistic look at how the term "driver" penetrates existing FMVSS and associated statutory provisions will be an important consideration. Equally important is consideration of how the term will be utilized and cross-referenced across the entire transportation safety spectrum. In its early stages, it will be important that FMCSA collaborate with all safety stakeholders on the meaning of the term as ascribed to commercial vehicle safety and ensure that the exact same definition be applicable to non-commercial applications. AAMVA believes FMCSA should consider vehicle safety in the most general terms possible. Given that we are seeing exemption applications that very lightly touch on one of the most serious aspects of operational performance - the ADS as "driver" - it is important to understand that the majority of FMVSS were comprehensively developed for vehicles transporting a human driver. Those human drivers have been evaluated based on competency at the state level in order to legally operate the vehicle, it will be important for FMCSA to clearly document who or what is responsible for the operational functions of the vehicle. AAMVA recommends FMCSA collaboration with all AV stakeholders, many of which are outlined in AAMVA's "Guidelines for the Safe Testing and Deployment of Highly Automated Vehicles."

2.1 - Should a CDL endorsement be required of individuals operating an ADS-equipped CMV?

AAMVA is currently in the process of formally exploring the application of an endorsement for an ADS-reliant CDL endorsement. Without knowing whether there is an absolute need for a specific endorsement, AAMVA believes that all drivers should be required to understand the capabilities and limitations of the advanced technologies equipped on their motor vehicles. AAMVA recognizes that the suite of technologies contributing to the driving task may be too extensive for anyone to know or be aware of on an individual component level. However, it is extremely important that all drivers be able to masterfully prove their ability to safely operate their vehicle under any conditions. With this in mind, while it may not be feasible to test a driver on the names, applications and design components of a singular ADS, what should be expected of all drivers is their unerring ability to translate what the ADS is communicating to them and contributing to the driving task by ensuring a sustained and controlled demonstration of safe driving behavior. This means intervening in the driving task to ensure adherence to all applicable safety laws, attentive oversight of the driving task, and demonstrated proficiency in controlling the vehicle. While AAMVA continues to explore the potential for endorsing ADS proficient drivers, it is nevertheless more important that FMCSA focus on how best to partner with states on the safe testing of CDL applicants who arrive in ADS equipped vehicles.

Under the assumption that ADS systems truly contribute to assisting the driver in avoidance of dangerous driving situations, ADS systems should be viewed *only* in terms of assistance. Drivers should still be required to demonstrate the safe operation of any vehicle they are in control of. With this in mind, the existence of an endorsement may only serve as relevant in the post-citation, post-crash environment. At this point, it may be too late for an endorsement to be considered a safety precaution, but the endorsement may serve a purpose in terms of liability, enforcement and predictive data on drivers. Certainly the driver licensing community has used restrictive endorsements in the past (such as the air brake endorsement), but in this instance, FMCSA is requesting comment on use of the endorsement to ensure the driver understands the capabilities and limitations of the advanced technologies. AAMVA offers that there are certain to be numerous technologies the states and other oversight agencies are not even aware of as part of the vehicle. Because the ADS system components perform a driving function, and may be less "mechanically visible" than previous restrictive endorsements, it may prove too difficult for examiners and roadside enforcement agents to realize the presence of every driver-dependent ADS technology. Further, the states may be unable to classify and integrate every individual or layered ADS technology into a uniformly recognized telltale. In terms of demonstrated ADS proficiency, the application of an endorsement for every permutation of ADS technologies seems expansive. However, the ultimate goal of safely demonstrating the ability to operate a commercial motor vehicle commensurate with federal standards seems a more achievable, outcome-based, litmus test.

2.2 – If so, what should be covered in the knowledge and/or skills test associated with an ADS endorsement?

As mentioned above, the ultimate determining factor will be the assurance that the operator can safely ensure the safe operation of the vehicle. What that takes in terms of demonstrating proficiency by each unique ADS component will take close collaboration between the documentation requirements prescribed by FMCSA, those responsible for testing in the states, and the evolution of a modern testing methodology. AAMVA stands ready to partner with FMCSA in ensuring the continued safe operation of commercial vehicles.

2.3 – What would be the impacts on SDLAs?

SDLAs would at a minimum be required to work closely with FMCSA on any modifications to the testing methodology and training their examiners accordingly. AAMVA anticipates that there would be additional training costs for any changes made to current testing. Depending on the determination made by FMCSA with respect to endorsement, there could be additional system modification costs to accommodate a new endorsement so that the changes would be accurately captured by the Commercial Driver's License Information System (CDLIS) and the shared functionality of Commercial Skills Test Information Management System (CSTIMS). Additional testing requirements

could complicate an already crowded skills testing environment and complicate the ability for states to exchange data. There are also considerations for how to incorporate additional training and testing requirements into the Entry-Level Driver Training Rule (ELDT).

As mentioned above, FMCSA would have to work very closely with its state administrators to ensure a uniform standard of proficiency in varying ADS circumstances is utilized in a consistent manner.

2.4 – Should a driver be required to have specialized training for ADS-equipped CMVs?

Yes. See our response in previous questions regarding the need for appropriate training to accompany all CDL applicants. At a minimum, drivers should be able to identify which functions of the vehicle are assisted or performed by ADS technologies. Drivers should be able to not only identify, but be trained on how to seamlessly accommodate any ADS "hand-offs" if that is described as a safety redundancy in the event of ADS failure. Drivers should be proficient in recognizing what telltales and indicators mean with respect to their associated ADS functions, should be able to detect anomalies, and should be able to proficiently intervene if they notice functional issues with the ADS. If the ADS is not capable of performing the entire dynamic driving task, the drivers should be able to perform any functions that the ADS cannot perform <u>at all times.</u>

2.5 – In an operational model that has an individual remotely monitoring multiple CMVs, should the Agency impose limitations on the number of vehicles a remote driver monitors?

The agency should seriously consider the ability of a remote operator to safely monitor any more than one vehicle at a time. Given that the term "remote operator" has been used under different scenarios, it may require further refinement of just what that function entails. If a single monitor may be required to intervene in multiple safety issues, it would seem prudent to start at a relatively low threshold to avoid any inability to respond. FMCSA would also need to clarify the role between any human occupants who are assigned to deal with vehicle performance issues and the role of the remote monitor. If the two are working in tandem, that may require a different oversight scenario than one in which the remote monitor is expected to intercede in any vehicle operations.

2.6 – Is there any reason why a dedicated or stand-by remote operator should not be subject to existing driver qualifications?
No.

Section 3 – Hours of Service

AAMVA defers comment on hours of service requirements to the motor carrier industry, FMCSA and its enforcement partners.

4.1 – Should some of the physical qualification rules be eliminated or made less stringent for humans remotely monitoring or potentially controlling ADS-equipped CMVs?

Again, FMCSA must carefully consider the differentiation of remote monitoring from remote control of a commercial vehicle. AAMVA defers on medical fitness to the experts at FMCSA, but if a remote operator is expected to take physical control of any commercial vehicle, it would seem applicable that the remote operator have the same medical fitness qualifications as a driver physically present in the vehicle.

4.2 – If so, which of the requirements should be less restrictive for human operators who would take control of an ADS-equipped CMV remotely?

AAMVA defers to FMCSA expertise on medical fitness for remote monitors.

4.3 – Should the Agency consider less restrictive rules for humans who have the benefit of ADS technology to assist them in controlling the vehicle (e.g. technologies that would enable individuals with limb impairments to operate at a level comparable to individuals without such impairment?

AAMVA defers to FMCSA on medical fitness and safety equivalency evaluation and determination.

5.1 – How should the prohibition against distracted driving (i.e. texting, hand-held cell phone) apply to onboard operators responsible for taking control of the CMV under certain situations, and to remote operators with similar responsibilities?

This question, like others, will largely depend on the SAE-level designation of the vehicle, the operational capabilities of the vehicle, and the role of the driver. As the technologies progress, the role of the "driver" may change. If the role of the driver becomes one of monitoring without the expectation that they take direct control of the vehicle, then there may be latitude on safety expectations. For the time being, any human given the designation of "driver" should be responsible for safe oversight of the vehicle without engaging in any form of distracted driving.

FMCSA further requests comments on whether fatigue monitoring and alertness assistance be provided to human drivers. Where applicable, these features have the potential to increase safety. As mentioned above, if the expectation is that the "driver" is responsible for oversight of the driving task, and that task is routinely being performed by ADS systems which may need to hand off control of the vehicle at any

point, then those types of monitors and alerts would provide a much needed additional layer of safety.

6.1 – Should FMCSA consider revising its rules to ensure that (1) any human exercising control of an ADS-equipped vehicle must continue to comply with all the rules under Part 392, and (2) a CMV under the control of a Level 4 or Level 5 ADS must satisfy the operational rules?

AAMVA supports the continued mandatory compliance of Part 392 for any human exercising control of a commercial vehicle.

6.2 – For example, should FMCSA require that the ADS be capable of identifying highway-rail grade crossings and stopping the CMV prior to crossing railroad tracks to avoid collisions with trains, or going onto a highway-rail grade crossing without having sufficient space to travel completely through the crossing without stopping?

Yes.

6.3 For scenarios in which the control of the ADS-equipped CMV alternates, or may alternate, between a human and the technology, should FMCSA require that both the human operator and ADS comply with the applicable operational rules?

Yes.

7.1 – What qualifications should be required of the individual performing the pre-trip inspection?

The individual should be able to satisfy the existing pre-trip requirements and ensure the mechanical components of the vehicle are in order and prepared for safe operation of the vehicle. The individual performing the pre-trip inspection should also be able to describe the functions of any system contributing to the dynamic driving task. The individual should be able to identify and describe any telltales or indicators that illustrate any issues preventing optimal commercial motor vehicle safety operations or any condition that may present an impediment to safety.

7.2 – What kind of routine or scheduled inspections should be performed and what types of ADS-related maintenance records should be required?

FMCSA should consider required inspections when vehicle functionality has been significantly altered. AAMVA defers to FMCSA and the manufacturers on the ability to safely evaluate ADS components throughout their lifecycle, but encourages documentation of inspections and maintenance so that safety trends or hazards might be mitigated based on the ADS components associated with each vehicle.

7.3 – Should the inspection period be more or less frequent than annual for an ADS-equipped CMV?

AAMVA defers to manufacturers, CVSA and FMCSA in making determinations on inspection periods for ADS-equipped vehicles. However, if the vehicle undergoes a significant change through over-the-air updates or experiences a change in its automated capabilities, FMCSA may want to consider tying significant functional changes to the vehicle inspection process.

7.4 – Should inspections be mileage based or time based?

AAMVA defers to industry and FMCSA expertise in developing appropriate safety evaluation criteria. The inspections should be conducted annually at a minimum.

7.5 – Should FMCSA impose general requirements for motor carrier personnel responsible for ADS-related inspection, repair, and maintenance tasks similar to the Agency's brake inspector qualification requirements?

Motor carrier personnel responsible for ADS-related inspection, repair, and maintenance should have the technical experience and expertise to correct any issues with the CMV. Given that this will become a highly-technical duty, FMCSA may want to ensure they have the ability to satisfy any issues with the ADS functions of the vehicle – including the ability to identify and mitigate safety hazards that may be the result of faulty software or system integration.

7.6 – How could FMCSA ensure that motor carriers apply safety-critical software updates?

One way to ensure all appropriate safety-critical software updates have been installed is to make motor carriers attest to that fact as a part of periodic or roadside inspections. The visibility to ensure different software patches have been installed will not be readily apparent to third parties, so documentation of attestation by manufacturers that the safety-critical updates have been deployed coupled with attestation by the operator/motor carrier that the updates have been installed may assist the agency.

8.1 – Should motor carriers be required to notify FMCSA that they are operating Level 4 or 5 ADS-equipped CMVs?

Yes.

8.2 – If so, how should the carrier notify FMCSA?

AAMVA defers comment on the best method of communication between motor carriers and FMCSA, however, that communication should be readily documented.

8.3 – Should FMCSA require markings identifying the ADS level of a vehicle?

AAMVA recommends that ADS-equipped vehicles should be marked in a visible manner so that roadside enforcement and first responders can readily identify them. Given that the ADS capability of the vehicle may change, an external identifier of any AV capability may make sense rather than a static external identifier of the level of ADS capability. AAMVA also recommends that the vehicle be able to *communicate safety data* to first responders and roadside enforcement agents (whether manned or unmanned.) Beyond visible exterior markings, it would be helpful to first responders and crash investigators to have access to information on whether the ADS or a human operator was in control of the CMV.

8.4 – Should the Agency require motor carriers to utilize ADS-equipped CMVs that have a malfunction indicator?

FMCSA should consider how malfunctions can be properly and efficiently identified by third parties – especially in the case of safety-critical failures. This is important to all parties interacting with the vehicle if it is operating in an unsafe state.

8.5 – Should the Agency require that motor carriers deploying ADS-equipped CMVs ensure the vehicle can pull over in response to federal and state officials or move out of the way of first-responders?

Yes.

8.6 – How might that be achieved, and at what cost?

Any impediment to first responders' ability to respond to an incident should be met with appropriate enforcement penalties. States have already developed associated laws for mitigating this problem for human drivers. Motor carriers who impede first responders should be subject to the same consequences as any other entity, with the caveat that if FMCSA sees the problem as endemic, the vehicles be removed from service until they can properly identify and respond to emergency services.

8.7 – How would roadside enforcement personnel know that a vehicle can no longer operate safely?

See previous comments regarding safety-critical telltales and system failure. AAMVA has also commented on attestation, which would only solve part of the issue. The other half of the equation is being able to detect and identify non-visible signs of unsafe operation. AAMVA would defer to CVSA on the best way to ensure roadside enforcement personnel know that a vehicle can no longer operate safely.

8.8 – Absent an FMVSS, how could standard indications be provided to enforcement personnel?

FMCSA must describe what standard information is critical for safe operation of the CMV. Given there are numerous different functions of the ADS-equipped CMV that may impact safe operation, FMCSA should consider what malfunctions or failures are deemed safety-critical and associate a uniform indicator that can be easily identified by third parties. In the absence of a single indicator for multiple functions, FMCSA should consider the ability to transmit available safety data to inspectors and enforcement, and must require that the data be submitted to enforcement personnel if requested.

9. Cybersecurity

AAMVA defers comment on cybersecurity to those most qualified to protect the integrity of ADS systems.

10.1 – As the development of ADS technology continues, the Agency believes there is a need to learn about the performance limitations of these systems. FMCSA draws a distinction between information about performance limitations and details about the system design. To what extend to ADS developers believe performance data should be considered proprietary and withheld from the public?

While AAMVA will not comment on behalf of ADS developers, we do recommend the need for manufacturers to collaborate with FMCSA on how to submit information on ADS systems. All applicable and relevant testing data that applies to exemption from the standard should be documented. Where sensitivity around sharing that data for proprietary reasons may limit the prudence of submission of this data, the manufacturer should attest to having data supporting the relative safety measurement of performance and should attest to its veracity. Petitioners declining to provide data for proprietary reasons should be prepared to claim ownership of the technologies as their own. Manufacturers should also provide enough of a detailed description to allow for comparison against existent technologies so that it can be differentiated from other models and evaluated for its “innovative” nature.

AAMVA thanks FMCSA for the opportunity to comment on its consideration of integrated ADS technologies in commercial motor vehicles. AAMVA understands the need for FMCSA to be agile in its approach to moving life-saving technologies to consumers and stands willing to work with the agency as we revisit what it means to deemed federally compliant with a robust catalogue of commercial safety regulations.

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