August 23, 2019

Raymond P. Martinez
Administrator
Federal Motor Carrier Safety Administration
1200 New Jersey Avenue SE
Washington, DC 20590

Re: Docket FMCSA-2018-0037, Safe Integration of Automated Driving Systems-Equipped Commercial Motor Vehicles

Dear Administrator Martinez:

The Iowa Department of Transportation (Iowa DOT) is pleased to provide comments on the Federal Motor Carrier Safety Administration (FMCSA) Advance Notice of Proposed Rulemaking on "Safe Integration of Automated Driving Systems-Equipped Commercial Motor Vehicles" (Docket FMCSA-2018-0037). Given the speed of technological development and adoption of emerging technologies to support commercial motor vehicles equipped with automated driving systems (ADS), it is reasonable and necessary for FMCSA to revisit the Federal Motor Vehicle Carrier Safety Regulations (FMCSRs) that may need to be amended, revised, or eliminated to account for significant differences between human operators and ADS. Iowa DOT is eager to support the advancement of ADS-equipped commercial motor vehicles to improve safety, mobility, and reliability of the transportation system.

On the following pages of this letter we provide specific responses to the questions in section XI of the notice.

We urge your consideration of the responses provided in this letter. Iowa DOT appreciates the opportunity to contribute to the federal rulemaking process.

Best regards,

Mark Lowe
Director

(515) 239-1111
Mark.Lowe@iowadot.us
www.iowadot.gov
Address:
[800 Lincoln Way, Ames, IA 50010]

Questions and Responses

1. Do the FMCSRs require a human driver?

   1.1. Should FMCSA establish a rule that would prohibit an ADS-equipped CMV from operating outside its designated ODD?
   Response: Yes, until the operating systems can be fully vetted and their reliability to operate safely is confirmed. We must embrace new technology and understand this is the future. However, it must be proven to be safe and ultimately not a danger to the rest of the driving public.

   1.2. What are manufacturers' and motor carriers' plans for when and in what way Level 4 and 5 ADS-equipped CMVs will become commercially available?
   Response: N/A

   1.3. Should FMCSA consider amending or augmenting the definition of ''driver'' and/or ''operator'' provided in 49 CFR 390.5 or define a term such as ''ADS driver'' to reduce the potential for misinterpretation of the requirements?
   Response: Yes, definitions need to specifically outline what defines a "driver" or an "operator." Questions will quickly arise if not defined properly, which will require interpretations to clarify.

2. Commercial Driver's License (CDL) Endorsements

   2.1 Should a CDL endorsement be required of individuals operating an ADS-equipped CMV?
   Response: Yes, a human driver obviously must have the proper class of license and endorsements to operate the vehicle should the ADS fail. The human driver should also be required to demonstrate basic understanding of how the ADS systems operate. This could be accomplished through training and subsequent testing of the driver on this subject

   2.2 If so, what should be covered in the knowledge and/or skills test associated with an ADS endorsement?
   Response: The applicant would need to demonstrate a clear understanding of an ADS-equipped CMV and the skills necessary to safely operate the vehicle, as well as the ability to respond appropriately when there is a malfunction of the vehicle and the human driver is required to take over.

   2.3 What would be the impacts on State Driver License Agencies (SDLAs)?
   Response: The greatest impact would be the education of staff involved in testing drivers. Staff would have to be trained on the new testing standards and what to expect of the drivers given the presence of technology to perform some or all of the driving tasks. In addition, these changes could be multiplied since there are may be numerous systems in use. Similar to electronic logging devices, it is assumed there will be multiple companies or vendors developing proprietary ADS products. It will be very difficult unless just one system is approved.

   Additional impacts: the need to program the issuance database, electronic skills test tablets, and knowledge testing software; as well as the need to update all web and print materials including manuals and guidance documents.

(515) 239-1111
Mark.Lowe@iowadot.us
www.iowadot.gov
Address:
[800 Lincoln Way, Ames, IA 50010]

2.4 Should a driver be required to have specialized training for ADS-equipped CMVs?
Response: Yes, a human driver needs to show proficiency with the ADS. A human driver needs to understand what the ADS system can do safely and also what the system is incapable of doing. This can only be accomplished with mandatory and specialized training on how the system operates.

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?
Response: Yes, the number may depend on where the vehicles are operating and at what speeds. We recommend limiting the number of vehicles a remote driver can operate based on the degree of difficulty associated with each ADS involved. We would suggest no more than two.

2.6 Should a dedicated or stand-by remote operator be subject to existing driver qualifications?
Response: Yes, any individuals involved in any way with operation or observation of CMV's must be qualified.

3 Drivers' Hours of Service (HOS) Rules

3.1 Should HOS rule changes be considered if ADS technology performs all the driving tasks while a human is off-duty or in the sleeper berth, or physically remote from the CMV?
Response: There will be a need to change the definitions of driving time in FMCSR section 395.2 to include physical and remote control. The stand-by or remote operator should be defined as "on-duty."

3.2 Should the HOS requirements apply to both onboard and remote operators?
Response: Yes, an on-board and a remote human operator should be on the same duty status. Fatigue and boredom would be nearly the same for either.

3.3 If so, how should HOS be recorded when an individual is not physically in control of the vehicle?
Response: It could be recorded as, "On-duty not driving time."

4 Medical Qualifications for Human Operators

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?
Response: No. To ensure the safety of the public as well as the safety of the physical driver of the vehicle, individuals monitoring or controlling the operation of ADS-equipped CMVs remotely must meet the same physical qualifications as those physically driving 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?
Response: Regulations should not be less restrictive. They should have a commercial driver's license as well as the training to drive ADS-equipped CMVs remotely.

(515) 239-1111
Mark.Lowe@iowadot.us
www.iowadot.gov
Address:
[800 Lincoln Way, Ames, IA 50010]

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 impairments)?
Response: For safety reasons, with the current state of the technology and its acceptance by the public, these rules should be no less restrictive.

5 Distracted Driving and Monitoring

5.1 How should the prohibition against distracted driving apply to onboard operators responsible for taking control of the CMV under certain situations, and to remote operators with similar responsibilities?
Response: The same distracted driving prohibitions that apply to physical drivers should also apply to onboard operators responsible for taking control of the CMV under in certain situations, and also to remote operators with similar responsibilities. The level of ADS will dictate the level of attention that the "operator" must give the vehicle. The operator will still be responsible for the safety of the vehicle being operated.

6 Safe Driving

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?
Response: Yes.

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?
Response: Yes. An ADS vehicle would operate just as safely, or more safely than a human operated CMV and until more highly automated vehicles become more prevalent, consistency must be maintained in the operation of CMVs between human operators and ADSs.

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?
Response: Yes, to maintain consistency in operation and human driver expectation, especially if a hand-off of the driving task is made between the human and the ADS.

7 Inspection, Repair, and Maintenance

7.1 If so, what qualifications should be required of the individual performing the inspection?
Response: An inspector should have advanced training concerning the technical aspects of the equipment that they will be using or inspecting. If they are required to work with the CMV, then they should go through the same qualifications that the CMV human driver is required to complete.

(515) 239-1111
Mark.Lowe@iowadot.us
www.iowadot.gov
Address:
[800 Lincoln Way, Ames, IA 50010]

7.2 What kind of routine or scheduled inspections should be performed and what types of ADS- related maintenance records should be required?
Response: The computer system must go through self-checks in a predetermined regulatory period to ensure sensors and equipment are operational. When an issue is found, the vehicle must be removed from the roadway. Maintenance records of the self-diagnostics should be maintained in the computer system of the vehicle or be available off-site on a centralized database. Daily inspections logs must be completed. Any mechanical issues should be fixed in a timely manner, with documentation requirements similar to those of the CMV human driver.

7.3 Should the inspection period be more frequent than annual for an ADS-equipped CMV?
Response: Until the technology is more widely adopted and broadly accepted, it is recommended that more frequent inspections be conducted.

7.4 Should inspections be mileage- based or time-based (e.g., 1,000 miles, 3 months or 1,000 hours of operation)?
Response: Inspections should be both mileage- and time-based. For example, 1,000 miles or three months, whichever is sooner. With the possibility of the operator overseeing several vehicles, they need to be inspected more frequently.

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?
Response: Yes, inspectors should be held to a high standard of knowledge and skill and be required to test annually to demonstrate proficiency in the use, repair, and operation of ADS systems. Technology and standards will change rapidly so inspectors will need to stay proficient on the latest operational methods, technology, and procedures.

7.6 How could FMCSA ensure that motor carriers apply available after- market software updates?
Response: Until ADS technology is further adopted and standardized and it is possible to verify the vehicle status and software version remotely, it will be necessary to trust motor carriers. It could be noted in the maintenance files or could become part of the inspection process. If the vehicle does not have updates as necessary, the vehicle should be shut down. Long-term, and as technology progresses, if the vehicle is connected to a central database, a diagnostic check could be required to ensure updates are being made.

8 Roadside Inspections

8.1 Should motor carriers be required to notify FMCSA that they are operating Level 4 or 5 ADS-equipped CMVs?
Response: Yes. It is assumed each OEM or motor carrier will have the ability to determine when an ADS is operating at level 4 or 5. Similar to applying for a permit and until this technology is more broadly adopted, reporting this information would be helpful to maintain safety on the transportation system in the event of an accident.

(515) 239-1111
Mark.Lowe@iowadot.us
www.iowadot.gov
Address:
[800 Lincoln Way, Ames, IA 50010]

8.2 If so, how should the carrier notify FMCSA?
Response: As noted above, FMCSA should be updated with any change of vehicles. In the near term, this could be by letter or by the carriers submitting updated forms online. The FMCSA could update existing forms or create an email process to store this information in a database. At this level of automation (4 and 5), it is assumed the vehicles are connected to a centralized database system that would allow for such exchange of information to occur dynamically.

8.3 Should FMCSA require markings identifying the ADS Level of a vehicle?
Response: Yes, it will help roadside inspectors and support staff (such as but not limited to peace officers, maintenance staff, and Highway Helper) identify what type of vehicle they're dealing with. If hours of service for ADS-equipped CMVs are changed, this will be critical. This will also help increase the effectiveness and actions taken by emergency response.

8.4 Should the Agency require motor carriers to utilize ADS-equipped CMVs that have a malfunction indicator?
Response: Yes, for the safety of all involved.

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?
Response: Yes, it must have this function to ensure safe operation of the transportation system.

8.6 How might that be achieved, and at what cost?
Response: Sensors, cameras, or other technology could detect a flashing light or siren or communicate between vehicles and warn a human driver (if present) when the vehicle is in ADS mode and performing some or all levels of the driver tasks. It is crucial that the ADS communicate to a human driver if not involved in the driving tasks to avoid startling the human driver and potentially making conditions worse.

8.7 How would roadside enforcement personnel know that a vehicle can no longer operate safely?
Response: There could be a unique warning signal or light on the vehicle that would tell a person that the vehicle is out of service. It could be as simple as headlamps and brake lamps flashing, or a lamp in the windshield or rear-window that reads "Out-of-Service." If the ADS fails, the system should automatically detect the issue and safely pull the vehicle over. Once stopped, the ADS should have a mandatory warning system alerting the driver and inspector of the issues. An ADS system should have a lockout feature (once safely stopped) that cannot be reengaged until the ADS system is serviced and fixed by a certified technician. The ADS would need a mandatory reset to be reengaged.

8.8 Absent an FMVSS, how could standard indications be provided to enforcement personnel?
Response: Warning lights associated with the operating system of the ADS, submitted remotely to a centralized database. This process could be similar to the electronic log process.

(515) 239-1111
Mark.Lowe@iowadot.us
www.iowadot.gov
Address:
[800 Lincoln Way, Ames, IA 50010]

9 Cybersecurity

9.1 What types of safety and cargo security risks may be introduced with the integration of ADS-equipped CMVs?

Response: Any vehicle that has an unsecured computer system can be made to operate in an unsafe manner and have cargo stolen. Someone could take control of a CMV remotely, essentially kidnap the human driver, steal the cargo and put a ransom on the vehicle, human driver, or cargo, and crash the CMV if a ransom isn't paid. Cyber thieves would try to take control of the ADS vehicle to safely drive it to an alternate location with the intention of stealing the load. There are also concerns about terrorism and criminal interdiction.

9.2 What types of rules should FMCSA consider to ensure that motor carriers safety management practices adequately address cybersecurity?

Response: FMCSA would need to have regular checks of the technology to confirm it's working correctly as designed. As with the system updates, the vehicle must have up-to-date cyber security and meet some sort of network security requirements. They would also need to develop a security policy and review it on an annual basis.

10 Confidentiality of Shared Information

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 (e.g., how well does the ADS keep the vehicle in its lane and under what environmental conditions, etc.) and details about the system design (e.g., the specific types of sensors, or the arrays of sensors and cameras used for input to the central processing unit for the ADS). To what extent do ADS developers believe performance data should be considered proprietary and withheld from the public?

Response: The performance data of the system should be public information. Everyone driving on the roads will want to know the limitations of the ADS. The technology behind the ADS operation could be kept proprietary. Proprietary information can be withheld to the point that safety is not affected.

10.2 Are the Agency's current processes under 49 CFR 389.9 for submission and protection of confidential business information in the context of a rulemaking sufficient to allow ADS developers and motor carriers to communicate essential information to the Agency regarding the operation of ADS?

Response: Business information can be withheld if the safety of the operation of the vehicle and the public is not jeopardized. This is an area where a legal opinion is recommended.

10.3 If not, how should those processes be modified?

Response: N/A

(515) 239-1111 | Mark.Lowe@iowadot.us | www.iowadot.gov | **Address:** [800 Lincoln Way, Ames, IA 50010]