ALLIANCE FOR AUTOMOTIVE INNOVATION

May 29, 2020

James C. Owens, Esq.
Acting Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

RE: Notice of Proposed Rulemaking (NPRM); Occupant Protection for Automated Driving Systems, NHTSA Docket No. 2020-0014, 85 Fed. Reg. 17624 (March 30, 2020)

Dear Acting Administrator Owens:

The Alliance for Automotive Innovation (Auto Innovators) appreciates this opportunity to provide comments supporting the National Highway Traffic Safety Administration (NHTSA or "Agency") efforts to address regulatory barriers for vehicle equipped with automated driving systems (ADS) through the subject NPRM.

Vehicles operated by an ADS have the potential to significantly improve overall safety on our nation's roadways. In 2018 alone, 36,560 traffic crash fatalities[1] occurred in the United States with the major factor in 94 percent of all fatal crashes being human error.[2] ADS-operated vehicles are the most promising approach for addressing these driver-error crashes, having the potential to reduce this number by using advanced sensing technologies combined with artificial intelligence programing to avoid crashes. Unlike conventional human drivers, the ADS cannot get distracted, drive impaired, or fall asleep at the wheel. In addition to safety benefits, ADS-operated vehicles hold promise to provide numerous social and economic benefits, including less congestion, lower fuel consumption, and increased mobility for older adults and people with disabilities.

We appreciate that NHTSA has continued the important work to reduce regulatory barriers to ADS-equipped vehicle deployment. The "technical translation" approach to

[1] https://www-fars.nhtsa.dot.gov/Main/index.aspx

[2] Automated Driving Systems 2.0, A Vision for Safety, https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf

identify and address regulatory barriers for ADS-DVs (Automated Driving System-Dedicated Vehicles) will help to align such vehicles within the framework of the current Federal Motor Vehicle Safety Standard (FMVSS), thereby maintaining motor vehicle safety. This approach will reduce the need to rely on the administratively complex and time-consuming FMVSS exemption process. We strongly urge NHTSA to expedite completion of this key step toward addressing and resolving the subject regulatory barriers for vehicles equipped with automated driving systems. We also urge the agency to expeditiously issue an NPRM for the 100 series standards, as well as rulemaking notices addressing warning labels and telltales in order to complete this initial effort to reduce unnecessary administrative barriers to certification of automated vehicles. We also appreciate the agency providing a full redline markup illustrating the proposed revisions to the standards and encourage this practice in future rulemakings.

Parallel Phased Approach

Auto Innovators emphasizes that the task of amending each appropriate FMVSS to remove its barriers to the introduction of ADS-operated vehicles, especially those without manual controls, needs to be completed using a parallel and phased approach. This approach should focus on assigning priorities to tasks, so that the agency can focus in the near-term on removing unnecessary regulatory barriers, enabling ADS-equipped vehicles to be within the safety framework of the existing FMVSS, thereby realizing societal benefits associated with these vehicles as soon as possible. In the longer term, the agency should develop a structure of additional guidance and, where necessary, further rulemaking to make the FMVSS requirements and test procedures fully compatible with ADS operation in accordance with the Motor Vehicle Safety Act. This is not to say that no work should be done immediately on the longer-term matters. Agency research should continue and expand as needed on fundamental automated vehicle safety performance metrics and criteria.

Fortunately, there are near-term solutions that do not require extensive research or immediate rulemaking, in particular a continuation of the "technical translation" work, relevant legal interpretations or guidance, compliance test procedure modification where there is not alignment with the corresponding regulatory text, and allowance of technical documentation as a component of a Part 555 temporary exemption application. Auto Innovators urges that any of this type of action be conducted in parallel with foundational rulemaking to fully codify any technical interpretations or significant revisions to the test procedures.

Another near-term action that could facilitate ADS-equipped vehicle testing and deployment with appropriate oversight by the Agency is the proposed AV Pilot Program.

AV Pilot Program

The AV Pilot Program contemplated in the October 10, 2018, ANPRM would establish exemptions to advance NHTSA's safety research and build public acceptance of the technology. The Pilot Program would advance the testing and deployment of ADS-

equipped vehicles in a framework that provides NHTSA with critical data and information that could be used to inform a future safety assurance framework for such vehicles. Further, the Pilot Program would enable the public road testing that is required as part of the engineering process to fully develop ADS-equipped vehicles.

To date, most of the FMVSS exemptions that automakers have been granted occur under Title 49, Section 30113 of the U.S. Code. However, 30113 exemptions have volume (2,500 vehicles per manufacturer) and duration (2 years) limitations that may hinder their effective use for ADS-operated vehicles in certain circumstances. This is especially true if one purpose of the exemption is to generate the requisite data needed to support a new or modified FMVSS.

The Motor Vehicle Safety Act provides another avenue for exemptions under 49 U.S.C. 30114. Section 30114 has traditionally been used to provide exemptions for imported vehicles but provides authorities beyond this scope. When coupled with the authority provided by Section 30182, which confers authority on NHTSA to conduct motor vehicle safety research, "including activities related to new and emerging technologies," Section 30114 authorizes NHTSA to create and execute a Pilot Program for ADS-operated vehicles.

Unlike Section 30113, a Section 30114 exemption is not constrained by any statutory maximum on the number of vehicles or the duration of the exemption. It is likely that much more than 2,500 vehicles will need to be placed in service if the agency hopes to generate the requisite, statistically significant data during the Pilot Program. It is also likely that a duration of more than two years may be needed, both to generate statistically valid data on the performance of the subject vehicle, as well as to justify participants' investment in the Pilot Program. Structuring the Program to allow collection of sufficient data will be critical to support future FMVSS rulemaking in compliance with Section 30111.[3]

If implemented, the AV Pilot Program would be a significant step for the Agency to help develop public trust in the technology and create a clear pathway for ADS-equipped vehicles testing and deployment. Furthermore, it would do so with NHTSA oversight and generate the data and information necessary for the Agency to create new or modified FMVSS for ADS-equipped vehicles.

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[3]Auto Innovators finds both Section 30114 and 30113 exemptions to be valuable, but situation dependent. Thus, the AV Pilot Program should proceed under Section 30114, while recognizing that some automakers may continue to seek exemptions under Section 30113.

Part 581

While not the subject of this notice, amending Part 581 in accordance with the December 5, 2018, Alliance/Global/MEMA rulemaking petition is critical in order to remove barriers to the deployment of ADAS and ADS-equipped vehicles and remain technology neutral with respect to sensor technologies. As detailed in the petition, the Part 581 bumper test requirements significantly inhibit the fitment of bumper mounted advanced crash avoidance sensors as standard equipment. Such sensors and sensor placements are critical enablers to the deployment of ADS-equipped vehicles. Auto Innovators encourages NHTSA to prioritize this rulemaking.

Technical Comments

Below are high level summaries of key Auto Innovators technical observations and recommendations. More specific treatment of these and other topics is detailed in the Appendix. In addition, Auto Innovators also reviewed the 300, 400, and 500 series of standards and provided our comments and recommendations that could also be considered either as part of this rulemaking or in a separate one. Our detailed comments on these additional standards are also included in the Appendix.

Obsolete Provisions

NHTSA notes that various sections of the regulatory text of FMVSS No. 208 are no longer active because they have been superseded by revisions NHTSA has made over the years. Eventual removal of obsolete provisions of the standard would make the standard much clearer and should eventually be done. However, we agree that there are instances where "obsolete" provisions are referenced by other provisions that are not "obsolete," so simple deletion of such provisions would not be appropriate. Given the urgency of this rulemaking, Auto Innovators recommends that NHTSA put a "clean up" of this standard on its regulatory "to do" list, but not include it as part of this rulemaking.

Technology Neutrality

Auto Innovators appreciates the agency's efforts to propose regulatory modifications that are technology neutral. This is especially important for ADS-equipped vehicles because the technology is at a phase where manufacturers are developing and deploying many different types of technical solutions to address the key performance challenges of ADS operation. It is critical that regulatory requirements be performance-based and technology-neutral so as not to inhibit the development and deployment of a diverse range of applicable technologies. Where a single technical requirement might not be universally technology-neutral, we urge NHTSA to explore alternative compliance options that enable additional technologies or approaches to achieve the same safety goal.

Motion Suppression

The NPRM proposes motion suppression for dual mode vehicles when: 1) the occupant of the seat is classified as a child, for which air bag suppression would be an option in a passenger seat, i.e., up to a 6-year-old as determined by the same test procedures used by air bag suppression (S20, S22 and S24); and 2) the vehicle is an operational state that does not require a driver, i.e., any situation where the ADS is under full control.

We appreciate the thoughtful concern expressed in this proposal and agree that while children should not be placed in the front seat if other seating options exist, whenever a child can be placed in front of an air bag when the vehicle is in motion the appropriate advanced air bag requirements should apply at that seating position. However, the issue of vehicle motion suppression does not fall within the category of a simple technical translation of current FMVSS 208 requirements. While we firmly support the need to address child occupant safety in dual mode vehicles, in our view the current technical translations rulemaking is not the mechanism for consideration of the broader topic of vehicle operational safety. Therefore, we urge NHTSA to complete the current technical translations rule without including the vehicle motion suppression proposal and address motion suppression and other vehicle operational topics on a separate track.

Center Front Seat

As NHTSA notes, there is no existing FMVSS requirement for an air bag in the center front seat. Where there is only a single forward-facing front row center seat (and no other front row seating positions), current levels of FMVSS 208 crash performance, including advanced air bag performance criteria, if applicable, should be required for that position. However, in order to maintain technical neutrality, there should not be a specific air bag installment requirement to meet this crash performance.

In addition to the performance requirements when there is only a single forward-facing front row center seat, the airbag telltale requirements currently appropriate for the front right seat should apply.

FMVSS 204/208

While Auto Innovators agrees with the agency's proposed modification to FMVSS 204, we note that this standard is ripe to be re-evaluated to consider exemption of vehicles that already comply with the frontal crash performance requirements of FMVSS 208 through the installation of advanced air bags.. Review of the March 23, 2006, denial of the Honda petition, indicates that the primary reason for denial (lack of data with respect to how FMVSS 204 relates to vehicles certified to the advanced air bag requirements) is no longer valid. Auto Innovators supports the agency considering whether to exempt FMVSS 208 compliant vehicles from FMVSS 204 as a separate deregulatory rulemaking that should not be included as part of the subject rulemaking in order to avoid delay in completing the latter rulemaking.

Parking Brake & Transmission Position Criteria

Auto Innovators agrees with NHTSA's proposal to maintain the existing text noting that the agency indicated that:

> *NHTSA has tested vehicles with automatic electronic parking brakes and electronic gear selectors, which may make it challenging to place the vehicle transmission and brake into the pre-test position. In these instances, NHTSA and its testing laboratories have worked with the vehicle manufacturers to achieve the necessary vehicle status.*

In this case, since the standards being tested are not for parking brake or gear selector performance, it is only necessary for the agency to obtain information from the manufacturer to ensure that the vehicle be either in a state where it will not roll on its own (e.g., FMVSS 214), or able to roll freely (e.g., FMVSS 208 impact tests). As long as these conditions are met, the FMVSS test in question will be able to be conducted with no adverse effects from the methods used to achieve either stationary or free rolling conditions.

FMVSS 205 Light Transmittance/Shade Bands

While Auto Innovators agrees with NHTSA's proposed revisions to the FMVSS 205 applicability section for trucks without a designated seating position (DSP), the agency should also consider revising the following visibility requirements for vehicles without a driver's DSP and no manual driving controls.

S5.3 Shade Bands – for ADS-DVs without a human driver, the visibility requirements established in FMVSS 205 for a human driver serve no safety need. The portion of the shade band in front of the forward-facing camera assembly is eliminated and the camera assembly (including a decorative black strip surrounding the area where the camera assembly meets the windshield) also exceeds the allowable lower boundary of the shade band area.

General transmittance issues - NHTSA should consider adopting the SAE J3097 procedure into FMVSS 205 to allow both trucks and passenger cars to use privacy glass rearward of the B-Pillar and allow additional options of glass plastics including polycarbonate, which offers potential weight, cost savings and additional protections. Adopting the procedure can also harmonize the regulation with EU standards (allows polycarbonate) and transmittance criteria, rearward of the B-Pillar.

Darkening the windows rearward of the B-Pillar can reduce the sun load, which in turn can lower air-conditioning needs especially during summer, resulting in fuel savings or longer driving range for electric vehicles.

Additional savings can be accrued without compromising safety in the case of ADS-equipped vehicles, by darkening all the openings, since unlike human drivers that need to

see outside the windshield, ADS-equipped vehicles use multi-modal sensors for 360-degree awareness. The perception sensor suite includes externally mounted sensors like radars, lidars and cameras. One or more exterior facing cameras in the sensor suite could be located within the passenger compartment but only need a small section of clear glass to perceive the surroundings.

We recommend that the agency undertake this matter, in a manner that is consistent with the needs of first responders and law enforcement personnel to view the interior of the vehicle. However, if doing so as part of the current rulemaking would delay issuance of a final rule, we would support deferring action for a separate rulemaking proceeding.

Applicability

There are a number of standards where the applicability section should be updated to expressly exclude vehicles where there is no DSP. In some cases, it appears that the agency intended such exemption to apply. However, the agency may have considered it obvious that the standards do not apply to such vehicles. In our view, making the "Application" sections of the various FMVSS consistent and explicit in their identification of classes of vehicles that are included or excluded from the requirements of the standards will be an aid to those who reference the standards and could avoid future questions.

These standards are:

- FMVSS 202a (Head restraints)
- FMVSS 210 (Seat belt assembly anchorages)
- FMVSS 212 (Windshield mounting)
- FMVSS 213 (Child restraint systems)
- FMVSS 219 (Windshield zone intrusion)
- FMVSS 302 (Flammability of interior materials)
- FMVSS 500 (Low-speed vehicles – portions of standard)

Auto Innovators appreciates the opportunity to provide input to NHTSA on this important topic. We look forward to any follow up with the agency to expand on these comment s further.

Sincerely,

Scott Schmidt
Senior Director, Safety

Enclosure

APPENDIX

AUTO INNOVATORS RECOMMENDED ADDITIONS TO NHTSA TECHNICAL TRANSLATIONS

General comments

Timing of rulemaking

We urge NHTSA to assign a high priority to completion of this rulemaking. The vast majority of the proposed changes in regulatory language should not be controversial, while adopting the revised language would provide immediate benefit to both the agency and manufacturers in facilitating the certification of automated vehicles within the framework of the existing FMVSS. We make the same request for completion of all the FMVSS technical translation rulemaking on an expedited basis, including the planned rulemaking on 100-series standards.

Obsolete provisions

As noted by the agency[4], FMVSS 208 contains numerous provisions which are not applicable to current vehicles, such as phase-in requirements and performance criteria for previous model year vehicles. Removal of obsolete provisions in the standard would be desirable from the readability perspective. However, we agree that there are instances where "obsolete" provisions are referenced by other provisions that are not "obsolete," so simply deleting all of the "obsolete" provisions may not be appropriate. We would not want to delay completion of this rulemaking while agency staff attempt to resolve these issues, though we urge the agency to undertake this effort on a separate track.

Technology neutrality

We fully support NHTSA's commitment to maintain technology neutrality in modernizing the FMVSS to accommodate automated vehicles.[5] Given the numerous paths that future technology may take, every effort should be made to avoid imposing unnecessary burdens on innovation. Reliance on performance-based criteria in the FMVSS, rather than imposing technology mandates, will best avoid the imposition of such burdens on innovation.

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[4] See 85 Fed. Reg. 17639.

[5] See section III.b.4 of the preamble to the proposal.

Parking brake and transmission position criteria

We support NHTSA's proposal to apply current test criteria in several FMVSS regarding parking brake application and transmission shift lever position.[6] We agree that NHTSA staff can continue to work with manufacturers to identify methods for achieving the necessary parking brake and transmission status for compliance testing, even in the case of advanced vehicles that do not have conventional controls for these systems.

FMVSS revisions

Part 571.3 (Definitions) - *"forward control"* definition. ADS equipped vehicles may use electrified powertrains that can afford developers innovative vehicle architectures for optimizing new mobility needs. Such architectures may not have been possible with a traditional internal combustion engine. Some of the new architectures may have a Forward Control design[7,8,9], but the absence of an engine and manual controls will not allow them to meet the definition of a Forward control vehicle described in section 571.3. The proposed change to the definition recommends the alternative use of the electric motor in place of the engine and a reference point relative to a first-row seating reference point in place of the steering wheel hub when either do not exist.

Auto Innovators is developing recommended regulatory language to address these concerns, which will be provided separately in a supplemental submission.

FMVSS 201 (Occupant protection in interior impact)

S5.1.1(d) – In the console test of S5.1, NHTSA proposes to exclude from testing those areas determined in relation to the "inboard edge of the steering control." For unconventional steering controls such as joysticks, it is not clear how this determination would be made. We suggest that for any such unconventional steering control, an alternative determination be made, perhaps by reference to the seating reference point. We plan to develop a specific recommendation for NHTSA on how to make this determination for unconventional steering controls, which we will provide in a supplemental submission.

In addition, in that section NHTSA proposes to use the phrase "if the steering control is present." It is not clear how this phrase would be applied for a dual mode vehicle in

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[6] See 85 Fed. Reg. 17641.

[7] Navya shuttle – www.navya.tech

[8] VW Sedric concept - https://www.volkswagenag.com/en/news/stories/2018/02/sedric-the-future.html

[9] Cruise Origin concept - https://www.getcruise.com/origin/

which the steering control might be stowed in various manners or simply deactivated. We suggest changing this phrase to "if the steering control is present or, in the case of dual-mode vehicles, fully deployed in manual driving mode."

FMVSS 202a (Head restraints)

S2 -We recommend adding a statement in the first sentence of the application section to make it explicitly clear that the standard does not apply to trucks that have no designated seating positions.

> "This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks ***that have at least one designated seating position***, and buses …"

S4.7.1 – The phase "including the driver" is unnecessary and inappropriate for a truck with no DSP. It should be deleted.

FMVSS 204 (Steering control rearward displacement) –

S2 - In our view, vehicles that comply with FMVSS 208 frontal barrier crash requirements should be exempt from this standard, as is the case with the other steering system standard, FMVSS 203. This has been an issue of discussion for many years, with NHTSA at one point proposing such an exemption in FMVSS 204. See history cited at 71 Fed. Reg. 14673, March 23, 2006. Now that data regarding vehicles having advanced air bags is available to assess whether FMVSS 204 criteria provide additional safety benefits, the agency should reevaluate this matter. However, the agency should not delay the completion of this rulemaking to conduct the necessary analysis, but rather should pursue that matter on a separate track.

FMVSS 205 (Glazing materials)

Allowing greater flexibility in light transmittance levels and regulation of shade bands in vehicles without a driver's DSP would help reduce sun load, and thereby reduce air conditioning load. Such changes would, in turn, improve fuel economy and EV driving range. We recommend that the agency undertake this matter, in a manner that is consistent with the needs of first responders and law enforcement personnel to view the interior of the vehicle. However, if doing so as part of the current rulemaking would delay issuance of a final rule, we would support deferring action for a separate rulemaking proceeding.

FMVSS 208 (Occupant crash protection)

It is not clear how the agency would evaluate various configurations of manual driving controls in dual mode vehicles, in terms of whether those configurations are considered to be stowed. The agency discusses related issues in the preamble to the NPRM:

> *"For occupant protection, some of the issues that require further research include novel seating arrangements (e.g., campfire seating; carriage- style seating), novel occupant seating postures (e.g., lay flat seating), rear seat protections, occupant seat use patterns, and transitions of traditional manual controls in dual-mode ADS equipped vehicles (i.e., driving controls that can be stowed away while an ADS controls the vehicle).* (page 17627)
>
> *If dual-mode vehicles have the capability of stowing driving controls, NHTSA expects that manufacturers will need to certify compliance in both states (e.g., manually-operated driving controls available and stowed."* (page 17634)

A variety of positions may be provided for manual driving controls in dual mode vehicles, ranging from complete relocation to an enclosed compartment(s) to adjustment of the steering control to positions that are within the range of normal manual adjustment.

It is not clear how the term "stowed" is defined in this range of cases. Auto Innovators plans to separately seek clarification of this point from NHTSA.

S3 - In response to the agency's question[10] regarding the appropriateness of excluding occupant-less vehicles from the standard, we support the proposed language excluding trucks that are not designed to accommodate human occupants.

S4.1.5.3 - In response to the agency's question[11] regarding front outboard vs. center seating position requirements for AVs that lack manual driving controls, for conventional seating arrangement (two front outboard seating positions), an advanced air bag should continue to be installed at each front outboard position.

However, where there is only a single forward-facing front row center seat, Innovators believes that current levels of FMVSS 208 crash performance should be required. However, to maintain "tech neutrality" a requirement to meet this crash performance using an air bag should not be included.

S4.4.4.1.2, 4.4.4.2, and 4.4.5.3 - In response to the agency's question[12] regarding the appropriateness of requiring seat belts at all front seating positions in buses with no manual driving controls, we support the agency's proposed language for these sections.

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[10] See 85 Fed. Reg. 17635.

[11] See 85 Fed. Reg. 17636.

[12] See 85 Fed. Reg. 17638.

S.13.3 – In response to the agency's question[13] regarding leveling of the sill of the test vehicle on the driver's side, we support the agency's proposed language substituting the "left side."

S16.3.3.1.4 – In response to the agency's question[14] regarding dummy placement on bench seats, we see no need to mention the driver's seating position - lateral placement can be made in the same manner for each side by reference to the seating reference point.

S19.2.1 – In response to the agency's question[15] regarding applying advanced air bag requirements to the left front seating position where no manual driving controls are present, if a child can be placed in the left front seating position, suppression features should be provided in both front seating positions. The requirement should be as performance-based as possible and should not provide specifically for one type of technology.

S19.2.2 – In response to the agency's question[16] regarding requiring a separate air bag suppression telltale for each front seating position in a vehicle that lacks manual driving controls, a single telltale unit should be permitted so long as it is visible from each front outboard seating position and the unit makes clear which air bag(s) is suppressed.

S19.5 – The NPRM proposes motion suppression for dual mode vehicles when: 1) the occupant of the seat is classified as a child, for which air bag suppression would be an option in a passenger seat, i.e., up to a 6-year-old as determined by the same test procedures used by air bag suppression (S20, S22 and S24); and 2) the vehicle is an operational state that does not require a driver, i.e., any situation where the ADS is under full control.

We appreciate the thoughtful concern expressed in this proposal and agree that while children should not be placed in the front seat if other seating options exist, whenever a child can be placed in front of an air bag when the vehicle is in motion the appropriate advanced air bag requirements should apply at that seating position. However, the issue of vehicle motion suppression does not fall within the category of a simple technical translation of current FMVSS 208 requirements. While we firmly support the need to address child occupant safety in dual mode vehicles, in our view the current technical translations rulemaking is not the mechanism for consideration of the broader topic of

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[13] Id.

[14] Id.

[15] See 85 Fed. Reg. 17636.

[16] Id.

vehicle operational safety. Therefore, we urge NHTSA to complete the current technical translations rule without including the vehicle motion suppression proposal and address motion suppression and other vehicle operational topics on a separate track.

S22.2 - We recommend that the language of this section be revised to clearly specify that suppression is tested only for the seating position where the child dummy is placed.

Suggested regulatory text revision:

S22.2 *Static tests of automatic suppression feature which shall result in deactivation of ~~the~~* ***any front outboard*** *passenger air bag,* ***associated with that designated seating position.***

The same revisions should be adopted for provisions relating to all 3 child dummies.

Standard 210 (seat belt assembly anchorages) –

S2 - We recommend adding a statement in the first sentence of the application section to make it explicitly clear that the standard does not apply to trucks that have no designated seating positions.

> "This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks ***that have at least one designated seating position***, and buses …"

FMVSS 212 (windshield mounting) –

S3 - We recommend adding a statement in the first sentence of the application section to make it explicitly clear that the standard does not apply to trucks that have no designated seating positions.

> "This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks ***that have at least one designated seating position***, and buses …"

FMVSS 213 (child restraint systems) –

S3 - We recommend adding a statement in the first sentence of the application section to make it explicitly clear that the standard does not apply to trucks that have no designated seating positions.

> "This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks ***that have at least one designated seating position***, and buses …"

FMVSS 214 (Side impact protection)

We support a method similar to FMVSS 208 for test dummy positioning when no manual driving controls are present or for vehicles having unconventional steering controls such as joysticks. The seating reference point should be used for lateral placement. Foot positioning should be the same as for passenger side dummy for vehicles with no foot controls. For dummy clearance, the dashboard or interior trim should be used (see passenger side dummy with no steering control).

FMVSS 216a (Roof crush resistance)

S7.1 – Roof mounted sensors and cameras, being "non-structural components," should be removed prior to testing. Leaving sensors in place could complicate placement of the platen and could lead to incorrect test results. NHTSA staff should consult with the manufacturer to resolve any questions regarding which components are structural in nature.

FMVSS 219 (windshield zone intrusion) -

S3 - We recommend adding a statement in the first sentence of the application section to make it explicitly clear that the standard does not apply to trucks that have no designated seating positions. "The standard applies to passenger cars, and to multipurpose passenger vehicles, trucks ***that have at least one designated seating position***, and buses …

S6.1(b) – It is not clear how to define the "instrument panel" on vehicles that are designed to operate with no human driver, particularly those with unconventional seating arrangements such as a single, front center seat. The agency may need to clarify what constitutes the "instrument panel" in these situations, to assure proper determination of the protected zone.

For example, in a future rulemaking relating to unconventional vehicle seating configurations and architectures, the "instrument panel" might be designated to include the forwardmost, lateral panel of the occupant compartment that may include components such as:

- airbags
- instrumentation such as speedometer, odometer, powertrain status, safety feature readiness indicators and other vehicle information
- messaging clusters and screens
- storage compartments such as a glove box
- audio, video, climate, lighting, and other controls.

Any such amendment could be placed in Part 571.3, so as to apply to FMVSS 201 as well.

It may be necessary to reconsider the applicability of this standard to future design concepts (e.g., vehicles without a hood or forward structure that could intrude into the passenger compartment) as they emerge.

FMVSS 220 (school bus rollover protection) -

S. 5.2(b) – The agency should consider changing the reference to "passenger and driver compartment" to "occupant compartment." However, we defer to the bus manufacturers on this point.

FMVSS 225 (Child Restraint Anchorage Systems)

The definition of "shuttle bus" includes a reference to the driver's seat. We suggest the following revision to generalize the applicability to automated vehicles:

"**Shuttle bus"** means a bus with only one row of forward- **or rearward-**facing seating positions rearward of the **front row** seat**(s)**."

FMVSS 226 (Ejection mitigation.)

S3 - The definition of "seat outline" should be moved to Part 571.3, along with the related "row" definition which NHTSA has proposed to move.

S4.2.2 – There may be alternative methods for providing information that is equivalent to that provided by the S4.2.2 countermeasure deployment readiness indicator, depending on the nature of an automated vehicle's operational design. For some fleet AV types, it may be appropriate to provide malfunction information to a fleet operations center to be addressed. We will defer making a specific recommendation on this matter until the issuance of the planned NHTSA proposal on telltales and indicators.

The visibility criteria for countermeasure readiness indicators should apply to the FMVSS 208, S.4.5.2, indicator as well ("visible from any designated seating position if no driver's seating position is occupied or present.")

Additional FMVSS

Although the agency describes its NPRM as applying to the 200-series FMVSS, it notes that it has also analyzed the 300-series standards.[17] We offer suggested changes to one 300 series standard and to the low speed vehicle standard (FMVSS 500), which the agency has dealt with recently in the context of an AV exemption petition filed by Nuro.

FMVSS 302 (Flammability of interior materials) –

S3 – We recommend adding a statement in the first sentence of the application section to make it explicitly clear that the standard does not apply to trucks that have no designated seating positions. We note that the purpose of the standard is to *"reduce the deaths and in-juries to motor vehicle occupants caused by vehicle fires, especially those originating in the interior of the vehicle from sources such as matches or cigarettes."* S4.1 of the standard establishes requirements for components of "vehicle occupant compartments." Vehicles having no designated seating positions would have no "occupant compartment" or "occupants." Moreover, most of the items listed in S4.1 would not be installed in such vehicles. In addition, since there will be no occupants, interior fires that would originate from occupant related activities (smoking/vaping) would not occur.

> "This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks ***that have at least one designated seating position***, and buses …"

FMVSS 500 (Low-speed vehicles) –

S5(b)(6) – The references to "driver's" and "passenger's" side should be changed to "left" and "right," respectively. LSV's with no manual driving controls should be exempt from mirror requirements.

S5(b)(8) – LSV trucks with no designated seating position should be exempt from the requirement to have a windshield.

S5(b)(11) – LSVs with no manual driving controls should be exempt from the requirement to meet rear visibility requirements in S6.2 of FMVSS 111.

S6.3.1 – Replace "driver" with "one occupant."

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[17] See Footnote 38, 85 Fed. Reg. 17630-17631.