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May 28, 2020

James C. Owens, Deputy Administrator
National Highway Traffic Safety Administrator
1200 New Jersey Avenue SE,
West Building, Ground Floor, W12-140
Washington, DC 20590

Re: Docket No. NHTSA-2020-0014: Occupant Protection for Automated Driving Systems

Dear Deputy Administrator Owens:

Uber's Advanced Technology Group (Uber ATG) is pleased to submit these comments in response to the National Highway Traffic Safety Administration's (NHTSA) notice of proposed rulemaking (NPRM) on Occupant Protection for Automated Driving Systems (ADS).[1] As it has in connection with other ADS-related rulemakings,[2] Uber supports NHTSA's common-sense approach to reducing regulatory barriers that might otherwise hinder the development and deployment of life-saving and safety-enhancing technologies like ADS.

This NPRM focuses on how existing crashworthiness regulations in the Federal Motor Vehicle Safety Standards (FMVSS) could impede the development of socially beneficial use cases for ADS,[3] like trucks that are not meant to carry human occupants and vehicles where the front-left seat is not reserved exclusively for a human driver.[4] For such situations, the NPRM appropriately pursues the twin goals of (a) providing relief from regulations that are inapplicable to particular use cases that do not implicate a regulation's underlying safety goals, while at the same time (b) recognizing that common vehicle features and equipment that have historically provided a net safety benefit in conventional vehicles may, in certain use cases involving ADS-equipped vehicles (AVs), diminish safety overall.

As this NPRM recognizes, for certain use cases involving ADS-Dedicated-Vehicles (ADS-DVs), construing the crashworthiness standards as mandating certain conventional controls may not materially advance vehicle safety design. And, importantly, a rigid approach to the FMVSS could create unnecessary safety hazards for vehicle occupants and road users by

[1] *Occupant Protection for Automated Driving Systems*, Notice of Proposed Rulemaking, 85 Fed. Reg. 17624 (proposed Mar. 30, 2020) (to be codified at 49 C.F.R. pt. 571) ("*Occupant Protection NPRM*").

[2] *See* UATC, LLC Comments on *Removing Regulatory Barriers for Vehicles With Automated Driving Systems*, Advanced Notice of Proposed Rulemaking, 84 Fed. Reg. 24,433 (Aug. 28, 2019).

[3] *Occupant Protection NPRM*, 85 Fed. Reg. at 17,625-26.

[4] *Id.* at 17,625.

mandating the presence of equipment (e.g., steering wheels and foot pedals) that, in the context of an ADS-DV, could actually increase overall risk.

Uber endorses NHTSA's approach to clarifying the meaning and scope of the crashworthiness standards and revising those standards where necessary to reduce barriers that might otherwise impede AV deployment. As NHTSA moves forward with this effort to provide relief from unnecessary or potentially harmful regulatory barriers, it should continue to apply these same types of principles to analogous situations where particular ADS-relevant use cases may require alternative safety approaches for AVs than for conventional vehicles.

I. Uber ATG's Approach to Self-Driving and Safety.

Uber ATG's efforts to develop self-driving technology are guided by our core value to Stand for Safety and, as such, Uber is acutely interested in NHTSA's various efforts to advance the safety of AV technology and transportation safety overall. We appreciate the potential of AV technology to improve transportation safety around the world, and look forward to providing consumers with a variety of mobility options, including AVs, through the Uber platform in the years ahead. This vision and commitment to safety motivates the filing of this comment.

Over the past several years, Uber endeavored to advance transportation safety through its own self-driving vehicle development. In November 2018, Uber published its Voluntary Safety Self-Assessment (VSSA), which details Uber Advanced Technologies Group's approach to safety.[5] Building on this work, we published Uber ATG's draft Self-Driving Vehicle Safety Case Framework in 2019, which is structured around the same safety principles outlined in our VSSA.[6] Furthermore, we made the Safety Case Framework available under an open source license in an effort to encourage others in the AV industry to adopt this approach that has been well proven in other safety critical industries. Additionally, over the past two years, Uber has been implementing a Safety Management System tailored to developing self-driving technology. A common framework in aviation and other safety-critical industries, a Safety Management System provides a whole-of-organization approach to risk, safety policy, safety communications, and other important drivers of safety culture. Uber ATG has been leveraging experience from these other safety-critical industries to apply this framework to the development of self-driving technology.

Uber has sought to put these principles into practice through testing efforts in cities around the United States and Canada.

[5] Uber Advanced Technologies Group, *A Principled Approach To Safety* (Nov. 2018), https://uber.app.box.com/v/UberATGSafetyReport ("UATC VSSA")

[6] Uber Advanced Technologies Group, *Safety Case Framework* (July 2019), https://uberatg.com/safetycase.

II. The NPRM implements the Motor Vehicle Safety Act's core policy objectives by tailoring specific FMVSS to those vehicles and contexts where such an application advances safety.

The amendments offered through this NPRM advance the Motor Vehicle Safety Act's core policy objective by structuring the FMVSS to promote safety advances -- a safety calculus that, as demonstrated here, reasonably accounts for a vehicle's intended use.

Through this lens, the stated rationale of the NPRM's proposed amendments to the crashworthiness standards is eminently reasonable: "a vehicle that will only carry things, not people, would not require the protections currently in place that are designed to protect occupants."[7] So, when dealing with steering wheels for example, an "occupant should not need protection from a steering control system if none exists in that vehicle."[8]

The underlying logic of NHTSA's approach to the FMVSS as they apply to ADS-equipped vehicles is evident: When safety equipment and features are unnecessary for a given type of vehicle use, federal regulations should not (and in many cases do not) mandate such equipment or features. Towards this end, USDOT is empowered with various administrative tools to eliminate any such vestigial regulatory barriers, whether that entails revising regulations, granting exemptions, or offering administrative guidance or interpretations.

Broadly speaking, the crash-avoidance FMVSS seek to ensure the presence of certain safety systems to help avoid crashes in particular scenarios whereas the crashworthiness standards look to mitigate the severity of a crash where one occurs, including through the protection of a vehicle's occupants. Various FMVSS also facilitate the ability (by NHTSA or otherwise) to test vehicles for compliance with those requirements. As such, any construction or application of the relevant regulations should account for the regulations' policy objectives and default context. For example, the standards for electronic stability control in FMVSS No. 126 refer to steering wheels.[9] This reference does not give rise to a categorical imperative to maintain a steering wheel for its own sake. Instead, as NHTSA has recognized, the standards found in FMVSS No. 126 were not promulgated for the purpose of requiring a steering wheel or mandating that steering wheels perform in a certain way, "but used the equipment it reasonably anticipated at the time would be included in any of the vehicles for which [electronic stability control] would be required."[10] More generally, many of the FMVSS that refer to manual controls were either "intended to address the performance of some other part of the vehicle,

[7] *Occupant Protection NPRM* at 17,625.

[8] *Id.*

[9] 49 C.F.R. § 571.126.

[10] *Removing Regulatory Barriers for Vehicles With Automated Driving Systems*, Advanced Notice of Proposed Rulemaking, 84 Fed. Reg. 24,433, 24,439 (Aug. 28, 2019).

rather than the manual control"[11] that was most commonly used to engage the relevant vehicle system at the time, or else were intended to help provide location or placement context for a particular safety feature (e.g., the nexus between an airbag and a steering wheel). Meaning that references in the FMVSS to conventional features do not, in all cases, give rise to a mandate to include such a conventional feature, especially where the presence of that feature loses its safety relevance in a particular use case.

This understanding is not new to the ADS context and is fully applicable to vehicle designs that are now on the market or are in active development. For example, NHTSA's approach to low-speed vehicles (LSV) recognizes that those types of vehicles -- because of the relevant vehicle designs and because their intended and anticipated use varies from the typical use of conventional passenger vehicles operating on most public roads—calls for different safety protections than full-speed, conventional vehicles.[12] And NHTSA has reaffirmed that the different safety calculus attendant in LSVs informs the agency's approach to low-speed vehicles equipped with ADS.[13] So too with NHTSA's approach to advanced driver-assistance systems like collision mitigation braking and lane keeping systems that can take over some part of the dynamic driving task from the driver, like steering and braking. NHTSA has broadly recommended adoption of this technology, without any suggestion that this type of Level 1 or Level 2 functionality conflicts with either the FMVSS or section 30122's prohibition on rendering safety features inoperative.[14] The Motor Vehicle Safety Act's inherent flexibility helps explain DOT's undoubtedly-correct assessment that federal law does not restrict the testing or deployment of autonomous vehicles that retain conventional controls:[15] The Motor Vehicle Safety Act does not prohibit everything outside of that which has been specifically approved, but rather provides a targeted set of regulations, which include some latitude for use cases that vary from the conventional vehicle context. This flexibility has repeatedly enabled the industry to develop and deploy innovative life saving technologies such as seat belts, anti-lock brakes, airbags, and electronic stability control, well before the relevant FMVSS was promulgated.

That assessment applies fully to ADS-equipped trucks and delivery vehicles (the subject of this NPRM) that are being developed now, that will not require the presence of a human driver, and that will transform supply chains and delivery systems in the United States. And in fact, NHTSA has appropriately recognized—through this NPRM and otherwise—a further corollary. When predominantly-available safety systems or equipment do not provide any safety benefit because of the vehicle's design or the context in which the vehicle is used, those systems and equipment may actually *reduce* safety overall. That potential is particularly germane for

[11] *Id.*

[12] *See* 49 C.F.R. § 571.500*; Nuro, Inc.; Grant of Temporary Exemption for a Low-Speed Vehicle With an Automated Driving System*, 85 Fed. Reg. 7,826 (Feb. 11, 2020) ("*Nuro Exemption*").

[13] *Id.*.

[14] *See* U.S. Dep't of Transp., *Driver Assistance Technologies*, available at https://www.nhtsa.gov/equipment/driver-assistance-technologies

[15] See U.S. Dep't of Transp., *Preparing for the Future of Transportation: Automated Vehicles 3.0* 6-7 (2018).

vehicles equipped with ADS and ADS-relevant use cases, which reinforces the importance of tailoring the FMVSS accordingly.

As NHTSA has recognized, when a vehicle is deployed with safety equipment that, given the vehicle's design an intended use, fails to advance safety, that equipment may increase the risk of injury to occupants, pedestrians, vulnerable road users, or collision partners—even if only marginally. For example, in its recent decision to grant several exemptions for low-speed, ADS-equipped delivery vehicles, NHTSA granted an exemption from the requirement that LSVs be equipped with exterior and interior mirrors.[16] In NHTSA's view, the mirrors "would not serve a safety-related purpose on an occupantless LSV operated by an LDS."[17] And "the presence of protruding exterior mirrors on such a vehicle may increase strike risk for pedestrians and other vulnerable road users."[18] Even if the strike risk posed by protruding mirrors is small, NHTSA recognized that this risk could not be offset by any corresponding safety benefits for a vehicle that has no need for side-view or rear-view mirrors. NHTSA's exemption approach therefore not only reduced the regulatory burdens on a manufacturer of ADS-equipped LSVs, but affirmatively improved the safety of such vehicles.

The same rationale applies straightforwardly to ADS-equipped trucks that are not designed to carry passengers. In such vehicles, equipment that is designed to protect occupants in traditional vehicles will do nothing but create unnecessary potential safety hazards in the event of a crash or if that equipment malfunctions. This rationale also applies to ADS-equipped passenger vehicles, and to ADS-DVs in particular.

The crashworthiness FMVSSs themselves recognize the hazards that manual controls can impose. For example, FMVSS No. 204, which governs the rearward displacement of the steering system,[19] captures NHTSA's recognition that steering wheels can injure drivers and other passengers in the event of a crash. The calculus on this kind of risk—whatever its magnitude—changes where there is no need for an occupant to manipulate the vehicle's steering system with a manual control. So too with manual controls and other safety equipment installed within the cabin or on the exterior that may, just by their presence, pose some safety risks. The risk calculus for such equipment changes even further when a vehicle's intended use case fundamentally alters the necessity of a particular piece of equipment. For ADS-DVs, if the occupants are never expected to assume control of the vehicle, the presence of manual controls may furthermore create a false sense of manual controllability, leading an occupant to attempt to intervene and thereby potentially introduce even greater risk to the scenario.

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[16] *Nuro Exemption*, 85 Fed. Reg. at 7,832-33.

[17] *Id.* at 7,832.

[18] *Id.*

[19] 49 C.F.R. § 571.204.

III. NHTSA Should Continue to Evaluate Whether the Net Safety Benefit of FMVSS the FMVSS in ADS-Related Contexts.

As it approaches further ADS-relevant regulatory proceedings, Uber encourages NHTSA to continue to apply the core principles animating this NPRM—providing relief from unnecessary and perhaps harmful regulatory structures—to other ADS use cases.

Certainly, as NHTSA has recognized in a 2019 advanced notice of proposed rulemaking,[20] such an approach allows for a recognition that elements of the federal crash prevention standards (in particular those involving conventional controls) may apply differently to both the design and validation of ADS-equipped vehicles. This NPRM implies a similar approach to dual-use vehicles where traditional manual controls (such as a steering wheel) can be retracted and/or stowed -- i.e., that the mere fact of intended dual-use does not otherwise raise tensions with the Motor Vehicle Safety Act so long as both modes entail lawful design.[21] Towards this end, the NPRM suggests that a dual-use vehicle might require validation testing in both modes: with the steering wheel both in its conventional and retracted positions. The NPRM seems to therefore acknowledge a conclusion that is absolutely consistent with the whole of the Motor Vehicle Safety Act -- that certification is appropriate for a vehicle equipped with a steering wheel that temporarily deactivates and retracts, and that this type of multi-mode conventional feature does not raise any legal concerns, preclude certification for FMVSS compliance, suggest a concern under Section 30122 (whether due to the temporary periods where the steering wheel would not be conventionally operative while stowed or otherwise), or create tension with federal law more generally.

This same set of principles can help inform NHTSA's approach to ADS-equipped vehicles dedicated to other use cases, including fleet vehicles where members of the public would not expect to operate the vehicle controls. For example, Uber ATG anticipates making managed fleets of shared vehicles equipped with Level 4 capability available via the Uber platform.[22] By definition, such a vehicle featuring Level 4 or Level 5 capability will not give rise to the expectation that a human occupant would perform any part of the DDT or fallback within the vehicle's operational design domain (ODD). Meanwhile, the fleet/platform model allows the fleet manager to constrain a given vehicle to its ODD and further underscores that riders will not expect any human driver (including the riders themselves) to be responsible for performing any aspect of the DDT during their use of a shared mobility service. This context forms a baseline for determining which systems and equipment may provide an actual safety benefit, and which are simply extraneous at best and potentially harmful at worst -- a calculation that, as this NPRM recognizes, appropriately should impact the assessment of which regulatory provisions can and do apply. That may be due to limitations baked into the structure of the Motor Vehicle Safety

[20] *Supra* note 10.

[21] *Occupant Protection NPRM*, 85 Fed. Reg. at17,634.

[22] *See* UATC VSSA at 15-16.

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Act itself, such as the different standards applicable to LSVs,[23] the optionality written into certain FMVSS,[24] and the limitations in Section 30122 to certain segments of the motor vehicle supply chain.[25] While there may be cases where regulations for conventional vehicles arguably or definitively apply to ADS-equipped vehicles under current law, NHTSA and USDOT can and should continue to use administrative tools to prevent those requirements from acting as barriers to innovation and safety improvements. For that reason, Uber encourages NHTSA to continue invoking its administrative authority, as needed, to reflect the nuanced realities involved in ADS technology and to use other tools at the agency's disposal where appropriate.

IV. Conclusion

Uber would like to thank NHTSA once again for its efforts to remove regulatory barriers to the development and deployment of vehicles equipped with ADS. NHTSA's consistent approach to the interaction between the FMVSS and new vehicle technologies will be a boon to safety, ADS developers and vehicle manufacturers, road users, and the American economy as a whole. We look forward to continuing our work with NHTSA on these and other issues that are critical to the future of safe transportation.

Sincerely,

Danielle Burr

[23] *See* 49 C.F.R. § 571.500.

[24] *See, e.g.*, *id.* § 571.126.

[25] *See* 49 U.S.C. § 30122(b) (prohibiting making required safety equipment inoperative for a "manufacturer, distributor, dealer, rental company, or motor vehicle repair business).