Uber Technologies, Inc.
1515 3rd St.
San Francisco, CA 94158

April 1, 2020

Steven Cliff, Acting Administrator
National Highway Traffic Safety Administrator
1200 New Jersey Avenue SE,
West Building, Ground Floor, W12-140
Washington, DC 20590

Re: Docket No. NHTSA-2020-0106-0001: Framework for Automated Driving System Safety

Dear Mr. Cliff:

Uber Technologies Inc. (Uber) is pleased to submit these comments in response to the National Highway Traffic Safety Administration's (NHTSA) advanced notice of proposed rulemaking (ANPRM) on a Framework for Automated Driving System Safety ("Framework ANPRM").[1] As it has in connection with other automated driving system ("ADS")-related rulemakings,[2] Uber supports NHTSA's steady progress towards developing a federal ADS regulatory regime that can both promote the development and deployment of life-saving and safety-enhancing technologies like ADS, while simultaneously bolstering public confidence in the safety and efficacy of ADS technology.

The Framework ANPRM takes stock of the current approach to ADS regulation and rightly asks what roles NHTSA might play over the short, intermediate, and long terms to continue to advance federal ADS regulatory development. In Uber's view, NHTSA has, over the past several years, built key foundations for an eventual ADS regulatory framework, including through a variety of steps that have encouraged industry participants to publish streams of information on ADS technology to educate the public and regulators.

Uber also views this as an opportune moment to leverage those foundations towards the development of comprehensible substantive standards that can help enhance American consumers' confidence in ADS safety. Although the Framework ANPRM recognizes challenges to the promulgation of traditional vehicle safety standards in connection with autonomous vehicles ("AVs"), we encourage NHTSA to utilize a series of available tools to help build and

[1] *Framework for Automated Driving System Safety*, Advanced Notice of Proposed Rulemaking, 85 Fed. Reg. 78058 (proposed Dec. 3, 2020) (to be codified at 49 C.F.R. pt. 571) ("*Framework ANPRM*").

[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).

spotlight credible substantive criteria that can help advance AV safety in the short term, and establish a predicate for an eventual permanent rulemaking.

I. Uber's Interest in a Framework that Promotes Safe Autonomous Driving Technology

At Uber, we strive to make transportation safe, reliable, accessible, efficient and affordable. Our platform helps serve the needs of over 100 million monthly active platform users, who complete over 20 million trips a day. Simply put, a huge portion of this country's consumers open the Uber app to help move them throughout their lives.

We believe that trustworthy autonomous driving technology will eventually play a significant part in increasing the safe and affordable transportation options available to our customers. We are thus preparing to play a central role in connecting fleets of AVs with American consumers, by building the technology to incorporate those fleets into the broader Uber platform and helping to fold safe autonomous technology into the fabric of the country.

As a result, Uber anticipates the importance that our customers will place on AV safety and welcomes NHTSA's leadership in establishing standards that will help reinforce that type of public confidence. Uber simultaneously appreciates the potential value of increased clarity regarding prevailing safety standards for our current and prospective AV fleet partners. Uber's efforts in this space are guided by our core company priority 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. In processes such as these, we take seriously the imperative to serve as an advocate for our many customers and partners, and to speak on their behalf in encouraging policies that promote safe and affordable transportation options. This vision and commitment to safety motivates the filing of this comment.

II. NHTSA can Play a Key Role in Building Public Confidence in AVs

As NHTSA has recognized, both through the Framework ANPRM and historically, the development and commercialization of AV technology requires educating consumers as to reasonable expectations for this technology -- on safety and on a range of issues.[3] Industry actors

[3] *See, e.g.,* Framework ANPRM at 78067 ("Demonstrating the safety of ADS is critical for facilitating public confidence and acceptance, which may lead to increased adoption of the technology."); *see also* U.S. Dep't of Transp., *Automated Vehicles 3.0: Preparing for the Future of Transportation* at iv (hereinafter, "FAVP 3.0") ("U.S. DOT will lead efforts to address potential safety risks and advance the life-saving potential of automation, which will strengthen public confidence in these emerging technologies.").

also would benefit from a clearer sense of how regulators and the public will assess and quantify safety, including through greater specificity on safety targets that can help guide testing and development efforts.

The federal government's leadership over the last several years has begun laying foundations for this type of meaningful understanding of safety. NHTSA's encouragement has directly resulted in the production and publication of safety content for public and technical consumption, including through VSSAs and information made available through AV TEST. These existing processes are yielding fruit. VSSA content (whether compulsory or not) that genuinely details developer approaches to technical safety can help promote healthy information flow within industry, so as to enable developers to improve their approaches through reference to best practices that the VSSAs help to spotlight. And separate streams of content, whether through VSSAs or otherwise, that focus on public messaging, can help educate consumers as to progress in AV development.

This content from industry valuably educates stakeholders as to how developers are conceptualizing key issues related to AV safety. But for all their value, these processes have not answered some key safety questions facing an American consumer. We are therefore moving to a phase where industry would benefit from a common lexicon on measuring AV safety, and consumers would benefit from digestible safety-related information that helps increase confidence in these emerging technologies. To help address these various questions, NHTSA can build on its prior steps of safety content generation towards a more directed framework for assessing AV safety -- key for developers in search of a regulatory regime to which they can reliably map development, while also convincing consumers and the public at large.

A. NHTSA Should Encourage the Development of Consensus Approaches for Assessing AV Safety Before Promulgating AV-Focused FMVSS

As the Framework ANPRM recognizes, an immediate focus on promulgating AV-related Federal Motor Vehicle Safety Standards (FMVSS) may both inhibit development and lock-in product and regulatory choices that may well prove unsound as this nascent technology advances.

Undoubtedly, NHTSA's past rulemaking efforts (for non-autonomous technologies) have helped reinforce vehicular safety. But autonomous technology has not given rise to the type of clear performance demarcation that can animate a new safety standard regulation. First, the

technology remains highly fluid: Developers are continuing to launch wholly new hardware and software approaches to solve the many dimensions of automated driving. Amid this dynamic development -- with approaches that vary from developer to developer -- the industry may be beginning to coalesce around broadly appreciated bases for evaluating performance. But, such alignment remains in its earliest stages. Only with a more definitive approach for performance evaluation in hand can industry and regulators really seek to pinpoint the types of precise safety performance targets that would be necessary for rulemaking. And even then, operating domain variations (which are less of an issue for conventional vehicles) may complicate the prospects of a one-size-fits-all AV-focused rulemaking.

As NHTSA notes, premature (or overly specific) rulemaking can lock-in suboptimal standards and thereby undermine vehicle safety. Additionally, a focus by NHTSA on promulgating FMVSS -- a protracted, multi-year process -- may fail to meet present imperatives to help craft and highlight content that can begin to build consumer confidence in the immediate term.

NHTSA can help cut through this short-term information deficit through various administrative and regulatory mechanisms that help build technical and public understanding on AV capacity. As discussed below, through encouraging a rolling focus on safety best practices and bases for measuring AV safety, NHTSA can -- even in the absence of AV-focused FMVSS -- drive the industry towards consensus approaches on safety practices for AVs, while also exploring potential bases to help the public appreciate an AV's safety design.

B. NHTSA Can Take Immediate Action to Promote the Emergence of Substantive Safety Content Even without Promulgating Final Safety Standards

As this ANPRM recognizes, NHTSA can help to catalyze the development of substantive, informative content regarding AV safety performance and expectations. NHTSA has already taken and/or proposed valuable initial measures in this direction, but NHTSA can -- even now -- go further in encouraging and identifying substantive bases for appreciating AV safety. As with NHTSA's existing AV efforts, such forward looking programs can valuably advance both (i) the state of technical understanding within the industry and (ii) the somewhat separate issue of public understanding of the progress of AV technology.

Uber

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1. Procedural and Organizational Mechanisms Can Help Reinforce Confidence in an Operator's Commitment to a Robust Safety Culture

As noted above, NHTSA has already developed programs to invite the dissemination of foundational content, such as through the VSSA initiative and the AV TEST program. These information-sharing opportunities offer particular value in helping to build industry-wide appreciation of emerging safety best practices. Additionally, through the agency's past analysis of measuring an AV's compliance with existing FMVSS,[4] NHTSA has helped to differentiate safety issues related to the functioning of an AV from safety issues that incidentally involve an AV but not the core processes for autonomy.

Through this ANPRM, NHTSA has proposed additional procedural mechanisms for evaluating an AV operator's approach to safety. Uber agrees that these procedural mechanisms can help build public confidence in AV technology, and that NHTSA -- even in the absence of rulemaking -- can take steps to encourage adoption of these types of practices.

For example, the creation of a safety case (*see* Framework ANPRM at 78067), provides a valuable signal as to the sophistication of a developer or operator's approach to safety -- and a safety case that more clearly addresses the various facets of autonomous development provides an even stronger message as to a developer/operator's cultural commitment to safe AV practices.[5]

Other procedural and organizational mechanisms can similarly reflect on an operator's approach to safety culture. For example, for the last several years, and in conjunction with the recommendations of several outside experts, Uber ATG began implementing a Safety Management System (SMS) to help govern self-driving vehicle operations.[6] This self-driving-focused SMS borrowed from a systematized approach to organizational risk, with a proven track record in aviation and other safety-critical industries. Like the safety case, adoption of a robust, well-designed SMS, or a comparable, structured approach to safety, can convey that a self-driving vehicle operator is maintaining the type of safety culture that provides a valuable framework for anticipating and addressing risks.

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[4] Cf. Comments of Uber Technologies Inc., in response to Department of Transportation, Docket No. NHTSA-2019-0036: Removing Regulatory Barriers for Vehicles With Automated Driving Systems (August 28, 2019)

[5] *See* Uber ATG, "Safety Report 2.0: A Principled Approach to Safety" at 12 (2020), available at https://uber.app.box.com/v/UberATGSafetyReport (discussing Uber ATG-developed Safety Case Framework).

[6] *See Id*. at 15 *et seq*.

Although these types of procedural mechanisms may not be immediately amenable for conversion into final safety standards, NHTSA can invoke an array of tools to both highlight such practices as valuable safety standards, while encouraging adoption of these types of practices. NHTSA can identify practices as positively impacting safety, can convene public meetings to highlight emerging standards or the agency's developing views, and can (as it has done in recent AV-related guidances) issue recommendations as to practices the agency finds valuable. This type of leadership can help developers and operators preview those safety strategies that may become aspects of rulemaking down the road, while also clarifying the types of processes that NHTSA will view as providing a credible backdrop for the measurement and public availability of more granular safety data.

2. NHTSA Can Lead the Promotion of Substantive Safety Standards

These procedural and organizational solutions, though valuable, still leave room for confidence-building measures on fundamental questions of functional autonomous safety. On that score, NHTSA can play a central role in developing and building consensus around the types of standards and substantive content that can help establish AV safety design -- even while definitive FMVSS remain some time off.

As discussed above, NHTSA can employ a variety of non-rulemaking tools to build public understanding of AV safety expectations, and to provide consumers and industry actors with a rolling sense of safety benchmarks (ones that may inform an eventual regulatory structure):

- The agency can direct consumer and industry attention to emerging trends or practices, such as by spotlighting substantive approaches that, in the agency's view, warrant further development or attention.
- NHTSA can serve as a convening authority to catalyze the exchange of safety approaches from different developers (including bases for measuring safety, and the types of safety targets that reasonably would promote AV safety), and to assure a helpful daylighting of standards and best practices, which NHTSA could identify as such.
- NHTSA can highlight salutary AV-related safety metrics and aspects of performance that, even in the absence of definitive/all-encompassing performance standards, can at least allow for a meaningful comparison of AV safety profiles. The Framework ANPRM (at 78065) refers to one industry method for measuring a safety envelope that accounts for a variety of actors in the transportation environment. Uber understands that other

standard-setting and industry-expert bodies have been exploring parallel methods for measuring AV safety -- such as through other safety envelope approaches, metrics that look to adherence (where practicable) to traffic standards, and metrics that look to maintaining predictable vehicle control.[7] As one example, the Society of Automotive Engineers (SAE), which has provided some key advances in our ability to understand and discuss AV technology, has established the Automated Vehicle Safety Consortium which, among other efforts, is working to to establish best practice safety principles for the operation of AVs and guidelines for robust safety standards.[8] NHTSA can review these types of budding non-governmental efforts and highlight emerging content.

With leadership, per the above, on establishing a baseline technical vocabulary for measuring and evaluating AV safety, NHTSA can also help encourage the development of comprehensible, use-case-tailored bases for providing safety information to consumers, operators, and developers.

The NCAP-type obstacle course approach described in the ANPRM (Framework ANPRM at 78067) would provide one such basis: Encouraging the development of such an industry practice (even outside of rulemaking) would help consumers and developers intuitively appreciate the safety advantages of an AV that safely and reliably navigated a battery of tests that mimicked real-world conditions.

Again, less important than the actual mechanism is the generation of content that (i) consumers can comprehend and appreciate and (ii) developers/operators can review as guideposts for development efforts. Encouraging this type of substantive safety target helps move operators and consumers closer to a common understanding of AV safety expectations, and can remain fluid enough to account for continued dynamism in AV development efforts. And,

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[7] In a variety of contexts, NHTSA and other academic, government, and industry entities have all confirmed the relationship between driving safety and predictable motion control -- meaning, driving in the absence of hard deceleration, acceleration, and swerve maneuvers. *See, e.g.*, U.S. Dep't of Tranps., NHTSA, "Comparing Real-World Behaviors of Drivers With High versus Low Rates of Crashes and Near-Crashes", available at https://one.nhtsa.gov/DOT/NHTSA/NRD/Multimedia/PDFs/Crash%20Avoidance/2009/811091.pdf; Insurance Journal, "Among Bad Driving Behaviors, Speeding Is Strongest Predictor of Crashes," available at https://www.insurancejournal.com/news/international/2019/08/22/537727.htm; Insurance Information Institute, "Facts + Statistics: Aggressive driving," available at https://www.iii.org/fact-statistic/facts-statistics-aggressive-driving. Though much of this research flows from the conventional vehicle context, the same principle may provide one possible basis for evaluating an AV's operational safety.

[8] *See* Automated Vehicle Safety Consortium, available at https://avsc.sae-itc.org/.

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NHTSA can promote this substantive alignment without needing to follow the protracted processes involved in rulemaking.

III. Conclusion

Uber would like to thank NHTSA once again for its efforts to chart a path towards the safe deployment of AVs. NHTSA's efforts to date have provided a firm foundation for a broader understanding of AV design and capacity. This foundation allows NHTSA, consumers, industry, and all other stakeholders to start progressing towards a more robust appreciation of AV safety expectations. NHTSA is now positioned to lead all relevant actors in achieving progressively greater clarity on these types of issues; clarity that will benefit all involved and set up NHTSA's continuing efforts in establishing the regulatory underpinnings for these innovative products. We look forward to continuing our work with NHTSA on these and other issues that are critical to the future of safe transportation.

Sincerely,

Joshua Wilkenfeld

Director, Regulatory, Uber Technologies