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Honorable Heidi King
U.S. Department of Transportation
1200 New Jersey Ave SE
West Building, Ground Floor, Room W12-140
Washington, DC 20590

RE: ***Advance notice of proposed rulemaking: Pilot Program for Collaborative Research on Motor Vehicles With High or Full Driving Automation***
Docket No. NHTSA-2018-0092
Fed. Reg. No. 2018-21919

Dear Deputy Administrator King,

Uber appreciates the opportunity to comment on the National Highway Traffic Safety Administration's ("the Agency's") recently published advance notice of proposed rulemaking, "Pilot Program for Collaborative Research on Motor Vehicles With High or Full Driving Automation" (October 2018) ("ANPRM").

The ANPRM makes clear that the Agency shares Uber's view regarding the enormous potential of Automated Driving Systems ("ADS") to improve road safety. At Uber, we put safety at the heart of everything we do. Our efforts to develop self-driving technology are consistent with our core value to *Stand for Safety* - we believe that introducing self-driving vehicles to the Uber digital network could make transportation safer for people around the world. It is this commitment to safety that motivates us in preparing this comment.

We appreciate the Agency invoking its statutory research authority in order to inform future regulation of vehicles with high or full driving automation through a pilot program which facilitates information-sharing and learning with technology developers, vehicle manufacturers, research organizations, and others. The ANPRM also reflects a shared awareness that the benefits of this technology could be realized more quickly than prior automotive industry innovations, and seeks to maintain an environment that is conducive to such development while appropriately promoting safety. ANPRM at 50876.

We understand that the Agency's focus for a potential pilot program is on gathering the data necessary to inform regulatory approaches for novel vehicle designs which do not meet current Federal Motor Vehicle

Safety Standards ("FMVSS") and would therefore require an exemption. This focus is sensible and closely aligns with the Agency's prior recognition that the Agency's "current safety standards do not prevent the development, testing, sale, or use of ADS built into vehicles that maintain the traditional cabin and control features of human-operated vehicles." U.S. Department of Transportation, Preparing for the Future of Transportation: Automated Vehicles 3.0 (Docket No. DOT-OST-2018-0149) ("FAVP 3.0") at 6-7. Because deployment of vehicles with novel designs may face additional regulatory hurdles, the pilot program understandably seeks to identify mechanisms for the controlled evaluation of these vehicles. ADS-equipped vehicles with traditional design elements have already been certified as maintaining safety features reflected in current FMVSS; the Agency has recognized that such vehicles may be deployed without raising the issues posed by other vehicles that may meet safety requirements via other means.

However, this type of research exercise will, by its nature, inform the Agency's activities beyond the specific regulation of novel vehicle designs. For example, a pilot program with this focus could easily generate learnings that would inform future regulations of ADS equipment per se, whether deployed on vehicles with novel designs or otherwise. Given this, should the Agency proceed with a pilot program, we recommend opening this program to all types of ADS developers - including those working on ADS systems to be used with conventionally designed vehicles - and considering different conditions for participation for these developers, in order to ensure that the Agency could benefit from information exchanges with all these possible sources. The information expected from a potential pilot participant for a vehicle that cannot lawfully deploy under current regulatory conditions would reasonably vary from the showing for a developer that wants to help share conclusions with the Agency but otherwise does not require the same type of upfront regulatory authorization.

The Agency has stated that the aim of this pilot program is to inform "the development and establishment, as needed, of standards for vehicles equipped with ADS." ANPRM at 50874. Given that such standards development will understandably take time and flows from the Agency's statutory authority to conduct research to support its own regulatory functions, the Agency may wish to ensure that its implementation of a pilot program, regardless of format, clarifies the Agency's expectation that pilot participation is voluntary and should not become a prerequisite at the State level to engage in safe testing activities, as long as those activities otherwise meet all applicable Federal and State requirements. In the absence of new FMVSS governing safety performance for ADS-equipped vehicles, companies must still meet their obligations under Federal law. To this end, Uber and potentially other companies are continuously strengthening internal safety processes that govern their existing testing activities.

Were States to, for example, interpret the requirements of the pilot program as standards, encourage oversubscription into the pilot program, and/or deter participation through inconsistent state operational requirements, this could undermine the Agency's purpose in collecting information to inform future Federal regulatory activities and slow technology development.

Question 1. What potential factors should be considered in designing the structure of a pilot program that would enable the Agency to facilitate, monitor and learn from on-road research through the safe testing and eventual deployment of vehicles with high and full driving automation and associated equipment?

In designing the structure of a pilot program, the Agency may wish to consider a number of factors, including but not limited to:

- Representativeness - In order to inform effective regulations, pilot program participants would need to broadly represent the diversity of ADS technologies, testing locations, and target capabilities.
- Scale - Information gathered from pilot participants and the number of vehicles would need to be sufficient and carefully considered in order to generate broadly-applicable insights for regulatory development.
- Timelines - In designing a pilot program, the Agency may wish to consider geographies where developers are already working, given the time required to identify and establish test operations in new areas and the benefits to development of co-locating test operations with engineering centers.
- Reporting - It will be important that the Agency seeks to strike an appropriate balance in any reporting that may be anticipated by participation: constant reporting would become onerous for companies, but in-frequent reporting would provide little value.

At the same time, and as noted above, the precise contours for a program should, in our review, account for the varied technological and regulatory contexts posed by different types of ADS. For example, per the above, because conventional vehicle design gives rise to a different cluster of regulatory issues than a vehicle that does not maintain the safety features captured by the FMVSS, we recommend that the pilot program structure also allow for different participation approaches to reflect these different regulatory and technological backdrops.

Question 4. How can existing statutory provisions and regulations be more effectively used in implementing such a pilot program?

The Agency can establish a strong foundation for a pilot program via an explicit tie to the Agency's statutory authority to conduct research, and a description of how this manifestation of the Agency's research authority will contribute to the Agency's longer-term execution of its regulatory mission.

Question 5. Are there any additional elements of regulatory relief (e.g., exceptions, exemptions, or other potential measures) that might be needed to facilitate the efforts to participate in the pilot program and conduct on-road research and testing involving these vehicles, especially those that lack controls for human drivers and thus may not comply with all existing FMVSS?

As noted above, and as reflected in this question, the need for regulatory relief varies based on whether an ADS has been deployed in the context of a vehicle that has been certified as meeting all existing FMVSS (due to maintaining conventional design). We encourage the Agency to tailor the preconditions for participation in a pilot program to the particular regulatory contexts facing different development efforts (e.g. whether up front exemptions might be needed).

Question 7. What types of performance measures should be considered to ensure safety while allowing for innovation of emerging technology in vehicles with high and full driving automation participating in a pilot program?

Uber understands the Agency's desire to establish performance metrics for vehicles in the pilot program to ensure safety. Given the wide variety of ODDs and ADS developers, a one-size-fits-all metric for everyone established at the onset would likely not create any improved transparency and could be misinterpreted. Alternatively, the Agency could provide examples of performance measures for companies to consider but allow applicants of the pilot program to articulate the performance measures they will track to ensure safety along with any associated rationale. Such an approach would allow continued innovation and provide the Agency with insight into how different companies are considering safety to inform future regulatory decisions.

Question 8. How should the Operational Design Domains ("ODDs") of individual vehicle models be defined and reinforced and how should Federal, State, and local authorities together to ensure that they are observed?

Uber notes that the Agency recently published a report in this area. As such, given a high degree of variability in ODDs of focus across developers, we would recommend that the Agency aim to support common approaches to ODD definition by encouraging industry adoption of a standard definition paradigm, built on a common lexicon of terms and descriptions. Seeking comparability in the approach to definition at the national level will work to avoid any inconsistencies in regulation at the State level, in particular the imposition of operational or design limitations that limit development before sufficient testing has been undertaken to demonstrate safety. For example, limiting speed for an ADS-equipped vehicle in a way that differs from posted speed limits could introduce unintended safety risks and inhibit demonstration of capabilities outside of offline, or simulation, testing and testing on closed course tracks.

With regard to enforcement, the Agency may wish to encourage States to undertake traditional enforcement for traditional State rules of the road. This approach should avoiding inconsistent approaches across States, and retain authority around the ODD definition paradigm for the Federal government.

Question 9. What type and amount of data should participants be expected to share with NHTSA and/or with the public for the safe testing of vehicles with high and full driving automation and how frequently should the sharing occur?

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development. One seminal benefit of the pilot program would be to allow more robust - albeit reasonably tailored - exchange of the types of data cultivated by developers; that exchange will undoubtedly inform consensus on which data types might prove most useful for regulators and the public.

The potential for this benefit should, however, be balanced against the recognition that constant reporting of large data sets would become onerous for companies. It will neither be practicable nor informative for the Agency to ask pilot participants to share raw sensor data generated during testing. Transmitting,

storing, and processing this data is expensive and time-consuming for developers and may introduce unnecessary risks to privacy. As the Agency works to establish its view of appropriate performance measures, it may be best served by seeking submission of processed data which informs these. Any data which is shared publicly should be made relatable and digestible, aggregated, and anonymized.

Question 10. In the design of a pilot program, how should NHTSA address the following issues--
a. confidential business information?

For developers who do not need additional regulatory permission to deploy an ADS, participation in a pilot program can help benefit the state of knowledge about self-driving through information exchange with the Agency. However, this information and data sharing should not introduce undue risks to extremely sensitive confidential business information. The Agency's existing procedures (including through the procedures described in Part 512) for protecting sensitive information provide a helpful framework to identify potentially sensitive information. But even those designations are ultimately subject to challenge and potential release of information deemed highly sensitive by a developer.

To further facilitate the type of information exchange underpinning the pilot program, then, we encourage the Agency to develop a communications structure that limits the risk that all information sharing results in Agency records subject to FOIA. Whether by maintaining data only after anonymizing and aggregating, allowing developers to maintaining custody and control of their documents, or otherwise.

Additionally, we recommend that the Agency explicitly reaffirm that information supplied under the auspices of a pilot program represents a voluntary disclosure, subject to the highest protections under FOIA's provision for protecting confidential business information.

b. privacy?

To the extent that data gathered under the purview of any pilot program was personally identifiable and this data was of interest to the Agency, we would recommend that developers provide aggregated, anonymized data to protect the privacy of individuals and adhere to established best practices. We also recognize and appreciate DOT continuing to work with the Federal Trade Commission on privacy matters involving new technologies.

c. data storage and transmission?

As noted above, to promote the free flow of typically-confidential information, we recommend the Agency adopt a structure whereby it preserves (as Agency records) a minimal amount of information and documentation, especially in connection with raw data submitted by a developer.

For that data actually stored by the Agency, we would recommend that the Agency implement segregated storage and encrypted transmission procedures in respect of data shared through a pilot program.

d. data retention and reporting?

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development.

Given the extraordinary cost associated with retention and reporting of data that is not required either under existing law or for development, we would encourage the Agency to avoid imposing any specific retention and reporting requirements on pilot participants.

Question 11. In the design of a pilot program, what role should be played by--
b. The elements listed below,
iii. Third party evaluation?

Uber supports the framework reiterated in FAVP 3.0, thus our recent publication of our own Voluntary Safety Self-Assessment ("VSSA"). In addition, we note that the industry has not reached consensus on objective performance criteria, testable scenarios, and the test procedures for evaluating crash avoidance performance of ADS equipped vehicles. While we recognize the value of independent assessments of safety in building public trust in ADS technology, we would not suggest that third-party evaluation will be practicable for a pilot program. In our experience, third-party evaluation may be most usefully applied to individual features or elements of the system, rather than the ADS as a whole.

Over time, as development proceeds and the Agency gathers information through this or similar pilot programs, capabilities and availability of third-party assessors may improve such that their role could be broader. Additionally, a third party evaluation is most useful where the third party is equipped with a clear basis for evaluation. Because one potential end of a pilot program would be to develop such a basis, the time may not be ripe for third party involvement.

A. Failure risk reduction?

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development.

In considering any requirements for the functionality of features or capabilities required for safe operation, including redundancies and fail-safes, the Agency may wish to convene a meeting with industry to further explore this issue. Given the variety of hardware and software approaches across the industry, a redundant and fail-safe system may be achieved in a variety of ways; prescriptive approaches could, in this context, not achieve the desired safety outcome.

B. Crash avoidance performance of vehicles with high and full driving automation?

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development.

Per response to question 11(b)(iii)(A), given the variability in vehicle platforms and integration factors, the Agency may wish to consider welcoming industry guidance. Prescribing a specific solution could, in this context, reduce safety.

iv. Occupant/non-occupant protection from injury in the event of a crash (crashworthiness)?

ADS technology creates new questions and opportunities for crashworthiness. In evaluating crashworthiness in the ADS context, we recommend the Agency remain mindful of the crashworthiness baseline established under current law. Existing FMVSS are specifically designed, among other goals, to impose crashworthiness standards and protections for conventional vehicles. As a result, an ADS-equipped vehicle that maintains a conventional design should be recognized as proceeding from a crashworthiness baseline that the Agency has already recognized as worthwhile.

v. Assuring the safety of software updates?

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development.

While we acknowledge value in assuring software safety, regulation or requirements to report on or receive government approval of software release processes could inhibit progress in development. The Agency may wish to consider requiring that developers provide assurances regarding their use of software quality processes, rather than stipulating the approach.

vi. Consumer education?

We share the Agency's view that effective public education on ADSs will be key to the technology's deployment and ability to drive improved safety outcomes. Uber believes that education can happen in a variety of ways; including allowing the public to safely interact with vehicles. Such interactions allow us to learn a great deal from our passengers about their questions and expectations, and similarly we are able to answer questions and build confidence in the technology's potential.

We have previously offered UberX riders in certain cities an opportunity to experience self-driving technologies. As with all our points of consumer contact across different parts of our business, we were able to learn from our passengers about their questions and expectations, and were able to answer questions and build confidence in the technology's potential.

We would encourage the Agency to support, whether in the context of a pilot program or not, a broad spectrum of public paths by developers, including through safely providing ride-alongs and hosting demonstrations.

vii. Post-deployment Agency monitoring?

Per response to question 9, the Agency may wish to balance the potential benefits of reporting obligations against the recognition that constant reporting of large data sets would become onerous for companies.

viii. Post-deployment ADS updating, maintenance, and recalibration?

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development.

In our experience, the cadence for ADS updating, maintenance, and recalibration must be allowed to vary based on things like the scope of testing 'missions,' the vehicle platform, and its location.

Question 12. Are there any additional critical areas to consider in the design of a safe pilot program for the testing and deployment of vehicles with high and full driving automation?

No comment.

Question 13. Which of the following matters should NHTSA consider requiring parties that wish to participate in the pilot program to address in their applications?

a. "Safety case" for vehicles to be used in the pilot program (e.g., system safety analysis (including functional safety analysis), demonstration of safety capability based on objective performance criteria, testable scenarios and test procedures, adherence to NHTSA's existing voluntary guidance, including the submission of a voluntary safety self-assessment, and third-party review of those materials).

Depending on the level of detail required to participate in the pilot program, a requirement to submit a full safety case as a condition for participation may be prohibitive and result in the Agency having to review in a timely fashion a considerable amount of documentation. Additionally, it may be challenging to implement such a requirement consistently in the absence of an industry-wide consensus on what constitutes a "safety case."

For developers of vehicles with conventional designs in particular, participants should already have made available a VSSA. The Agency could review those in the context of participating in a pilot program and ask the applicant to submit additional information that would be made available to the public if the application is granted. The Agency should consider the impact on safety of a static set of participation criteria for all potential participants. For example, the showing for participants seeking a regulatory exemption to test a type of design that is not allowable under current law should differ from developers utilizing conventional designs which, as DOT has pointed out, can be lawfully tested and deployed today without any regulatory allowance.

i. What methodology should the Agency use in assessing whether an exempted ADS vehicle would offer a level of safety equivalent to that of a nonexempted vehicle? For example, what methodology

should the Agency use in assessing whether an ADS vehicle steers and brakes at least as effectively, appropriately and timely as an average human driver?

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development.

d. Considerations for other road users (e.g., impacts on vulnerable road users and the proximity of such persons to the vehicle).

Considerations for other road users, including proximity vulnerable road users to vehicles, are usually set by States and localities. Safe deployment of self-driving vehicles requires attention to these rules to facilitate the integration of self-driving vehicles with the broader set of actors in the transportation environment. For specific capabilities we design for, we assess the relevant traffic laws for a given ODD to ensure that those rules are integrated into the self-driving system. As with other limitations on the behavior of the self-driving system, we enact formal limits within the self-driving system to promote compliance with these rules. For example, we build state and local road rules, e.g. speed limits, into our high-definition maps and program the vehicles to follow these rules, e.g. by staying below the prevailing speed limit.

e. Reporting of data, e.g., reporting of crashes/incidents to NHTSA within 24 hours of their occurrence.

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development.

In light of additional existing and emergent incident reporting requirements at the State and local levels, developers may require varying amounts of time for notification, depending upon the reporting threshold and type and scale of information requested. We would recommend that the Agency seek and encourage consistency with accident-reporting requirements under existing State testing and deployment programs.

g. Adherence to recognized practices for standardizing the gathering and reporting of certain types of data in order to make possible the combining of data from different sources and the making of statistically stronger findings.

See response to question 9.

k. Assuring safety of software updates

See response to question 11(b)(v).

l. Consumer education

See response to question 11(b)(vi).

m. Post-deployment monitoring

See response to question 11(b)(vii).

n. Post-deployment maintenance and calibration considerations

See response to question 11(b)(viii).

Question 15. What value would there be in NHTSA's obtaining one or more of the following potential categories of data from the participants in the pilot program? Are there other categories of data that should be considered? How should these categories of data be defined?

b. Statistics and other information on outcome (e.g., type, number and cause of crashes or near misses, injuries, fatalities, disengagements, and transitions to fallback mechanisms, if appropriate).

Per response to question 9, the Agency may wish to balance the potential benefits of reporting obligations against the recognition that constant reporting of large data sets would become onerous for companies.

With regard to disengagements specifically, disengagements alone may not paint an accurate or complete picture of self-driving vehicle safety, for a number of reasons:

- Disengagements may be required to support development of capabilities required in challenging, real-world scenarios - One of the objectives of on-road development testing is to identify real-world scenarios that are particularly challenging for self-driving vehicles, in order to train them on the capabilities required.
- Disengagements may be a matter of policy - Vehicle operators may be directed to disengage in various situations (e.g. construction zones, emergency vehicles, significant weather events) proactively, regardless of how the vehicle might have performed in the absence of the disengagement.
- Disengagements may be defined differently by different developers and enforcing a common definition may not be practicable - Because systems and testing approaches differ greatly, comparing disengagement data across developers (or collating it in aggregate) may not yield high quality data or inferences.
- Disengagement rate may be a function of the ODD, specific capabilities under development, operator judgement and preferences, and the goals of a particular day's testing; consequently, inferring conclusions from disengagement rate can be difficult.

c. Vehicle/scene/injury/roadway/traffic data and description for each crash or near miss (e.g., system status, pre-crash information, injury outcomes).

In the context of ADS-equipped vehicles, it may be difficult to establish a workable definition of "near miss" which can apply across developers. As such, the Agency may wish to limit any reporting to serious or reportable crashes, using existing definitions, including the Agency's definitions.

Per response to question 13(e), we would recommend that the Agency seek and encourage consistency with accident-reporting requirements under existing State testing and deployment programs.

d. Sensor data from each crash or near miss (e.g., raw sensor data, perception system output, and control action).

Per response to question 9, it will neither be practicable nor informative for the Agency to ask pilot participants to share raw sensor data generated during testing.

Should the Agency wish to receive data or information which may inform a finding of cause, processed data will be more useful. Per response to question 15(c), as it may be difficult to establish a workable definition of "near miss" which can apply across developers, the Agency may wish to limit any reporting to crashes.

e. Mobility performance impacts of vehicles with high and full driving automation, including string stability of multiple consecutive ADS vehicles and the effects of ADS on vehicle spacing, which could ultimately impact flow safety, and public acceptance.

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development.

f. Difficult scenarios (e.g., scenarios in which the system gave control back to an operator or transitioned to its safe state by, for example, disabling itself to a slow speed or stopped position).

Per response to question 7, the Agency may wish to offer a standard taxonomy for defining scenarios, rather than determining which scenarios may be deemed difficult.

g. Software updates (e.g., reasons for updates, the extent to which updates are made to each vehicle for which the updates are intended, effects of updates).

The Agency may wish to reserve a view on this issue, given the age and stage of ADS technology development.

h. Metrics that the manufacturer is tracking to identify and respond to progress (e.g., miles without a crash and software updates that increase the operating domain).

See response to question 7.

j. Metrics or information concerning the durability of the ADS equipment and calibration, and the need for maintenance of the ADS.

See response to question 11(b)(viii).

k. Data from "control groups" that could serve as a useful baseline against which to compare the outcomes of the vehicle participating in the pilot program.

Developers may not hold useful safety outcomes data for a control group of human drivers which could be used for this purpose. Should the pilot program successfully inform the Agency's view of useful performance measures or metrics, it may be best placed to draw from its own data sets in establishing benchmarks for these metrics for human drivers.

m. Given estimates that vehicles with high and full driving automation would generate terabytes of data per vehicle per day, how should the need for data be appropriately balanced with the burden on manufacturers of providing it and the ability of the Agency to absorb and use it effectively?

See response to question 9.

n. How would submission of a safety assurance letter help to promote public safety and build public confidence and acceptance?

We recognize the importance of earning the trust and confidence of both the public and various levels of government in support of successful development and deployment of self-driving vehicles.

We believe that the most effective approach to building trust is to provide regular, consistent, accessible information on our development efforts, business plans, and the potential impacts of our operations on local communities where we operate. We want our stakeholders to have high-quality information on the technology in order to make informed decisions about use and regulation of self-driving vehicles. At this stage of development, a VSSA, or safety assurance letter, is an important platform for self-driving technology developers to communicate consistently and regularly regarding progress in development, remaining challenges, and plans for deployment, and thereby build public confidence and acceptance.

o. For all of the above categories of information, how should the Agency handle any concerns about confidential business information and privacy?

See response to question 10(a).

Question 16. How should the Agency analyze safety in deciding whether to grant such exemptions under each of the separate bases for exemptions in section 30113? Can the exemption process be used to facilitate safe and effective ADS development in an appropriate manner?

Different exemption requests will undoubtedly raise different safety considerations particular to the individual request. Some exemption requests may turn on the sufficiency of an ADS to provide the safety benefit otherwise achieved through a particular FMVSS.

Question 19. How could the exemption process in section 30113 be used to facilitate a pilot program? For vehicles with high and full driving automation that lack means of manual control, how should NHTSA consider their participation, including their continued participation, in the pilot program in determining whether a vehicle would meet the statutory criteria for an exemption under section 30113? More specifically:

c. The Agency requests comment on what role a pilot program could play in determining when to grant an exemption from the "make inoperative" prohibition under section 30122 for certain "dual mode" vehicles. Relatedly, what tools does NHTSA have to incentivize vehicles with high and full driving automation that have means of manual control and thus do not need an exemption to participate in the pilot program?

Consistent with the Agency's past implementation of Section 30122, and prior efforts to provide cross-cutting guidance on the application of the make-inoperative provision, the Agency could - as part of this pilot program or as part of a more durable statement of Agency policy - interpret the make inoperative provision to not apply to the type of control hand-off that occurs in certain dual use vehicles, especially in the context of fleet vehicles. After all, preserving the prospect of manual control at the same time the ADS is active could result in a less safe overall product, due to the risk of conflict between the human operator and the ADS.

To avoid developers unnecessarily preserving this potentially dangerous design simply to avoid a potential conflict with Section 30122, the Agency could reaffirm that no make-inoperative concern arises due to a temporary disabling of a design feature under 30122 where the contemplated dual use simply involves transferring the means of control from one type of legitimate driver (the human) to another (the ADS). As an initial effort, the Agency could tailor this type approach to the make-inoperative clause, to fleet context which, by its nature, affords certain built-in incentives to preserve safe operations and avoid the type of unsafe modifications that animate Section 30122.

Question 21. What role could a pilot program play in determining when to grant an exemption from the "make inoperative" prohibition under section 30122 for certain "dual mode" vehicles? Relatedly, what tools does NHTSA have to incentivize vehicles with high and full driving automation that have means of manual control and thus do not need an exemption to participate in the pilot program?

See response to question 19(c).

Question 22. If there are any obstacles other than the FMVSS to the testing and development of vehicles with high and full driving automation, please explain what those are and what could be done to relieve or lessen their burdens. To the extent any tension exists between a Federal pilot

program and State or local law, how can NHTSA better partner with State and local authorities to advance our common interests in the safe and effective testing and deployment of ADS technology?

At Uber, we believe that ADS technology will be most effectively and efficiently deployed through shared fleets because this approach:

- Improves access to technology which is otherwise prohibitively expensive for personal ownership, thereby familiarizing consumers and speeding adoption
- Encourages a shift away from private car ownership, thereby reducing the size of the vehicle fleet and space required for parking
- Manages the risk of increased Vehicle Miles Traveled and related sprawl, congestion, and environmental impacts by combining trips and using infrastructure more efficiently.

Safe self-driving technology should be able to be operated in on-demand networks, including for ride-sharing purposes. Policymakers at the State and local levels can facilitate near-term efforts by leveraging existing regulatory categories, whether Transportation Network Company (TNC) or other for-hire regulatory regimes. In addition, policies and public services that encourage sharing, like High-Occupancy Vehicle lanes, commuter tax benefits, robust mass transit systems, and variable road and curb pricing will be important to realizing the benefits of automation.

Sincerely,

/s/ Noah Zych

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Noah Zych
Head of System Safety
Uber Advanced Technologies Group