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National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Docket Number NHTSA-2018-0092

Lyft, Inc. ("Lyft") submits these comments to the Advanced Notice of Proposed Rulemaking ("ANPRM"), NHTSA-2018-0092, published in the October 10, 2018 *Federal Register*. We applaud the National Highway Traffic Safety Administration's ("NHTSA") leadership in seeking public comments on *its Pilot Program for Collaborative Research on Motor Vehicles with High or Full Driving Automation* ("Pilot Program").

Introduction

Lyft's mission is to provide the world's best transportation -- in a manner that is safe, reliable, and efficient. Over the last six years, Lyft has connected communities previously underserved by other transportation options, enhanced efficient usage of public transportation, and been a driver of economic empowerment. In pursuing its goal of furthering broad access to transportation, Lyft is committed to the safe development of Autonomous Driving System ("ADS") technology and believes that the widespread adoption of ADS vehicles is key to improving the safety of America's roadways. To accomplish widespread adoption, the technology must be safe and as ubiquitously available as possible, which is why Lyft's development and deployment strategy was crafted with an eye toward expanded access to safe ADS vehicles. Lyft's strategy is two-fold: (1) to promote widespread availability, Lyft's Open Platform allows other ADS providers to deploy safe vehicles on Lyft's



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network; and (2) Lyft's Level 5 Engineering Division in Palo Alto, California focuses on the development of Lyft's own ADS technology for deployment on Lyft's Open Platform. Lyft looks forward to industry-wide collaboration with NHTSA in its Pilot Program to leverage the safety advantages of ADS technology in reducing accidents and injuries.

Lyft responds to several of the specific questions the Agency raises in its ANPRM as follows:

Answer to Question 1

In designing the Pilot Program to 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, NHTSA should consider the following:

- Lyft encourages NHTSA to remain technology neutral in conducting the Pilot Program, both to ensure that regulatory efforts do not stifle innovation and to avoid a scenario in which NHTSA might inadvertently pick winners and losers in terms of developing technology. More important than implementing prescriptive requirements is ensuring that ADS vehicles operate safely within the domains in which they are intended and designed to operate.
- Lyft agrees with NHTSA's engagement at the federal level on the safety of ADS technology to avoid a patchwork of state laws in allowing the testing, development, and deployment of ADS vehicles across the country.



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- Lyft encourages NHTSA to move beyond limited exemption-based paths through the existing Federal Motor Vehicle Safety Standards ("FMVSS") requirements, and in the interim, (1) provide widely available exceptions to certain FMVSS that may routinely conflict with ADS technology and (2) make those exceptions available to companies developing ADS technology across the industry. Currently many FMVSS requirements do not apply to ADS vehicles, especially for fleet-based business models in which ADS vehicles have their deployment limited to only the Operational Design Domains ("ODD")¹ that they are designed for. Lyft recommends that NHTSA use the Pilot Program to develop a modernized system for ADS vehicles that does not require rigid adherence to existing FMVSS requirements and can be more flexible to recognize different use cases for different types of deployments and levels of autonomy.
- NHTSA should consider creating a set of generalized safety exemptions that can apply across the ADS industry when relevant, rather than requiring each applicant to substantiate the safety of their exemption each time. For example, NHTSA could say it is acceptable to remove the steering wheel if there will be no person sitting in the

¹ The Society of Automotive Engineers defines ODD as follows: "Operating conditions under which a given *driving automation system* or *feature* thereof is specifically designed to function, including, but not limited to, environmental, geographical, and time-of-day restrictions, and/or the requisite presence or absence of certain traffic or roadway characteristics."



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driver's seat, without making every ADS developer prove the safety of removing the steering wheel in their ADS vehicles.

- To protect proprietary technology, confidential business information and consumer privacy, and to avoid unnecessary administrative burdens on the industry, data collection by NHTSA should be limited to only data that is directly related to improving automotive safety.

Answer to Question 2

A Pilot Program should be structured to ensure that ADS technologies within the program operate safely within the ODDs for which they were designed. An ODD describes the circumstances in which an ADS technology is intended to operate, such as weather conditions, roadway types, speed, etc. Thus, more important than testing whether ADS technology can perform in, for instance, multiple weather and traffic conditions, is confirming that each technology operates safely within the ODD for which it was designed and intended to operate. ADS technology designed for use in warm (snow-free) climates, for example, need not be able to operate in the snow, especially if the developer of that technology is capable of restricting where and when deployment occurs and has no intention to use it in climates where it would be in contact with snow.

As a network provider, Lyft can and does strictly limit deployment of ADS vehicles to specific ODDs. As long as an ADS developer ensures that its vehicles will not operate outside of the ODDs for which they were designed, it would be unnecessarily burdensome to have any regulations requiring ADS technology to be capable of performing beyond its ODD, and



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such regulatory requirements could significantly hinder testing and deployment of ADS technology. Furthermore, NHTSA should note that in some instances, a single supplier of ADS vehicles or technologies may supply multiple developers across the industry. As a result, any numerical limits on that supplier could cause certain developers or deployers of ADS technology to be unable to obtain requisite supply. There is thus no particular variety of conditions, number of vehicles or length of time that the Pilot Program should prescribe.

Answer to Question 3

In establishing a Pilot Program, it is essential that NHTSA ensure the Program is available to all types of companies that are developing ADS technology. The existing FMVSS exemption process applies differently to different types of companies. Given new business models not contemplated at the time the statutory exemption process was created, there is a risk that some developers of ADS technologies may be excluded from the Pilot Program, or otherwise ineligible to apply for an exemption. As NHTSA has indicated in its 2016 Federal Automated Vehicles Policy, these developers should be permitted to apply for exemptions which would enable them to participate and test ADS vehicles. NHTSA should avoid arbitrary limits on participation that would prevent new entrants to the market and avoid preventing sectors within the industry from developing or testing ADS technology.

Moreover, the basis for an exemption application in 49 C.F.R. part 555, requires detailed substantiation and testing that may prove burdensome and contrary to the stated policy objective of the Pilot Program: to facilitate the conducting of research and gathering of data that would provide substantiation of the safety of the vehicles long term. NHTSA's



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proposed voluntary safety self-assessment for manufacturers and other entities seeking to deploy ADS vehicles, and described in *Automated Driving Systems 2.0: A Vision for Safety*, seems to provide a more streamlined approach than the requirements for the temporary exemption process which almost assumes that the testing and data to be gathered by the Pilot Program has already been generated.

While NHTSA could engage in rulemaking to modify 49 U.S.C. § 30113 and 30114's scope to ensure it is more inclusive and does not require documentation that might foreclose participation from new market entrants, the time involved in doing so would likely foreclose the possibility of certain developers' participation in the Pilot Program. Alternatively, through its Pilot Program, NHTSA could unilaterally establish exemptions from current FMVSS compliance requirements that are unrelated to their vehicles' ODDs for those participating in the Pilot Program who are self-certifying the safety of their vehicles within their vehicles' respective ODDs.

Not only would such exemptions be appropriate, because they would level the playing field and permit all industry developers to participate, they are consistent with the fact that many FMVSS requirements may not even pertain to particular ADS vehicles. As explained throughout, each test vehicle will operate within its own ODD, which may affect the FMVSS that are even relevant to any given vehicle. Particularly in the instance of fleet-operated ADS vehicles, the party deploying the technology can control its use and restrict its deployment to the designed-for ODDs.



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Answer to Question 5

Please see Lyft's comments in response to Question 3 above. In addition, for all vehicles equipped with ADS technology, the Agency should through this Pilot Program unilaterally remove prohibitions on any ADS technology developer making a non-ADS safety system or component inoperative when the system or component is made inoperative in order to prevent conflicts between an ADS safety system or component and the non-ADS safety system or component. Doing so would remove the need for ADS developers to needlessly apply for exemptions in situations where it is inherently safer to make a conflicting non-ADS system or component inoperative.

Answer to Question 7

The safety profile of automated technologies should be evaluated by safety outcomes, and not by prescriptive metrics. In other words, ADS technology developers should self-certify to the Agency that ADS technologies are able to operate safely within their ODDs. Safety requirements should be "technology-neutral." As an example: the Agency can require that an ADS vehicle be capable of identifying and avoiding collision with a pedestrian crossing its path, but the Agency should not prescribe how this identification and avoidance be achieved. The Agency should avoid prescribing the use of a specific technology (e.g., lidar, radar, cameras, or a combination of the three in the example above) or even what the metrics of any such technology should be, as developers of ADS technology should be free to use innovative approaches as long as they are able to achieve the desired safety outcome.



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The primary risk of deeming prescriptive metrics and tests a proxy for evaluating safety is that it creates misaligned incentives—developers of ADS technologies and vehicles could focus their design efforts on ensuring compliance with a set of static metrics and tests instead of focusing their efforts on continuously improving actual safety outcomes. In doing so, NHTSA could risk incentivizing behaviors that cause developers to design to a safety ceiling, rather than a floor. Such an approach would not encourage innovation and the continued effort to maximize the safety of ADS technologies.

Answer to Question 8

At this stage in the development of ADS technologies, it would be premature for the Agency or any other regulator to prescribe the ODDs. Nor would it be feasible for the Agency to define what ODDs should be. ODDs may be fluid over time and expand as technology improves, and they can be specific to the development of an individual research and development vehicle (rather than a model). There is also wide variation of ODDs across the industry. As discussed above, the critical consideration is whether specific ADS technology operates safely within its own developer-defined ODD at any point in time. Individual companies should be responsible for defining their own ODDs, and then demonstrating to NHTSA that they only operate their technology within them.



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Answer to Question 9

Participants in the Pilot Program should be expected to share some data with NHTSA that bears directly on the safety of ADS technologies. This would include data such as the number of collisions in which a vehicle has been involved while operating in autonomous mode, whether property damage resulted, and whether there were any injuries to passengers and/or other road users.

By contrast, NHTSA should not require the sharing of data that is not instructive of the ADS technology's safety. One example is "disengagements." Disengagements can occur for any number of reasons unrelated to a vehicle's safety. In fact, it is expected that a safety driver would disengage ADS technology if a vehicle were entering conditions beyond the ADS technology's ODD (*e.g.*, a safety driver should disengage an ADS with a dry-weather-only ODD if it starts raining during testing).

By focusing the data that will be shared on that which materially advances NHTSA's goal of evaluating safety, NHTSA will also minimize some of the concerns addressed in response to Question 10, below, regarding the protection of sensitive and confidential data. It will additionally mitigate the risk that NHTSA is inundated with data from Program participants that does not materially advance NHTSA's goal of understanding the safety of ADS technologies. Lyft looks forward to working with NHTSA and other industry partners to develop more meaningful metrics that advance safety.

Answer to Question 10

NHTSA should be mindful of confidentiality and privacy concerns in evaluating the information that it will collect from participants in the Pilot Program. Although it should not



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need to do so if collecting only information that pertains to the safety of a technology, to protect privacy, NHTSA should not collect any Personal Identifying Information about individuals. NHTSA similarly should not request data specific to individual trips (either in real-time or past trip history), as this too could violate an individual's privacy by exposing intimately personal details revealed in usage patterns, such as medical appointments, places of worship, travel patterns, daily routines, business dealings. *See e.g., United States v. Jones*, 565 U.S. 400 (2012) ("As with GPS information, the time-stamped [cell phone] data provides an intimate window into a person's life, revealing not only his particular movements, but through them his 'familial, political, professional, religious, and sexual associations.'" [citation omitted]). These location records "hold for many Americans the 'privacies of life.'" Companies deploying ADS technology have a responsibility to protect the privacy of their customers' data.

NHTSA must additionally ensure that participation in the Pilot Program will not result in the public availability of participants' confidential business and/or trade secret information. This information is commercially sensitive and it should not be published as its release could result in competitive harm. As permitted under the Freedom of Information Act ("FOIA"), 5 U.S.C. § 552, *et seq.*, NHTSA should respond to inquiries seeking information gathered in the Pilot Program only once the Pilot Program participant that provided the information has been made aware of the disclosure request and has been given the opportunity to object to its disclosure under any of the bases that FOIA allows.



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Answer to Question 11

Third-party evaluation should not play a role in the Pilot Program for a number of reasons. At the threshold, third-party testing is not NHTSA's norm. Rather, FMVSS is currently based on a self-certification architecture which does not rely on independent third-party evaluation of compliance or third-party documentation in order to deploy vehicles. FMVSS should continue this architecture as it has served automotive safety well to date. A self-certification regime remains appropriate for ADS technologies because the technology designers are best positioned to evaluate their designs and confirm the functionality of their systems. It would not be engineering best practice to separate these functions.

Third-party testing regimes are also not appropriate for ADS technologies due to the inherent limitations of third-party evaluators. Given the wide range of technologies being developed (and their complexities), it would not be feasible for third parties to be positioned to evaluate them all. Third-party testing groups for performing such comprehensive testing do not currently credibly exist, so requiring such testing would slow development. Only a developer intimately familiar with the implementation of a specific technology architecture would be able to adequately design a testing plan to validate safety in a timely manner.

Nor would it facilitate the Agency's overall evaluation of ADS technologies to prescribe testing scenarios and evaluating disparate products under them, or to require all ADS technologies to meet arbitrary performance criteria untethered to vehicles' ODDs. It is difficult to have an evaluation methodology that comprehensively and fairly compared the multitude of technical ADS approaches. There are many and varying ADS technologies with different



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ODDs. They are not all intended to operate in the same manner or in the same conditions. They therefore should not be assessed per a common and prescribed test, as comparing performance of disparate technologies would require that the evaluation criteria be so general that they would cease to be useful to evaluate safety.

Finally, at this stage in research and development of ADS technologies, designs are rapidly changing and being constantly revised. Tests designed to evaluate current implementations would be by definition out of date when delivered.

Because of all of these difficulties and shortcomings, it would be highly unlikely that any third-party evaluation would be comprehensive, aggressive, and robust enough to discriminate between "good" performance and "bad" performance. This could result in the setting of performance goals that are too low and could provide a "false sense of safety" for the motoring public.

Answer to Question 13

As the Agency evaluates what information it should seek in its Pilot Program application, Lyft respectfully suggests that the Agency consider the following comments with regard to certain of the specific items raised:

As addressed throughout these comments, the Agency should embrace as much flexibility as possible for assessing the safety profile of ADS technology. For example, non-traditional technology companies do not have the proving grounds and testing facilities of traditional OEMs, and a regime that over-emphasizes non-road testing or third-party testing could disadvantage innovative new entrants whose technology or approaches could improve



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safety. Even to the extent that NHTSA determines to evaluate ADS safety according to the intended ODD of each technology, as Lyft recommends, Lyft respectfully suggests that the Agency avoid prematurely establishing metrics that compare an ADS system to an artificially "typical" human driver as there is currently no consensus on methodology to confidently quantify a human driver's response.

With regard to the timing for reporting data to NHTSA under the Pilot Program, NHTSA need not adopt the strict (and potentially unrealistic) 24-hour reporting requirement mentioned in the ANPRM. The Agency can instead adopt the reporting timeframes proven effective in analogous contexts. This includes the five working day requirement set forth in Part 573, 49 C.F.R. § 573.6(b), or California's 10-day notification requirement in the event of a collision originating from ADS technology on a public roadway that results in property damage, or bodily injury or death, Title 13, California Code of Regulations, § 227.48.

In response to the Agency's inquiry concerning the standardization of data, the Agency should not require that Pilot Program participants gather and report data to the Agency by prescribed metrics, or in a particular format. If the Agency were to require this, it could provide a barrier to entry for all but the most established and resourced entities that have the capacity to adapt their systems and processes to meet the metrics or format requirements. In particular, if the Agency were to choose a format purely because it was the first format created, and not necessarily the best one, NHTSA could be inadvertently picking winners and losers based upon their speed to market. This outcome would not have any rational relationship to safety.



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Finally, the Agency should not require ADS developers to engage in specific consumer education programs, and instead allow developers to educate consumers in the unique manner that fits with their business and technology models. A company that sells ADS vehicles directly to consumers, for example, will have very different consumer education needs than one with a business model such as Lyft's. Lyft currently educates its passengers about ADS Technology both before a ride (via the Lyft App after a customer requests an ADS vehicle ride) and during the ride (via an in-car video console that provides a visualization of the ADS vehicle's situational awareness).

Answer to Question 15

NHTSA should collect from Pilot Program participants only the data necessary to confirm the technology is safely operating within its intended ODD. Otherwise ADS technology developers could be tremendously burdened with the costs and logistics associated with data collection and storage unrelated to vehicle safety. There is not a one-size-fits-all approach to ADS technologies nor should there be as to data collection from vehicles equipped with those technologies. The same requirements may not apply for the different SAE levels of autonomy, different types of ADS technology used, different ODDs designed for, or even for the different business models under which various ADS technologies are being deployed.

Answer to Question 16

Please see Lyft's response to Question 3 above.

Answer to Question 19

Please see Lyft's response to Question 3 above.



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Answer to Question 21

Lyft believes "dual mode" vehicles will play an important role in the testing, development, and deployment of early ADS vehicles, and that it is important to allow all industry participants to modify vehicles by relying upon an exemption to the make inoperative provisions under section 30122. For dual mode vehicles with ADS technology that can be operated in manual and autonomy mode, developers should be able to make features inoperative in one mode and operative in the other, depending on the specific mode of operation.