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VIA ELECTRONIC FILE

Ms. Ann Carlson
Acting Administrator
National Highway Traffic Safety Administration
U.S. Department of Transportation
1200 New Jersey Avenue SE
West Building Ground Floor, Room W12-140
Washington, DC 20590-0001

Subject: Docket No. NHTSA-2022-0066
National Highway Traffic Safety Administration Ford -- Receipt of Petition for Temporary Exemption from Various Requirements of the Federal Motor Vehicle Safety Standards for an Automated Driving System-Equipped Vehicle;

Dear Acting Administrator Carlson:

Solo Advanced Vehicle Technologies ("Solo AVT") appreciates this opportunity to respond to NHTSA's Notice of Receipt of Petition from Ford Motor Co. for Temporary Exemption from Various Requirements of the Federal Motor Vehicle Safety Standards for an Automated Driving System-Equipped Vehicle[1] ("Notice"). Solo AVT supports actions by the U.S. Department of Transportation ("DOT") to support broader deployment of advanced, innovative technologies to fulfill NHTSA's stated intent to facilitate safe deployment of autonomous vehicle technology. Automated driving systems have the potential to improve safety, expand mobility, and contribute to a stronger U.S. economy.

There is a need for modernization of the Federal Motor Vehicle Safety Standards (FMVSS) to facilitate autonomous vehicle deployment that will enhance road safety for all users - drivers, passengers, pedestrians, and cyclists. Until that modernization is complete, the industry is dependent upon the Exemption Process specified in 49 C.F.R. Part 555[2]. Solo AVT urges the agency to streamline the Exemption Process and to expedite its consideration of exemption requests so that future petitions may be granted in a timely manner to support the deployment of innovative technologies. To complement the Exemption Process, Solo AVT encourages the agency to develop a pilot program as contemplated in a 2018 NHTSA Advanced Notice of Proposed Rulemaking[3] where collaboration and transparency between NHTSA and testing entities would provide the data needed to support rulemaking activities.

In respect to the instant request, Solo AVT supports NHTSA expeditiously granting Ford an exemption from the FMVSSs if the agency determines that Ford's submission has met the requirements establishing equivalent safety.

[1] Docket No. NHTSA-2022-0066
[2] 49 U.S.C. 30113.
[3] https://www.regulations.gov/document/NHTSA-2018-0092-0001

In response to the questions posed in the Notice, Solo AVT asserts that NHTSA has many tools in its toolbox to ensure vehicle safety on our nation's roadways. Additional requirements beyond the current regulations should not be imposed through the Exemption Process.

Solo AVT has a direct interest in the outcome of the subject petition for exemption as well as other similar requests. Solo AVT, based in Fremont, CA, is revolutionizing the freight transportation industry by building the first battery-electric, long-haul, autonomous-capable Class 8 truck. The truck can achieve an industry-leading range of over 500 miles per charge, has the lowest drag coefficient of any Class 8 truck, and aerospace-grade system reliability and redundancy for operational safety. These characteristics make the truck the most advanced, efficient, cleanest, and safest Class 8 truck on the road. When configured for autonomy or when in autonomous operation, several features or equipment required by FMVSS would be redundant.

We submit the following comments to the Notice published in the Federal Register in July 2022. Our comments that respond to specific questions posed in the Notice will be listed at the end.

Potential Benefits of Automated Driving Systems

The most powerful reason to support the development of Level 4 and Level 5 Automated Driving Systems is that they have the potential to significantly improve safety on our nation's roadways. NHTSA estimates that 42,915 people died on our nation's roadways in 2021.[4] In the National Motor Vehicle Crash Causation Survey, the "critical reason for the critical event" that precipitated the crash was coded to the driver in 94% of cases. Unlike human drivers, the ADS does not get distracted or drowsy or drive under the influence of alcohol or drugs.[5] The importance of emphasizing heavy truck safety is demonstrated by the fact that large trucks account for 4% of all registered vehicles yet represent 9% of all vehicles involved in fatal crashes.[6] Additionally, in 2020, 608 large truck occupants were killed in roadway crashes while a further 3,406 other vulnerable road users were killed in incidents involving large, commercial vehicles.[7]

Granting this exemption and others like it will facilitate the deployment of technology which will have a positive safety impact as well as a positive economic impact. In manufacturing a heavy truck intended for interstate commerce, Solo AVT is particularly interested in the potential for improved quality of life for drivers who endure long days on the road and extensive time away from home. By allowing autonomous trucks to safely execute long hauls, human drivers can perform the local routes that need human interaction and allow a return to home at the end of every shift.

Autonomous trucking will not cause significant job losses. In a 2019 analysis, the American Trucking Association found that the trucking industry was short roughly 60,800 drivers in 2018 and that deficit could swell to over 160,000 by 2028[8]. A DOT-sponsored study on ADS concludes that truck drivers should not fear significant job losses due to automation as the broad adoption of autonomous, heavy-duty

[4] https://www.nhtsa.gov/press-releases/early-estimate-2021-traffic-fatalities
[5] Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey, DOT HS 812-115, February 2015.
[6] https://injuryfacts.nsc.org/motor-vehicle/road-users/large-trucks/
[7] https://www.iihs.org/topics/fatality-statistics/detail/large-trucks
[8] ATAs Driver Shortage Report 2019 with cover.pdf (trucking.org)

trucks is expected to occur over a period of more than a decade [9]. Additionally, in a 2021 Report to Congress, the DOT asserted that "New jobs will be created. Driving automation systems would be expected to lower freight transportation costs and enhance productivity, leading to greater economic activity and job creation in the transportation and logistics industries, and other business sectors."[10]

Removing Barriers to Innovation

Where current regulations impose barriers to innovation, the agency should move to expeditiously update applicable FMVSS to allow for new vehicle designs that are made possible by automated driving technology (e.g., new seating configurations, windshield, mirror, and camera requirements, etc.). Solo AVT recognizes and appreciates the steps that NHTSA has undertaken already, including the review of specific regulations that include requirements, terms, and/or test procedures that may impede advancements in ADS technologies that would improve roadway safety for all. These efforts are summarized nicely by the Shared Use Mobility Center ("SUMC") [11..]

With respect to this Notice and the questions NHTSA poses, the agency should refrain from making the Part 555 Exemption Process more onerous, but instead revise it to facilitate safe, accelerated deployment of new technology to inform potential future rulemaking. Solo AVT recommends NHTSA (a) establish the required contents for a petition, (b) adopt clear, objective criteria for evaluating a petition, (c) set a time period in which the agency will promptly complete its review and determination of a petition request, and (d) increase the number of vehicles exempted per year in line with the proposals in the AV START Act.[12] Solo AVT asks the agency to review whether each question posed in the Notice to determine whether the response would have a net positive effect on safety considering that any delay to the deployment of safety enhancements is a missed opportunity to save lives[13].

Equivalent Safety

The Part 555 Exemption Process plays an important role in facilitating the deployment of new technologies while assuring equivalent or improved safety. The petitions for exemptions should be considered based on the already required justification of equivalent safety for specific relevant FMVSS. Solo AVT encourages the agency to refrain from including in this process requirements that can be more efficiently achieved through other NHTSA authorities, specifically its oversight and recall authority. Where there is additional need for data and/or oversight, it would be more appropriate to provide coordination through an AV Pilot Program.

Beyond The Exemption Process

Solo AVT supports the recommendation in the Alliance for Automotive Innovation's AV Roadmap[14] stating that, "DOT should establish a robust national pilot program for AV testing and deployment. Such a program would not only provide a venue to advance DOT research objectives relating to AVs, but also

[9] Macroeconomic Impacts of Automated Driving Systems in Long-Haul Trucking (bts.gov)
[10] Driving Automation Systems in Long-Haul Trucking and Bus Transit: Preliminary Analysis of Potential Workforce Impacts (transportation.gov), p.10.
[11] https://learn.sharedusemobilitycenter.org/overview/autonomous-vehicle-exemptions-to-nhtsas-fmvss/
[12] https://www.congress.gov/bill/115th-congress/senate-bill/1885/text
[13] https://www.rand.org/pubs/research_reports/RR2150.html
[14] https://www.autosinnovate.org/avroadmap

provide AV developers that choose to participate with an alternative pathway to AV testing and deployment. A focused pilot program carried out under DOT's oversight could increase public exposure to the technology."

NHTSA's tools to ensure vehicle safety include vehicle safety regulations and its broad defect authority to conduct timely recalls of vehicles and equipment that may pose an unreasonable risk to safety. OEMs generally follow the guidance provided by the DOT in submitting Vehicle Safety Self Assessments[15]. The 2021 Standing General Order[16] on incident reporting provides a wealth of data. Additional requirements should not be imposed through the Exemption Process.

Partnerships in New Mobility

As AV technology evolves and new processes and partnerships are born, Solo AVT respectfully submits that NHTSA should consider a new paradigm in granting petitions for exemption, especially for vehicles not intended for sale or use by the general public. In cases where a vehicle is designed to be paired with one or more ADSs, exemption and/or certification for compliance should apply separately to the vehicle itself.

A vehicle that has established "equivalent safety" for a particular standard should be granted the requested exemption pursuant to the regulation without restricting the exemption to operation solely with a specific, identified ADS system. For example, where the applicable standard requires the vehicle to provide a signal (visual or audible) to a human driver, providing an electronic signal to the ADS (regardless of the manufacturer of the ADS) which receives and integrates that signal in the ADS's functional processing establishes equivalent safety as the vehicle that provides the sensory warning. In fact, the vehicle subject to the exemption request provides superior safety because the ADS (no matter the manufacturer) cannot be distracted or otherwise ignore the signal.

This approach maintains the central role the FMVSS serve to ensure vehicle safety and the Part 555 Exemption Process serves to allow appropriate exemptions from the standards under long-established practice. Driver qualifications, whether human or the newly emerging ADS, have traditionally been the domain of the states. Within its authority, NHTSA may seek to establish new safety criteria or processes. A better mechanism to establish those new criteria would be through a pilot program. The Part 555 Exemption Process has proven to be reliable, albeit slow, for ensuring community safety and providing a path for deployment of industry's technological advancements. The process, however, is overdue for refinements that keep safety paramount while accelerating the process of approving technology advancements that maintain or enhance overall on road safety. A number of the considerations proposed by NHTSA in the Notice deviate from established Exemption Requirements, have not been adopted through proper rulemaking, and could impede the adoption of new technologies that can enhance vehicle safety for the benefit of all.

Responses to Selected Questions from the Notice

1. Reporting within 24 hours of an exempt vehicle being involved in any crash, to include:
a. The data elements specified in 49 CFR part 563, Event Data Recorders.

[15] Voluntary Safety Self-Assessment | NHTSA
[16] https://www.nhtsa.gov/laws-regulations/standing-general-order-crash-reporting

b. If the ADS was in control of the vehicle during the event, a detailed timeline of the 30 seconds leading up to the crash, including a detailed read-out and interpretation of all sensors in operation during that time period, the ADS's object detection and classification output, and the vehicle actions taken (i.e., commands for braking, throttle, steering, etc.).

c. If a human operator took over control of the vehicle prior to the event, a detailed timeline of the 30 seconds leading up to the human operator taking over control, including a detailed read-out and interpretation of all ADS sensors in operation during that time period, the ADS's object detection and classification output, and the vehicle actions taken (i.e., commands for braking, throttle, steering, etc.).

d. If a human operator was in control of the vehicle at any point during or up to 30 seconds before the event, a detailed timeline of any actions the human operator took that affected the crash event, as well as any technical problems that could have contributed to the crash (signal latency, poor field of view, etc.).

e. Any additional information about the event that NHTSA deems pertinent for determining either crash or injury causation, including additional information related to the ADS or remote operator system.

> ***Solo AVT Response:***
> NHTSA's 2021 Standing General Order ("SGO") requires much of what is posed in these terms and conditions. We think the SGO requirements are sufficient and anything beyond them should be part of an AV pilot program and not a condition for exemption.

2. Beginning 90 days after the date of the exemption grant, and at an interval of every 90 days thereafter, a report detailing the operation of each exempted vehicle in operation during that time period. This report may provide this information either in aggregate or on a per-vehicle basis, but it must include the following:

a. A calculation of the total miles the vehicle has traveled using the ADS during the report period, and heat maps of the geofenced area in which the vehicle operates to illustrate travel density.

b. Detailed descriptions of any material changes made to the subject vehicle's Operational Design Domain (ODD) or ADS software during the reporting period.

c. Detailed descriptions of any incidents in which any exempted vehicle violated any local or State traffic law, whether operating using the ADS or under human control.

d. Detailed descriptions of any incidents in which the exempt vehicles experienced a sustained acceleration of at least 0.7g on any axis for at least 150 ms, or of any incidents in which the vehicle had an unexpected interaction with humans or other objects (other than crashes that require immediate reporting).

e. Detailed descriptions of all instances in which a public safety official, including law enforcement, attempted to interact with an exempted vehicle, such as to pull it over, or contacted Ford regarding an attempted interaction with an exempted vehicle.

f. Detailed descriptions of any “minimal risk condition fallback” events that occurred, even if no crash has occurred. If the event has occurred because the vehicle self-diagnosed a malfunction of a vehicle system, the report must include a detailed description of the cause and nature of the malfunction, and what remedial steps were taken. If the event was caused by the vehicle encountering a complex or unexpected driving situation, the report must include a detailed timeline of the ADS's decision-making process that led to the event, including any difficulties the ADS had in detecting and classifying objects.

g. In addition, Ford must make necessary staff available to meet with NHTSA staff quarterly to discuss the status of its deployment program.

Solo AVT Response:
An aggregate report of appropriate information is not an unreasonable burden. Solo AVT suggests that NHTSA explain how its existing requirements to gather this data through the Early Warning Reporting System would be insufficient. Most of the information specified here should be part of an AV pilot program and not as a condition for exemption.

8. Ford must create and maintain a hotline or other method of communication for the public and Ford employees to directly communicate feedback or potential safety concerns about the exempted vehicles to the company.

Solo AVT Response:
Ford should not be required to create and maintain a hotline or other method of communication as part of granting the petition for exemption. However, companies may implement such a system, and should be guided by processes outlined in their VSSAs. Any communications requirement of this type is most appropriate in a pilot program.

10. If the agency were to require the reporting of data, for what period should the agency require it to be reported—the two-year exemption period or the vehicles' entire normal service life?

Solo AVT Response:
If the agency were to require it, data reporting should be (a) limited to the vehicles manufactured during the exemption period, (b) for a limited time, and (c) relevant to the standards for which the vehicle was exempted. This kind of reporting is more appropriate for a pilot program, and not as a condition for exemption.

11. Given estimates that vehicles with ADS 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 and maintaining it and the ability of the agency to absorb and use it effectively?

Solo AVT Response:
Data reporting requirements should be limited to identification of potential safety-related defects associated with the specific FMVSSs that are subject of the exemption request. NHTSA should accommodate different reporting formats depending on each OEM’s process.

In Closing

Solo AVT is fully supportive of Ford's request for exemption from the specified FMVSSs where the vehicle provides safety at least equal to that of nonexempt vehicles. We urge NHTSA to act quickly to streamline the exemption process, and modernize the FMVSS to support innovative technologies including automated driving systems.

Respectfully Submitted,

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