U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

1200 New Jersey Avenue SE.
Washington, DC 20590

June 22, 2020

The Honorable Robert L. Sumwalt, III
Chairman
National Transportation Safety Board
490 L'Enfant Plaza East, SW
Washington, DC 20594

Dear Chairman Sumwalt:

This letter responds to the safety recommendations issued by the National Transportation Safety Board (NTSB) to the National Highway Traffic Safety Administration (NHTSA) in the NTSB's March 23, 2018, *Highway Accident Report, Collision Between a Sport Utility Vehicle Operating with Partial Driving Automation and a Crash Attenuator, Mountain View, California.* Our responses to the safety recommendations are discussed below.

NTSB Recommendations and Requested Designations:

H-20-1
Expand New Car Assessment Program testing of forward collision avoidance system performance to include common obstacles, such as traffic safety hardware, cross-traffic vehicle profiles, and other applicable vehicle shapes or objects found in the highway operating environment.

NHTSA Action:
NHTSA is actively pursuing research to develop objective criteria and repeatable methods for assessing the expansion of forward collision avoidance performance tests, which could be considered for future expansion of the New Car Assessment Program (NCAP). For example, NHTSA published a Request for Comments notice on November 21, 2019, in which the agency sought feedback on nine draft research test procedures for Advanced Driver Assistance Systems (ADAS) under development. These included draft research test procedures that were targeted to assess the performance of Intersection Safety Assist (ISA) systems in cross-traffic and left-turn across path driving situations, as well as those for Pedestrian Automatic Emergency Braking (PAEB) systems in daytime scenarios, which all relate to forward collision avoidance circumstances. The agency is further researching night-time testing possibilities with PAEB systems and plans to evaluate Automatic Emergency Braking (AEB) system responses to surrogate bicyclists. Other agency initiatives include additional AEB testing with bicyclists and motorcyclists in intersection test scenarios. Once this research is complete, the agency may consider incorporating these systems into NCAP.

NHTSA requests that recommendation H-20-1 be classified as **Open, Acceptable Response**.

H-20-2
Evaluate Tesla Autopilot-equipped vehicles to determine if the system's operating limitations, the foreseeability of driver misuse, and the ability to operate the vehicles outside the intended operational design domain pose an unreasonable risk to safety; if safety defects are identified, use applicable enforcement authority to ensure that Tesla Inc. takes corrective action.

NHTSA Action:
Vehicles equipped with SAE Level 2 automation require an attentive driver who is actively engaged in the driving task at all times.[1] This technology level is intended to assist the driver, not relieve the driver from any aspects of the driving responsibility nor to prevent the driver from committing legal violations. We note that there are numerous vehicle models that offer SAE Level 2 technologies on vehicles available to consumers today. NHTSA continually monitors new technologies for safety impacts and uses its enforcement authorities when it determines there is a potential or actual unreasonable risk to safety attributable to a defect. NHTSA uses a risk-based process to determine when to open an investigation into a potential safety-related defect. NHTSA evaluates data and other available information from a wide-variety of sources to identify issues that may warrant investigation. NHTSA communicates with all original equipment manufacturers regarding their vehicles' capabilities, including SAE Level 2 systems. At this time, NHTSA has not determined that a defect investigation of Autopilot is warranted.

NHTSA also is actively researching various aspects of SAE Level 2 driver assistance systems, including human factors engagement strategies and observations related to how drivers may react to different types of system performance challenges.

NHTSA requests that recommendation H-20-2 be classified as **Closed – Reconsidered.**

H-20-3
For vehicles equipped with Level 2 automation, work with SAE International to develop performance standards for driver monitoring systems that will minimize driver disengagement, prevent automation complacency, and account for foreseeable misuse of the automation.

H-20-4
After developing the performance standards for driver monitoring systems recommended in Safety Recommendation H-20-3, require that all new passenger vehicles with Level 2 automation be equipped with a driver monitoring system that meets these standards.

NHTSA Action:
With SAE Level 2 automation the driver is expected to remain fully and continuously engaged in the driving task. However, driver distraction is already a known safety issue and may be a factor while driving with advanced driver assistance systems engaged as well. As such, in NHTSA's

[1] Level 2 is "Partial Automation" where the vehicle "has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times." https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety.

Human Factors Design Guidance for Level 2 and Level 3 Automated Driving Concepts, it is recommended to manufacturers that "[s]trategies should be adopted that promote situation awareness and support understanding of the automation state when drivers are out of the control loop."[2]

NHTSA is aware that the SAE International On-Road Automated Driving (ORAD) Committee and Driving Automation Systems (DAS) Committee are both looking at driving monitoring systems and plan to address recommendation H-20-4. NHTSA has a representative serving as a liaison to these working groups.

NHTSA continues to research driver monitoring systems with respect to their potential role and effectiveness in identifying and mitigating inattentive and impaired driving. NHTSA will continue its research efforts, as well as its coordination with SAE International, to explore appropriate performance metrics/methods, and NHTSA will consider potential actions after this important work is complete.

NHTSA requests these recommendations be classified as **Open, Acceptable Response**.

H-15-4 (reiterated recommendation)
Develop and apply testing protocols to assess the performance of forward collision avoidance systems in passenger vehicles at various velocities, including high speed and high velocity-differential.

NHTSA Action:
NHTSA is exploring similar tests as described in this recommendation. Depending upon the results of the agency's research, which is anticipated to be completed in 2020, NHTSA may consider new test conditions (if appropriate) to evaluate the performance of advanced forward collision avoidance systems over a wider range of test speeds and speed differentials.

NHTSA requests this recommendation be classified as **Open, Acceptable Response**.

H-17-38 (reiterated recommendation)
Develop a method to verify that manufacturers of vehicles equipped with Level 2 vehicle automation systems incorporate system safeguards that limit the use of automated vehicle control systems to those conditions for which they were designed.

NHTSA Action:
NHTSA has considered the factors associated with developing a method to verify that a manufacturer's SAE Level 2 automation system incorporates system safeguards that limit the use of automated vehicle control systems to those conditions for which they were designed, and NHTSA has found this goal to be complex, resource-intensive, potentially impractical, and unlikely to result in changes in available technologies.

[2] Campbell, J. L., et al. (2018, August). *Human factors design guidance for level 2 and level 3 automated driving concepts* (Report No. DOT HS 812 555). Washington, DC: NHTSA.

First, we note that such conditions have many dimensions, including speed range, road types, weather conditions, lighting conditions, traffic conditions, road conditions, etc. Driver assistance systems inherently rely on a fully attentive driver to manage these underlying conditions—a factor that differentiates such systems from actual Automated Driving Systems.

Further, there is a broad range of SAE Level 2 automation systems currently on the market, with an associated high degree of operational differences between them. Systems vary greatly with respect to their intended functions as well as system safeguard strategies and interfaces that manufacturers employ. These systems can also change in service as the vehicle manufacturers issue upgrades, including via over-the-air updates.

The Vehicle Safety Act established a self-certification regime for the automotive industry whereby manufacturers of motor vehicles and motor vehicle equipment self-certify that their products meet applicable Federal motor vehicle safety standards (FMVSS). NHTSA's FMVSS are performance standards that establish the minimum performance necessary for a regulated vehicle or item of equipment, and are required by law to be objective and practicable. Due to the combination of circumstances described above, developing an objective and practicable standard that both meets the recommendation and allows for the operating variances of all the systems on the market today would prove extraordinarily challenging, if not impossible.

As mentioned above, there are many conditions that relate to "…limiting use of system to conditions for which they are designed…" Safeguards for each would also have impacts over methods to test for others. For example, geofencing would introduce challenges that will need to be addressed before such a method can be developed that covers other conditions. When systems limit the operation of SAE Level 2 automation functions to mapped roads only, other conditions, such as speed range, and behavior under challenging situations would not be safely tested in a controlled test track setting with deployed systems.

We emphasize again that SAE Level 0 to Level 2 systems are driver assistance systems, and as articulated in the SAE definitions, drivers are expected to remain fully and continuously engaged in the driving task.

Given these reasons, NHTSA currently does not see a practical possibility of developing such a single verification method that would address all the systems and all conditions for which they are designed on the market today. However, we continue to research and evaluate methods and measures that can help drivers remain fully engaged in the driving task.

Note that the agency's current defects authority remains a tool the agency can employ whenever NHTSA determines an unreasonable risk to safety exists. If NHTSA identifies a safety-related defect trend in the design or performance of a system, or identifies through its research or otherwise, any incidents in which a system did not perform as designed (including Levels 0 through 5), it will exercise its authority as appropriate.

As NHTSA has thoughtfully reevaluated and explained its position on this recommendation, the agency requests that this recommendation be classified as **Closed – Reconsidered**.

H-17-37 (reiterated recommendation to the Department of Transportation, which has been delegated to NHTSA)
Define the data parameters needed to understand the automated vehicle control systems involved in a crash. The parameters must reflect the vehicle's control status and the frequency and duration of control actions to adequately characterize driver and vehicle performance before and during a crash.

H-17-39 (reiterated recommendation)
Use the data parameters defined by the U.S. Department of Transportation in response to Safety Recommendation H-17-37 as a benchmark for new vehicles equipped with automated vehicle control systems so that they capture data that reflect the vehicle's control status and the frequency and duration of control actions needed to adequately characterize driver and vehicle performance before and during a crash; the captured data should be readily available to, at a minimum, National Transportation Safety Board investigators and National Highway Traffic Safety Administration regulators.

H-17-40 (reiterated recommendation)
Define a standard format for reporting automated vehicle control systems data and require manufacturers of vehicles equipped with automated vehicle control systems to report incidents, crashes, and vehicle miles operated with such systems enabled.

U.S. Department of Transportation Action:
The U.S. Department of Transportation has delegated responsibility for safety recommendation H-17-37, and all related correspondence with NTSB, to NHTSA. Pursuant to that delegation, NHTSA responds as described below**.**

NHTSA Action:
Pre-crash data parameters from vehicles involved in a crash, such as brake application, accelerator application, and steering input, are currently part of NHTSA's if-equipped Event Data Recorder (EDR) regulation. However, with the proliferation of increasingly sophisticated sensors and automation systems being installed on modern vehicles equipped with ADAS, NHTSA is in the process of evaluating [OR RESEARCHING] enhanced data logging elements for when an ADAS-equipped vehicle experiences a safety critical event:

- NHTSA coordinates with domestic and international standard setting bodies involved in the standardization of updated data logging. The agency continues to liaise with SAE International's EDR Committee and the Automated Driving System (ADS) Logger Task Force in defining data elements and pre-crash time durations needed for crash causation and crash reconstruction purposes. Crash reconstruction data availability and uniformity are also elements of this task force. The following are examples of recent activity:
    - In 2018, NHTSA published a report in response to a requirement in the Fixing America's Surface Transportation (FAST) Act to examine "the amount of time EDRs installed in passenger motor vehicles should capture and record for retrieval vehicle-related data in conjunction with an event in order to provide sufficient information to investigate the cause of motor vehicle crashes."

  - The SAE EDR Committee continues to refresh J1698, Event Data Recorder Recommended Practice, to ensure it is current with automotive technology.
  - The SAE ADS Logger Task Force recently adopted a new standard, J3197, for an ADS Data Logger. J3197 defines the data element definitions and record format of events leading up to a collision in an ADS-equipped vehicle.

- NHTSA is also coordinating globally through the United Nations World Forum for the Harmonization of Vehicle Regulations (WP.29) to develop harmonized draft technical requirements for data storage systems for automated driving and EDRs that would include appropriate pre-crash and crash data elements.

- NHTSA is initiating vehicle safety research to explore the use cases, data elements, viability, constraints, and special circumstances of logging selective data from driving automation functions.

- In accordance with the 2015 Fixing America's Surface Transportation Act section 24303(b), NHTSA is developing a notice of proposed rulemaking to amend 49 CFR part 563, "Event Data Recorders," to update the current pre-crash recording duration for motor vehicles equipped with event data recorders (Regulatory Identification Number 2127-AM12).

NHTSA requests these recommendations be classified as **Open, Acceptable Response**.

If you have any questions, or require additional information, please contact me or Mr. Steven H. Bayless, Director, Governmental Affairs, Policy and Strategic Planning at 202-608-8414.

Sincerely yours,

James C. Owens
Deputy Director