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Ms. Heidi King
Deputy Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Request for Comments Related to Advanced Notice of Proposed Rulemaking (ANPRM) on Removing Regulatory Barriers for Vehicles with Automated Driving Systems: Docket No. NHTSA-2019-0036

Dear Deputy Administrator King:

The Insurance Institute for Highway Safety (IIHS) appreciates the opportunity to comment on the National Highway Traffic Safety Administration's (NHTSA's) ANPRM to modify or enact new Federal Motor Vehicle Safety Standard (FMVSS) 100 series regulations to allow for the certification of compliance for vehicles with automated driving systems that lack traditional vehicle controls. IIHS recognizes the potential for automated driving technology to improve safety on our nation's roads and trusts that NHTSA will use its authority to ensure that the technology is developed in a way that prioritizes safety.

General themes that apply to NHTSA's questions

We offer some general themes that apply to many of the questions posed in NHTSA's advanced notice:

- NHTSA should create new standards to address Automated Driving System-Dedicated Vehicles (ADS-DVs) when either the existing standard or performance test procedure require manual controls. NHTSA has used this method in the past, creating new fuel system integrity standards for vehicles not powered by traditional internal combustion engines and fuel sources (e.g., FMVSS 305 Fully electric vehicles) because these fuel systems have distinct safety risks. Similarly, ADS-DVs have distinct safety risks from conventional vehicles.

- NHTSA should use the new standards not only to ensure a minimum equivalence to the current levels of safety ensured for traditional vehicles but to possibly enhance safety.

  For example, the notice identified the FMVSS 126 Electronic Stability Control (ESC) compliance procedures as a barrier to certifying ADS-DVs. ESC was developed to assist in cases of human driver loss of control. Rather than just certifying the ADS-DVs can assist similarly as required in the standard, NHTSA can provide an even higher level of safety by developing new standards to ensure the ADS rarely, if ever, executes maneuvers that could lead to a loss of control.

Barriers in regulation

In its ANPRM, NHTSA outlines two types of standards with barriers to compliance for vehicles with ADS-DVs. The first are standards that require a manual control (e.g. a foot operated brake pedal), and the second are standards in which the compliance test procedures require use of manual controls (e.g. a steering wheel).

Below are possible approaches suggested in the ANPRM for different scenarios and our comments on each approach.

Barrier 1: Standards that require a manual control

1. *If a required control is needed for all vehicles, NHTSA would retain the requirement and add potentially redundant requirements for ADS-DVs.*

   This appears to be a contradiction of the concept of a *dedicated* autonomous vehicle, which by design will never have a control intended for human operation.

2. *If a required control is no longer required for safety for all vehicles, the requirement would be eliminated.*

   IIHS agrees with this approach, as it is part of the basic stewardship of the regulatory authority granted NHTSA under the Highway Safety Act.

3. *If required controls are needed to safely operate traditional vehicles but not ADS-DVs, then the latter would be exempt from the requirements.*
4. *If required controls are needed to safely operate traditional vehicles, but different controls are needed for ADS-DVs, then separate requirements would be applied to the ADS-DVs.*

   IIHS believes the third and fourth approaches can be more appropriately addressed by creating standards dedicated to ADS-DVs.

Barrier 2: Standards in which the compliance test procedures require manual controls

1. *Normal ADS-DV operation*

   IIHS believes there is an important role in evaluating the ADS-DV in normal operation for some requirements. ESC is a good example: NHTSA may need to expose the automated driving system to situations in which vehicle stability is challenged, such as low friction on curves, to ensure the vehicle and ADS can adequately maintain stable control in a range of challenging driving situations.

2. *Test Mode with Pre-Programmed Execution (TMPE)*
3. *Test Mode with External Control (TMEC)*

   Both TMPE and TMEC may prove valuable to demonstrate the ADS-DVs have the electro-mechanical systems capable of performing extreme maneuvers on a test track. With both methods, NHTSA should ensure that the programmed modes do not remain available in the ADS when the vehicle is in normal service to avoid possible unintended on-road initiations.

4. *Simulation*

   Simulation can and should ultimately be used to augment certification of ADS-DVs to safety standards. However, common simulation platforms and validation methodologies may not yet exist among all automakers and NHTSA. NHTSA should begin working now toward the goal of integrating simulation into the ADS-DV certification process.

5. *Technical Documentation for System Design and/or Performance Approach*

   Elements of this approach are already in use by NHTSA in certifying FMVSS 126, specifically in the Laboratory Test Procedure for FMVSS 126, Electronic Stability Control Systems, Section 13.1 (ESC System Technical Documentation). In this section, automakers are required to provide technical documentation:

   > Identify each of the components of the vehicle's ESC system that are used to determine its yaw rate, estimated side slip or the side slip derivative, driver steering inputs, and any other inputs to the ESC system computer, and to generate brake torques at each wheel and other countermeasures (i.e., modifying engine torque) to maintain vehicle stability. Provide a brief explanation for each of the required ESC system operational attributes. The methods used to modify engine torque (engine timing, fuel delivery, etc.) and to estimate side slip or side slip derivative should be documented. (NHTSA, 2011, p. 17)

6. *Use of Surrogate Vehicle with Human Controls*

   This method may prove valuable for those ADS-DVs which share a common vehicle design with a traditional human controlled vehicle. In such cases a manufacturer could provide technical documentation to verify the underlying vehicle hardware is identical and certify compliance with the surrogate vehicle.

Summary

ADS-DVs offer an opportunity to potentially improve safety beyond the current requirements if they are designed to avoid the driving errors committed by human drivers. To achieve this, NHTSA would need to develop safety standards compelling a higher level of safety. IIHS urges NHTSA not to overlook the opportunity to enhance safety beyond the current state in its efforts to remove regulatory hurdles to the implementation of automated driving technology.

Sincerely,

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Insurance Institute for Highway Safety

Reference

National Highway Traffic Safety Administration. (2011, September 9). *Laboratory Test Procedure for FMVSS 126, Electronic Stability Control Systems (for vehicles manufactured on or after September 1, 2011)* (TP-126-03). U.S. Department of Transportation: Washington, DC. Retrieved from https://one.nhtsa.gov/staticfiles/nvs/pdf/test-procedures/TP126-03.pdf