Report to Congress

March 2026

NHTSA Research and Rulemaking Activities on Vehicles Equipped with Automated Driving Systems

for the period covering 7/1/25-12/31/25

Automated Driving System (ADS)—Equipped Vehicles

Introduction

House Report No. 118-154—incorporated by reference into the Joint Explanatory Statement accompanying the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2024 (Division F of the Consolidated Appropriations, Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2024, H.R. 4366; Pub. L. No. 118-42), enacted on March 9, 2024—requests that the National Highway Traffic Safety Administration (NHTSA) submit biannual reports on its autonomous vehicle (AV) rulemaking and research activities, following the guidelines included in the Joint Explanatory Statement accompanying the Consolidated Appropriations Act, 2023 (Pub. L. No. 117–328). Specifically, the report states:

> *Regulatory framework for autonomous vehicles (AVs).*—The Committee previously directed the NHTSA to submit a report on the status of research and rulemakings related to autonomous vehicles with novel designs that improve mobility and access for all. As China and other countries are establishing regulatory frameworks for this important technology, the Committee continues to believe it is critical that the NHTSA modernize its rules in a timely manner to ensure that the U.S. can safely deploy this new technology and not cede leadership to global competitors in this growing and important industry. In order to track the progress on these rulemakings, the Committee directs the NHTSA to submit biannual reports on its AV rulemaking and research activities, following the guidelines included in the Joint Explanatory Statement accompanying the Consolidated Appropriations Act, 2023 (P. L. No. 117–328).

In response to this directive, NHTSA submitted its first biannual Report to Congress in January 2025[1] and its second in July 2025.[2] This third biannual report summarizes NHTSA's research and rulemaking activities on Automated Driving Systems (ADS), with a focus on updates since the July 2025 report.

These reports specifically cover agency activities related to ADSs consistent with SAE International's (SAE) driving automation Levels 3-5.[3]

[1] Research-and-Rulemaking-Activities-on-Vehicles-Equipped-with-Automated-Driving-Systems-Report-to-Congress.pdf.

[2] https://www.nhtsa.gov/sites/nhtsa.gov/files/2025-07/report-congress-research-rulemaking-automated-driving-systems-july-2025-tag.pdf.

[3] SAE International, Recommended Practice J3016, "Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles," J3016_202104.

Agency Updates

New NHTSA Administrator

On September 18, 2025, Jonathan Morrison was confirmed as NHTSA's 17th Administrator. During his confirmation process, Administrator Morrison expressed his commitment to supporting the responsible development and deployment of automated vehicles.[4] Further, the Administrator emphasized that NHTSA must take a proactive leadership role in overseeing emerging technologies rather than waiting for problems to occur, calling for deep, technical collaboration with industry, State and local governments, and safety experts. In support of the AV framework that Secretary Sean Duffy announced in April 2024, as discussed in the prior report,[5] Administrator Morrison identified key agency priorities. Central to this effort is prioritizing the safety of ongoing AV operations, unleashing innovation by leveling the playing field for U.S. ADS developers, and enabling commercial deployment of AVs to enhance safety and mobility for the American public. Administrator Morrison also underscored that the mobility and safety benefits of AVs can be achieved only through public trust, which must be grounded in demonstrable safety. He further stressed that the technical and policy challenges posed by these innovations must be addressed decisively, as neglecting them would lead to products unacceptable to both consumers and the agency.

Leveling the Playing Field for American ADS Developers

Since the expansion in August 2025 of NHTSA's Automated Vehicle Exemption Program (AVEP) to include for the first time domestic manufacturers, the agency issued its first such exemption to Zoox to accommodate operations of its novel American-built automated vehicles.[6] All of the purpose-built vehicles manufactured by Zoox and currently operating on public roads in the United States are now covered by this exemption.

NHTSA Safety Research Portfolio Public Meeting—Fall 2025

On November 20-21, 2025, NHTSA hosted its safety research portfolio public meeting[7] at DOT headquarters in Washington, D.C. During this event, NHTSA provided a series of research activity updates on ADS related topics. These included human factors research topics, approaches to verification and validation of ADS simulation models, validation of augmented reality testing implementation, artificial intelligence training and validation methods, refinement of a ground truth trip recorder, preventive maintenance techniques for ADS vehicle safety, and ADS crashworthiness.

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[4] https://www.commerce.senate.gov/services/files/FF4555F5-A817-47CC-AFDA-65D0499EDD50.

[5] https://www.nhtsa.gov/document/report-congress-research-and-rulemaking-vehicles-equipped-automated-driving-systems-july.

[6] https://www.transportation.gov/briefing-room/nhtsa-issues-first-ever-demonstration-exemption-american-built-automated-vehicles.

[7] https://www.nhtsa.gov/events/nhtsa-safety-research-portfolio-public-meeting-fall-2025.

ADS Workshop
On November 20, 2025, in conjunction with the safety research portfolio public meeting, NHTSA also hosted an ADS workshop.[8] The ADS workshop included an overview of the Department's Automated Vehicle Framework followed by a technical working session where participants discussed important ADS related topics in roundtable discussion format and provided feedback to the agency.

Updates on NHTSA's ADS Research

NHTSA's ADS research program advances the body of knowledge on ADS-equipped vehicle safety. The following program areas target safety assessment methodologies that enable the agency to oversee ADS-equipped vehicles effectively from testing and development through full-scale commercial deployment.

Federal Motor Vehicle Safety Standards (FMVSS) Compliance
Description: This research area informs potential regulatory adaptations that would enable innovative, ADS-equipped vehicles, some with innovative designs, to demonstrate compliance with existing safety standards.

Status Update: NHTSA published Volume 4, which examined the remaining 23 FMVSS, focusing on braking, electronic stability control test procedures, technical translations, and unconventional seating challenges across several standards. In conjunction with this milestone, NHTSA issued a Request for Comment (RFC) to solicit additional public input on any industry changes, product plans, new concepts, or emerging issues that may have affected the scope of the effort since the research was initiated.[9] The RFC comment period will remain open until February 13, 2026.

System Safety Performance Assessment
Description: This ADS safety research program focuses on developing methods, tools, and metrics to assess system-level safety performance. This focus includes assessment approaches such as simulation, closed-course testing, and on-road evaluations. NHTSA is also researching objective methods for selecting relevant test scenarios that reflect the operational boundaries and safety needs of different ADS applications.

Status Update: NHTSA is advancing its research on how to test, validate, and assess the safety of ADS performance. The agency is developing new methods to evaluate how ADS detect and respond to their surroundings, including using augmented reality to blend virtual and physical objects in performance testing. The agency is also studying simulation methods as a complementary tool for assessing ADS-equipped vehicle safety. In parallel, the agency continues to research independent ground-truth trip recorders for both light- and heavy-duty vehicles to strengthen real-world safety assessments of ADS technologies. The agency is also exploring how

[8] https://www.federalregister.gov/documents/2025/09/19/2025-18220/nhtsa-safety-research-portfolio-public-meeting-fall-2025-and-public-workshop-on-automated-driving (Rescheduled from Oct. 21-22, 2025).

[9] Docket # NHTSA-2025-0886.

reliability-centered maintenance concepts can help reduce or prevent in-use failures for ADS vehicles.

Component and Subsystem Testing and Functional Safety

Description: NHTSA is studying the performance, reliability, and failure modes of components and subsystems in ADS to understand safety considerations better throughout vehicle design, development, and deployment. ADS functionality can be structured into three core elements: perception, decision/path planning, and execution/control. Gaining insight into the performance of each element is believed to improve overall confidence in ADS safety. NHTSA's research aims to evaluate these subsystems individually and collectively to identify potential risks and support the development of safety benchmarks.

Status Update: NHTSA continues to conduct research on characterizing subsystem performance, identifying failure modes, and exploring methods to evaluate and mitigate risks associated with ADS-equipped vehicles. NHTSA completed and published its research on the safety implications of sensor degradation. NHTSA is also finalizing its introductory research into artificial intelligence (AI) techniques used in ADS and advanced driver assistance system technologies and related validation approaches.

Crashworthiness, Alternative Cabin Design

Description: While ADS operations may not directly alter vehicle crash mechanics, they introduce new challenges for occupant crash safety. Without the need for manual driving, passengers in ADS-equipped vehicles may be offered a broader range of seating positions and orientations, such as reclining seats or rear-facing arrangements. These variations necessitate a re-evaluation of crash safety standards. NHTSA is exploring how these evolving design elements impact occupant protection and how to adapt safety systems to accommodate new seating configurations.

Status update: NHTSA continues to refine its understanding of human response kinematics and injuries for various-sized occupants in forward- and rear-facing reclined seating conditions. Research includes human body models for both males and females to evaluate occupant restraints for the range of seating conditions expected in new ADS-equipped vehicle designs. Advanced crash test dummies have been adapted for use in forward-facing reclined seating configurations and are also being evaluated in rear-facing reclined seating configurations. NHTSA's research also includes assessments of the injury risk posed to children by a deploying air bag when seated in the traditional driver's seating position in an ADS-equipped vehicle. NHTSA also continues to evaluate best practices for safe interaction of non-occupied ADS-equipped vehicles with existing vehicles, roadside hardware, pedestrians, cyclists, and motorcyclists.

ADS Human Factors and Unique User Needs

Description: The research explores how changing seating configurations and absence of a human driver may affect safety standards, occupant awareness, and system communication. These include human-machine interfaces, telltales, and warnings for Level 4–5 automation, remote operation methods, and their impact on both teleoperators and vehicle occupants.

Status update: NHTSA has advanced its research on emerging ADS human factors topics, focusing on control transitions between human drivers and ADS, and on the design and effectiveness of telltales, controls, and indicators in ADS-equipped vehicles. In addition, the agency is making progress on human factors research to understand better the mobility and information needs of all passengers and how to convey critical information effectively through human-machine interfaces to support safety related situational awareness. Research also continues on driver engagements in Level 3 and dual-use Level 4 ADS and the impact of different types of disengagements. Further, the agency is examining how changing seating configurations, and the absence of a human driver may influence safety standards, occupant awareness, and system communication.

Updates on NHTSA's ADS Rulemakings

The following list provides an update on NHTSA's current ADS rulemaking actions, reflecting changes that occurred during the reporting period as reflected in the Spring 2025 Unified Agenda of Regulatory and Deregulatory Actions.[10] Please refer to the prior report[11] for the status of rulemaking actions that have not changed in the current reporting period. NHTSA will continue to update the Unified Agenda to reflect regulatory actions that support the advancement of the AV Framework.

1. Modernization of FMVSS 108 to accommodate ADS (RIN 2127-AM70)—This new deregulatory Notice of Proposed Rulemaking (NPRM), first announced in the Spring 2025 Unified Agenda, would focus on the Federal Motor Vehicle Safety Standard (FMVSS) that regulates vehicle lighting (FMVSS 108). The current standard assumes the presence of a human driver and manual controls, references the location of a human driver, and specifies the operation of manual controls to effectuate testing for compliance with the standards. This rulemaking would address the applicability of the standard for vehicles that lack manual controls. This rulemaking would maintain the level of safety performance required by the standard.

2. Modernization of FMVSS 103 and FMVSS 104 to accommodate ADS (RIN 2127-AM71)—This new deregulatory NPRM, first announced in the Spring 2025 Unified Agenda, would propose to update the FMVSS regulating windshield wipers (FMVSS No. 103) and windshield defrosters (FMVSS No. 104) to enable applicability of these standards to vehicles lacking manual controls. These current standards assume the presence of a human driver and require manual controls, reference the location of a human driver, and specify the operation of manual controls to effectuate testing for compliance with the standards. This rulemaking would address the applicability of these standards for vehicles that lack manually operated driving controls and do not have outward-facing cameras or sensors behind the windshield. This rulemaking would maintain the level of safety performance required by the standard.

[10] Office of Information and Regulatory Affairs, "Spring 2025 Unified Agenda of Regulatory and Deregulatory Actions," available at https://www.reginfo.gov/public/do/eAgendaMain.

[11] https://www.nhtsa.gov/document/report-congress-research-and-rulemaking-vehicles-equipped-automated-driving-systems-july.

3. Modernization of FMVSS 102 to accommodate ADS (RIN 2127-AM72)—This new deregulatory NPRM, first announced in the Spring 2025 Unified Agenda, would propose to update the FMVSS for transmission shift interlock (FMVSS No. 102) to enable applicability of the standard to novel-design ADS vehicles lacking manual controls. The current standard assumes the presence of a human driver and manual controls, references the location of a human driver, and specifies the operation of manual controls to effectuate testing for compliance with the standards. This rulemaking would address the applicability of the standard for vehicles that lack manual controls. This rulemaking would maintain the level of safety performance required by the standard.

Appendix—NHTSA ADS Research Publications

The following list provides an update on NHTSA's research presentations and publications that occurred in the reporting period. Please refer to the prior report[12] for earlier research on this topic.

Reports

- Final Report—FMVSS Considerations for Vehicles with Automated Driving Systems Volume 3 (https://rosap.ntl.bts.gov/view/dot/85074)
- Final Report—FMVSS Considerations for Vehicles with Automated Driving Systems Volume 4 (https://rosap.ntl.bts.gov/view/dot/88071)
- Safety Implications of Potential Advanced Driver Assistance Systems Sensor Degradation (https://rosap.ntl.bts.gov/view/dot/88134)

Recent Presentations:

- "AI and Functional Safety Research," Kidambi, Narayanan, NHTSA. November 5, 2025. SAE International. Automated Transportation Symposium.
- "Computing Metrics with a Ground Truth Trip Recorder," Silvani, Sebastian, NHTSA. November 3, 2025. SAE International. Automated Transportation Symposium.
- NHTSA Safety Research Portfolio Public Meeting: Fall 2025. Automated Driving Systems. November 20-21, 2025.

[12] https://www.nhtsa.gov/document/report-congress-research-and-rulemaking-vehicles-equipped-automated-driving-systems-july.