



**The Journal of Robotics,
Artificial Intelligence & Law**

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NHTSA Continues Its Focus on Advancing Autonomous Vehicle Technologies

Rebecca Baden Chaney, Cheryl A. Falvey, and Rukiya Mohamed*

A new online log that will track the status of autonomous vehicles' public roadway efforts nationwide was recently launched by the National Highway Traffic Safety Administration. The authors of this article discuss the initiative.

The National Highway Traffic Safety Administration (“NHTSA”) announced its new Automated Vehicle Transparency and Engagement for Safe Testing initiative (“AV TEST”), a new online log that will track the status of autonomous vehicles’ (“AVs”) public roadway efforts nationwide. Specifically, the log will track submissions of state and federal AV activity as well as AV developer testing activities.

The AV TEST Initiative

Participation in the AV TEST log will be voluntary, but open to all stakeholders involved in the safe development and testing of automated driving system (“ADS”) vehicles. NHTSA anticipates that the initiative will include up to 60 state or local government respondents and 40 private industry respondents per year.

Automotive industry participants may include developers, manufacturers, suppliers, operators, and testers. The initial AV companies to sign up to use the new AV TEST log include:

- Beep;
- Cruise;
- Fiat Chrysler Automobiles;
- Local Motors;
- Navya;
- Nuro;
- Toyota;

- Uber; and
- Waymo.

Government participants may include departments of motor vehicles, departments of transportation, highway safety offices, and city governments. The initial states to sign up to participate in the log include:

- California;
- Florida;
- Maryland;
- Michigan;
- Ohio;
- Pennsylvania;
- Texas; and
- Utah.

The general public can register to receive email updates of AV testing activities and other safety-related information reported to the logs. This will allow the public to stay apprised of AV efforts within their communities, including those involving cars, low-speed shuttles, trucks, and driverless electric delivery vehicles. One especially important feature of the new log is an online, public-facing mapping tool that will allow the public to zoom in on where public roadway testing efforts are taking place at the local, state, and national levels as well as testing activity data, which may include dates, frequency, vehicle counts, and routes.

This initiative will also include a series of public events across the country intended to improve transparency and safety in the development and testing of automated driving systems. In fact, following its kick-off event and actual launch of the tool, NHTSA held several webinars on the initiative. AV TEST participants have and will attend these events to share information on their activities to increase the public's awareness of testing, centralize NHTSA's role in promoting safety and innovation, and build stronger relationships among federal, state, and local governments and stakeholders.

Further demonstrating its ongoing commitment to modernizing its regulations to accommodate AV technologies, NHTSA released a report from the Virginia Tech Transportation Institute ("VTTI") on Federal Motor Vehicle Safety Standards ("FMVSS"). This project follows on NHTSA's March notice of proposed rule

making (“NPRM”), which focused on the 200 series FMVSS on crashworthiness. NHTSA’s recent joint report with VTTI similarly focuses on 12 FMVSS.

Specifically, the report provides research findings on potential regulatory barriers on the 100 series FMVSS on crash avoidance (FMVSS Nos. 102, 108, 114, 118, 138, and 141), but also touches on crashworthiness as well, in addition to test procedures, telltales, and warnings (FMVSS Nos. 201, 202a, 203, 204, 205, and 206). The report also evaluates NHTSA’s test procedures and identifies possible options to address unnecessary/unintended regulatory barriers for ADSs that lack manually operated driving controls. Here are a few highlights from the report:

Suggestions for Test Procedure Adjustments

- The report noted that some test procedures could be performed via simulation or technical design documentation rather than through vehicle-based testing. For example, FMVSS No. 114 requires a specific order of service brake application and release in addition to transmission control. The report suggests that instead of requiring vehicle-based testing to verify compliance with this standard, the standard may utilize documentation instead to show ADS software compliance with rollaway prevention standards.
- Because FMVSS No. 102, on brake and transmission requirements, requires driver interaction with the vehicle’s transmission the report suggests changing the language for FMVSS No. 102 to not explicitly refer to the driver, and to instead refer to the action or state of the transmission rather than the manipulation of the control.

Suggestions for Technical Translations of FMVSS

- The research suggests reframing regulatory language addressing seating positions since there would be no driver in ADS vehicles.
- The research suggests that defining the front and rear of the vehicle may be critical to the technical translation and implementation of numerous provisions of FMVSS No. 108 (*e.g.*, the headlamps provide illumination forward of the vehicle and indicate the forward travel direction, and the taillamps illuminate the road to the rear of a vehicle and

indicate when the vehicle is/will back up). These considerations are also pertinent to FMVSS No. 141 sound requirements, which are likewise associated with both forward and reverse vehicle movement. To address this, the report suggests differentiating between a conventional vehicle, which can travel in reverse at relatively low speeds, and a true bidirectional vehicle, but ultimately states that additional research will be needed in this arena.

- The report also states that standards on telltales and indicators will need to undergo additional research because there is no longer a human driver, so it is uncertain who would be responsible for receiving such information from the vehicle. For example, some FMVSS explicitly state to whom the information in question should be communicated, and some specify the expected response (e.g., S4.5(a) of FMVSS No. 138, requires owner's manual language that describes the expected response: "when the low tire pressure telltale illuminates, you should stop and check your tires as soon as possible, and inflate them to the proper pressure"). Meanwhile, other provisions do not explicitly specify an expected response (e.g., FMVSS No. 108, S9.3.6 sets forth requirements to indicate to the driver a turn signal lamp failure, but there is nothing in the standard that specifies what the driver should do following such a malfunction indicator).

NHTSA and VTTI are currently working on Phase 2 of their guidance, which will provide recommendations on nine additional FMVSS (Nos. 101, 103, 104, 110, 111, 113, 124, 125, and 126).

The AV TEST Launch

As demonstrated by this report, NHTSA is actively engaged in the research of unintended regulatory barriers to AV development and plans to update the FMVSS and associated hurdles so that both accurately reflect new AV technology. NHTSA's virtual launch of its AV TEST initiative included a kick-off event with opening remarks from:

- U.S. Department of Transportation ("DOT") Secretary Elaine L. Chao;

- NHTSA Deputy Administrator James C. Owens;
- Federal Highway Administration Administrator Nicole Nason; and
- U.S. DOT Deputy Assistant Secretary for Transportation Policy Finch Fulton.¹

The launch continued with a discussion moderated by Mitchell S. Kominsky, NHTSA's Special Assistant for Policy, Governmental, and Public Affairs, and featured panelists:

- Mr. Matthew Lipka, Head of Public Policy at Nuro;
- Mr. Joe Moyer, Chief Executive Officer at Beep;
- Dr. Matthew Schwall, Head of Field Safety at Waymo;
- Ms. Chris Mullen, Director of Self Driving Vehicle Safety Standards at Uber Advanced Technologies Group; and
- Dr. Jennifer Dawson, Senior Manager for Functional Safety, at Toyota Research Institute.

This discussion focused on different use cases of ADSs, including developers, testing companies, passenger-less delivery, and other innovative companies and touched on opportunities and challenges in safe on-road testing, design for inclusivity, and emerging technologies that are being used among industry stakeholders.

NHTSA's virtual series also included a discussion moderated by NHTSA's Associate Administrator, Dr. Cem Hatipoglu, and featured panelists:

- Dr. Chris Gerdes, Director Center for Automotive Research at Stanford ("CARS"), Dynamic Design Lab Stanford University;
- Dr. Sandeep Neema, Program Manager, Assured Autonomy DARPA;
- Mr. George Nicols, Advanced Technology Standards Engineer, Toyota Motor North America, On-Road Automated Driving ("ORAD") Committee Chair, SAE International; and
- Dr. Chris Urmson, Co-founder and Chief Executive Officer, Aurora.

This discussion delved into a broad overview for the need, role, and history of on-road testing of automotive technologies, and specifically into the ongoing development of ADSs toward their

eventual safe deployment. It also touched on the current state of development and prototype testing in the United States with a focus on technical progress achieved to date, key remaining challenges, and activities underway.

Shortly after NHTSA's kick-off event, NHTSA held several webinars on the AV TEST initiative, including the official AV TEST Initiative Tracking Tool Launch on September 2, moderated by NHTSA Deputy Administrator James Owens with remarks by DOT Secretary Elaine Chao, Senator John Thune of South Dakota, and Congressmen Fred Upton of Michigan. The program also included a demonstration of the tool by NHTSA's Chief Safety Scientist Joseph Kolly, followed by a panel discussion, entitled "TEST Initiative Panel Discussion: Automated Driving Systems and Rural Safety," on the rural landscape and terrain challenges for AV developers and AV technology generally, and moderated by NHTSA's Director of the Office of EMS Dr. Jon Krohmer. Program panelists were:

- U.S. DOT Deputy Assistant Secretary for Transportation Policy Finch Fulton;
- Andrew Heath, Georgia DOT's State Traffic Engineer;
- Scott Marler, Director at Iowa DOT; and
- Dr. Reza Langari, Department Head Chair, Texas A&M University, JR Thompson, Engineering Technology and Industrial Distribution.

On September 3, NHTSA presented a panel entitled "AV TEST: A Foundational Resource for First Responders," moderated by NHTSA's Deputy Associate Administrator of Vehicle Safety Research Dee Williams and NHTSA's Director of Safety Programs John Marshall. The program discussed considerations for how ADSs will interact with first responders, and featured an overview by Congressman Adam Kizinger, Illinois Congressional District, on Committee of Energy & Commerce, and commentary by the following panelists:

- Michelle Chaka, Interim Director, VTTI Center for Public Policy, Partnerships and Outreach;
- Dia Gainor, National Association of State EMS Official;
- Chris Mullen, Director of SDV Safety Standards, Uber;
- Terry McDonnell, Retired New York State Police Staff Sergeant;

- Levasseur Tellius, Supervisor of Automated Vehicle Regulatory Compliance, Ford Motor Company; and
- Jack Sullivan, Director of Training, Emergency Responder Safety Institute.

Recently, NHTSA also offered guidance on its previously submitted advance notice of proposed rulemaking (“ANPRM”) on NHTSA’s AV Test Initiative. The ANPRM was issued on July 2, 2020, and sought comments on the initiative. NHTSA received 20 comments in response to its solicitation. NHTSA responded to the comments received, and requested an additional round of comments for submission by October 29, 2020. Specifically, NHTSA sought further comments on whether its proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility; ways to enhance the quality, utility, and clarity of the information to be collected; and reactions to NHTSA’s estimate of the burden this effort will have on respondents, and ways to minimize this burden, including the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology.

In its assessment of the comments thus far received, NHTSA noted that local statutes, regulations, and ordinances vary, ranging from operational requirements to mandating the submission of periodic reports detailing ADS vehicle operation. And in response, the AV TEST Initiative would support two main objectives: (1) to provide the public with access to geographic visualizations of testing at the national, state, and local levels, displayed on a graphic of the United States, with projects overlaid on the geographic areas in which the testing project is taking place, allowing members of the public to view additional information about the operation and the ADS operator, such as a brief statement about the operator, specific details of the testing activity, high-level (non-confidential) descriptions of the vehicles and technology, photos of the test vehicles, the dates on which testing occurs, frequency of vehicle operations, the number of vehicles participating in the project, the specific streets or areas comprising the testing routes, information about safety drivers and their training, information about engagement with the community and/or local government, weblinks to the company’s websites with brief introductory statements, and a link to the company’s Voluntary Safety Self-Assessment (“VSSA”); and

(2) to provide members of the public with information collected from states and local authorities that regulate ADS operations as state and local authorities will provide weblinks for their statutes, regulations, or guidelines for ADS operations, privacy-related issues, emergency response policies and training, or other activities that cultivate ADS testing.

NHTSA's key reactions to submitted comments are the following:

- *Mandatory Data Collection and Evaluation of Submissions.* It is outside of the scope of the project to make any reporting mandatory or to expand the collection to include technical information or information that NHTSA would use to evaluate the safety of ADS operations. NHTSA has previously outlined 12 areas related to ADS safety and performance to be included in AV developer's VSSAs, which can be linked in their submissions.
- *Data Standardization, Uniformity, and Completeness.* Participating stakeholders are required to complete a minimum set of data fields when submitting information. This allows the system to accommodate a wider range of ADS testing operations, vehicles, and jurisdictions. NHTSA has also integrated definitions for the requested data elements into the AV TEST tracker to ensure participants have a consistent understanding of the terminology being used by NHTSA.
- *Accessibility and Vulnerable Populations.* Currently, NHTSA does not restrict participants from conveying information on accessibility, and the impact it may have on children, particularly for ADS test sites that are available for public use. However, NHTSA will create new categories of weblinks that can be submitted to NHTSA.
- *Establish Sunset for AV TEST tracker.* NHTSA does not believe that the AV TEST Initiative would present a data collection redundancy for vehicles that comply with all applicable FMVSS. The type of information that will be collected through the AV TEST Initiative is not duplicative of data collected through NHTSA's existing crash data systems because NHTSA that includes only data on vehicles involved in crashes and vehicle-related deaths and injuries. Additionally, NHTSA will provide a mechanism for participants to change the status of test sites from active to inactive or completed, and will consider reaching out to

program participants about operations that have not been updated for an extended period of time. Participants will also be able to remove out-of-date information.

- *Categories of Eligible Participants.* NHTSA contemplated that motor vehicle equipment manufacturers would participate in the initiative, which could encompass Tier 1 suppliers conducting AV TEST operations on public roads. And as the AV TEST Initiative progresses, NHTSA will evaluate opportunities to enhance the scope of the project and may consider allowing submission of information from organizations engaged in evaluating emerging vehicle technologies.
- *ADS Policy.* NHTSA stated that it would keep in mind commenters' concerns over the overall safety of AVs, and the hackability of AVs when considering future approaches to ADS technologies.

Conclusion

As the AV industry continues to rapidly develop, the law, and regulators, are playing catch-up, and like NHTSA's AV TEST Initiative, looking to innovative tools to assist in the regulation of new technologies. AV developers should be forward looking as regulators continue to catch-up; legislative obstacles are likely to continue to fall, offering ample opportunities for innovation.

Notes

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1. Mr. Fulton has served as the Deputy Assistant Secretary for Transportation Policy since April 2017 and is the nominee for the role of Assistant Secretary for Transportation Policy.