DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

[Docket No. NHTSA-2019-0037]

Agency Information Collection Activities; Submission to the Office of Management and Budget for Review and Approval: Driver Interactions with Advanced Driver Assistance Technologies

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation**.**

ACTION: Notice and request for comments on a request for approval of a new information collection.

SUMMARY: In compliance with the Paperwork Reduction Act of 1995, this notice announces that the Information Collection Request (ICR) abstracted below has been forwarded to the Office of Management and Budget (OMB) for review and approval. A Federal Register notice with a 60-day comment period soliciting comments on the following information collection was published on May 21, 2019 (84 FR 23154). NHTSA received 7 public comments. A summary of the comments and the changes NHTSA made in response to those comments is provided below.

DATES: Written comments should be submitted on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Written comments and recommendations for the proposed information collection, including suggestions for reducing burden, should be submitted to the Office of Management and Budget at www.reginfo.gov/public/do/PRAMain. To find this particular information collection, select "Currently under 30-day Review – Open for Public Comment" or use the search function.

FOR FURTHER INFORMATION CONTACT: For additional information or access to background documents, contact Elizabeth Mazzae, Applied Crash Avoidance Research Division, Vehicle Research and Test Center, NHTSA, 10820 State Route 347—Bldg. 60, East Liberty, Ohio 43319; Telephone (937) 666-4511; Facsimile: (937) 666-3590; e-mail address: elizabeth.mazzae@dot.gov.

SUPPLEMENTARY INFORMATION: Before a Federal agency can collect certain information from the public, it must receive approval from the Office of Management and Budget (OMB). In compliance with these requirements, this notice announces that the following information collection request has been forwarded to OMB.

OMB Control Number: To be issued at time of approval.

Title: Driver Interactions with Advanced Driver Assistance Technologies

Form Numbers: NHTSA forms 1522, 1525, 1527

Type of Request: New information collection

Type of Review Requested: Regular

Length of Approval Requested: Three years from the date of approval

Abstract: NHTSA has proposed to perform research involving the collection of information from the public as part of a multi-year effort to learn about drivers' use of and behavior in interacting with certain advanced driver assistance technologies (ADAS). The research will involve on-road, semi-naturalistic driving experimentation in which participants who are members of the general public will drive government-owned instrumented production vehicles equipped with driver assistance technologies. The goal is to measure drivers' responses to system alerts and their frequency of system use, as well as observe their behavior during system

use. This research will support NHTSA decisions relating to safe implementation of advanced driver assistance technologies.

The research will also investigate whether drivers' experience with one brand's ADAS impacts how they interact when driving another vehicle equipped with a different brand's systems. This scenario is one that would be experienced with rental cars and family vehicle sharing and will provide important insights into how differences in system operation and interface design aspects may cause usability issues. The observation of usability issues would inform NHTSA about the benefits of common system interface design aspects (e.g., visual and auditory displays and controls).

Participants will include drivers with and without experience with the particular ADAS features being studied. Experienced drivers will be ones who own one of the two vehicle models equipped with the particular ADAS feature(s) being studied and can be verified to have a certain degree of experience in using the feature(s). Participants will be asked to drive a specified route over public roadways while using driver assistance technologies. Participants' actions to engage the assistance features and responses to unrequested disengagements will be observed and recorded.

Information will be collected during the course of the research through participant screening questions, recording of video and engineering data, and post-drive questionnaires. Questions addressed to individuals will serve to assess individuals' suitability for study participation, to obtain feedback regarding participants' use of the ADAS technologies, and to gauge individuals' level of comfort with and confidence in the technologies' performance and safety. Since qualitative feedback or self-report data is not sufficiently robust for the purpose of investigating driver performance/interaction issues with advanced vehicle control and safety

technologies, objective data will also be recorded including driver eye glance behavior and hand locations. Eye glance behavior will reveal how drivers visually monitor and respond to visual alert information. Hand location data will provide information regarding how well drivers are able to engage the advanced driver assistance functions efficiently (e.g., with one attempt or multiple attempts) and how long it takes. We will observe whether drivers engage in secondary tasks (e.g., interacting with infotainment functions) during feature engagement.

Description of the Need for the Information and Proposed Use of the Information:

The National Highway Traffic Safety Administration's (NHTSA) mission is to save lives, prevent injuries, and reduce healthcare and other economic costs associated with motor vehicle crashes. As driver assistance technologies advance, they have the potential to dramatically reduce the number of motor vehicle crashes, injuries, and associated economic costs. The safety and effectiveness of the technologies depends on drivers understanding the capabilities, constraints, and visual and auditory alerts provided. Drivers' understanding of when assistance features are available to use and when they are not is important for safety. In particular, drivers must understand and respond quickly when a feature indicates that it is disengaging and the driver must retake full manual control of driving. This work seeks to gather information regarding how drivers who are inexperienced compare to drivers with experience using driver assistance features including advanced cruise control and either lane keeping assistance or lane centering assistance. The research will compare the two groups' use of these features in interactions, response to disengagement notifications, and proper use.

The collection of information will consist of: (1) Question Set 1, Driving Research Study Interest Response Form, (2) Question Set 2, Screening Questions, (3) passive observation of driving behavior, and (4) Question Set 3, Post-Drive Questionnaire.

Affected Public (Respondents): Research participants will be licensed drivers aged 25 years to 65 who drive at least an average number of miles annually (e.g., 11,000 miles), are in good health, and do not require assistive devices to safely operate a vehicle and drive continuously for a period of 3 hours.

Estimated Number of Respondents: The data collection will have two equal-sized parts: one that will begin immediately upon receipt of PRA clearance and will involve use of two 2018-2019 model year U.S. production vehicle models. The second part of the data collection will begin after completion of the first part and will have the same approach, but will involve different vehicle models.

Information for both parts of the data collection will be collected in an incremental fashion to permit the determination of which individuals have the necessary characteristics for study participation. All interested candidates will complete Question Set 1, Driving Research Study Interest Response Form. A subset of individuals meeting the criteria for Question Set 1 will be asked to complete Question Set 2, Screening Questions. From the individuals found to meet the criteria for both Questions sets 1 and 2, a subset will be chosen with the goal of achieving a sample providing a balance of age and sex to be scheduled for study participation. A summary of the estimated numbers of individuals that will complete the noted question sets across both the first and second data collection parts is provided in the following table. Both

data collection parts will involve approximately 500 respondents for Question Set 1, 300 for Question Set 2, and 150 for Question Set 3.

Estimated Number of Respondents

Questions	Total N
Question Set 1, Driving Research Study Interest Response Form	1000
Question Set 2, Screening Questions	600
Question Set 3, Post-Drive Questionnaire	300

Estimated Time per Response: For both parts of the data collection, completion of Question Set 1, Driving Research Study Interest Response Form is estimated to take approximately 5 minutes and completion is estimated to take approximately 7 minutes for Question Set 2, Screening Questions. Completion of Question Set 3, Post-Drive Questionnaire is estimated to take 15 minutes per inexperienced participant and 20 minutes per experienced participant for both parts of data collection.

The estimated annual time and cost burdens across both the first and second data collection parts are summarized in the table below. For example, the anticipated number of individuals completing Question Set 1 for part 1 of the data collection is half of 1000, or 500, and so on.

The number of respondents and time to complete each question set are estimated as shown in the table. The time per question set is calculated by multiplying the number of respondents by the time per respondent and then converting from minutes to hours. The hour

value for each question set is multiplied by the latest average hour earning estimate from the Bureau of Labor Statistics[1] to obtain an estimated burden cost per question set.

Estimated Time per Response and Total Time

Question Set	Question Topic	Participants	Time per Response (Minutes)	Pay Rate*	Total Burden Hours	Total Cost
1	Driving Research Study Interest Response Form	1000	5	$28.32	83.3	$ 2,359.91
2	Screening Questions	600	7	$28.32	70.0	$ 1,982.40
3	Post-Drive Questionnaire, Inexperienced	150	15	$28.32	37.5	$ 1,062.00
	Post-Drive Questionnaire, Experienced	150	20	$28.32	50.0	$ 1,416.00
TOTAL Estimated Burden:					240.8	$ 6,820.31

Frequency of Collection: The data collections described will be performed once to obtain the target number of 300 valid test participants.

On May 21, 2019, NHTSA published a 60-day notice requesting public comment on the proposed collection of information.[2] We received comments from seven entities, including four organizations and three individuals. Organizations submitting comments included AAA, The Center for Auto Safety, Consumer Reports, and the Motor & Equipment Manufacturers Association (MEMA). All comments were supportive of the research. No comments addressed the questions to be asked of participants. Some suggestions for clarifying and expanding the research are summarized below.

[1] *Cost per hour based on Bureau of Labor Statistics Dec. 2019 Average Hourly Earnings data for "Total Private," $28.32 (Accessed Jan. 28, 2020 at https://www.bls.gov/news.release/empsit.t19.htm)
[2] 84 FR 23154 (May 21, 2019).

Some comments requested clarification of participation criteria, such as a more detailed definition of what NHTSA would consider "experience" with using an ADAS. For example, AAA recommended that in relation to study participant recruitment, NHTSA should collect more information on candidate participants' personally-owned vehicle(s), any ADAS features on their vehicle(s), and the individuals' experience with respect to ADAS technologies. NHTSA wishes to clarify that the participant recruitment criteria listed in the prior published 60-day PRA information collection notice was not a complete accounting of all information that will be considered in screening candidate participants. The notice was an announcement of a planned information collection for the purposes of obtaining PRA clearance and not a full, detailed accounting and substantiation of a research plan. NHTSA has a strategy for characterizing drivers' experience with the specific vehicle models and ADAS technologies planned for involvement in the study. For example, NHTSA will query state vehicle registration data for a particular VIN pattern to identify owners of vehicle models equipped with the technology of interest. In addition, vehicle registration data will provide information regarding how long an individual has owned the vehicle. A minimum annual driving mileage requirement will be used and participants will be required to be a primary driver of the vehicle model of interest. Owners will also be questioned about their use of the technology and also be observed using the technology during the experimental training step to allow us to confirm that the individual has an acceptable degree of system-use knowledge desired for the study.

Some comments suggested adjustments to study participation criteria, such as lowering the minimum annual mileage driven and including younger and older drivers.

1. A suggestion to lower the minimum annual driving mileage criterion of 14,000 miles was submitted by both AAA and The Center for Auto Safety. AAA commented that

the stated mileage criterion corresponded to drivers "who are in the top quartile of all drivers nationwide with respect to annual driving mileage...". The study's annual mileage criterion is based on a desire to obtain participants who drive regularly. NHTSA agrees that annual driving miles statistics show a declining trend. In response to these comments and further review of available data, the minimum annual driving mileage criterion will be lowered to 11,000 miles.

2. The Center for Auto Safety commented that the stated participant age range of 25- 54 years does not account for the other 49 percent of the driver population who are under 25 years of age or over 54 and that "…one of the fastest growing cohorts in the United States are people aged 65 and older." For this research, due to limited time and funding with which to conduct the research, NHTSA chose a single age group consisting of the "middle age" range of drivers, those aged 25 to 65, that is considered to have generally homogeneous driving behavior characteristics. NHTSA will consider including younger and older drivers in subsequent research efforts.

Other comments suggested broadening the study scope to include additional vehicle models and a variety of traffic scenarios and conditions.

1. Regarding the route over public roads that participants will drive in the research, AAA stated that the "course should entail a variety of road conditions including divided limited access highways, two lane rural roads and surface streets, as appropriate. Varying traffic conditions should be included as well." Route selection for the first part of this research is constrained by the operational design domain (ODD) of technologies and vehicle models chosen for the study. As such, the route

to be used in the first part of this work will necessarily consist of multi-lane highways. For the second part of this research, NHTSA will consider available production ADASs and their ODDs when selecting the route to be used for testing.

2. Both AAA and MEMA recommended that the study route should permit participants to use the technologies in different types of traffic conditions and traffic volumes. NHTSA will not control for traffic volumes directly in this research, but will constrain testing hours to daylight periods and will record video data documenting traffic conditions experienced by participants during their experimental drives for later characterization as part of data analysis.
3. Consumer Reports expressed concern that only two vehicle models are planned for use in the first part of this research. They noted that the "capabilities and limitations of these systems can vary greatly among manufacturers, and thus it would be very difficult to generalize the results to all vehicles if NHTSA's research includes only two vehicle models." While testing additional models would likely provide additional interesting information, it is not feasible to test a large number of vehicle models using the planned research method and ensure timely and relevant results. In choosing vehicle models, we considered feature availability, feature performance (e.g., can lateral and longitudinal control be engaged simultaneously?), and sales. The two vehicles' chosen have different strategies for determining when lateral and longitudinal control may be engaged: one is speed based and the other is map/location based. One of the two vehicle models is also a fairly frequently purchased model for which the ADAS technologies of interest are standard equipment.

For the second, subsequent part of this research, NHTSA will consider available production ADAS-equipped vehicles and their ODDs and choose ones that will best help us answer important safety questions.

4. A comment from AAA stated that "NHTSA should ensure that the methodology used for comparing vehicles accounts for the system variations, while tabulating the number and reason for disengagements of the system." NHTSA wishes to clarify that the focus of this research is not on comparing systems from different manufacturers, but rather to examine how effectively drivers use and interact with ADAS technologies involved in the research. The research will also examine the efficacy of the systems' different means of communication with the driver in relation to status of the ADAS feature(s). NHTSA has other ongoing research efforts that focus on characterizing technology performance separate from the driver behavior and technology use context.
5. MEMA recommended increasing the survey accuracy by increasing sample size. The total number of participants planned for this on-road, semi-naturalistic driving research is 300. For on-road, instrumented vehicle research, this number represents quite a large number of research participants and would require substantial funding and labor effort to complete the work. NHTSA's preliminary calculations show that the planned sample size will provide ample statistical power for the study analyses planned.
6. AAA suggested that "Before moving forward with experimental design, NHTSA should provide the public and industry an opportunity to conduct a design review." This step could be critical in ensuring that automakers who design and deploy

advanced driver assistance technologies can provide appropriate feedback and highlight important information to NHTSA to optimize research results." NHTSA generally welcomes exchanges of information with industry partners. In this instance, however, the approach and experimental design for the first part of this research is complete, as the study's magnitude in terms of number of participants and time required for participation (i.e., time burden) must be estimated in order to request clearance under the Paperwork Reduction Act. NHTSA has taken pains to ensure that the systems involved in the research will be production ADAS-equipped vehicles that are currently available for sale to the American public. Also, the vehicles will necessarily be driven on roadways that maximize the opportunity for use of the ADS features being examined given the ODD of those features. Therefore, we are confident that the study results will provide useful information to automakers.

Three additional comments from individual members of the public highlighted concerns regarding driving automation. One commenter concerned about the possibility of vehicles being hacked and remotely controlled asserted that in all vehicles with driving automation capability, "there needs to be the standard automotive equipment and a manual override switch in place" so that "in case something happens it can be changed back to 'normal' vehicle functions instantly." Another individual suggested that "in addition to instrumented vehicles for data collection, the latest in virtual reality technology be leveraged for such efforts." Lastly, a commenter stated his belief that automation in vehicles needs to be "all or nothing because as drivers get acclimated to automation they will lose their proficiency at driving a

vehicle. In my opinion all vehicles…will have to operate on the same system, with no human responsibilities…".

NHTSA appreciates the suggestions regarding participation criteria and additional experimental conditions to consider; however, the scope of the current work is limited by both program timeline and allocated funding amount. NHTSA will keep in mind the suggestions as input for future research programs.

PUBLIC COMMENTS INVITED:

You are asked to comment on any aspect of this information collection, including (a) whether the proposed collection of information is necessary for the Department's performance; (b) the accuracy of the estimated burden; (c) ways for the department to enhance the quality, utility and clarity of the information collection; and (d) ways that the burden could be minimized without reducing the quality of the collected information.

Authority: The Paperwork Reduction Act of 1995; 44 U.S.C. chapter 35, as amended; 49 CFR 1.49; and DOT Order 1351.29.

Issued in Washington, D.C.

_____

Cem Hatipoglu,
Associate Administrator,
Office of Vehicle Safety Research.

[FR Doc. 2020-18409 Filed: 8/20/2020 8:45 am; Publication Date: 8/21/2020]