: 4910-59-P]

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

[Docket No. NHTSA- 2024-0052]

Agency Information Collection Activities; Submission to the Office of Management and Budget for Review and Approval; Request for Comment; Examining the Effectiveness of Lane Departure Warning and Lane Keep Assist Advanced Driver Assistance Systems for Improving Driver Response

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

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

SUMMARY: In compliance with the Paperwork Reduction Act of 1995 (PRA), this notice announces that the Information Collection Request (ICR) summarized below will be submitted to the Office of Management and Budget (OMB) for review and approval. This document describes a new collection of information for which NHTSA intends to seek OMB approval titled "Examining the Effectiveness of Lane Departure Warning and Lane Keep Assist Advanced Driver Assistance Systems (ADAS) for Improving Driver Response." A Federal Register Notice with a 60-day comment period soliciting comments on this information collection was published on September 3, 2024. One comment was received in response, recommending the collection of an additional data point. NHTSA agrees with the comment and has incorporated the change in the respective form.

DATES: Comments must 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 OMB at

www.reginfo.gov/public/do/PRAMain. To find this particular information collection, select "Currently under Review – Open for Public Comment" or use the search function.

FOR FURTHER INFORMATION CONTACT: For additional information or access to background documents, contact Jeremiah Singer, National Highway Traffic Safety Administration, 1200 New Jersey Ave. SE, Washington, DC 20590; email jeremiah.singer@dot.gov; telephone (202) 366-7679. Please identify the relevant collection of information by referring to its OMB Control Number.

SUPPLEMENTARY INFORMATION: Under the PRA (44 U.S.C. 3501 *et seq.*), a Federal agency must receive approval from the OMB before it collects certain information from the public, and a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. In compliance with these requirements, this notice announces that the following information collection request will be submitted to OMB.

Title: Examining the Effectiveness of Lane Departure Warning and Lane Keep Assist Advanced Driver Assistance Systems for Improving Driver Response

OMB Control Number: New

Form Numbers: NHTSA Form 1840—Recruitment Screener; NHTSA Form 1841—Informed Consent; NHTSA Form 1842—Vision-Hearing Form; NHTSA Form 1843—Knowledge Experience Questionnaire; NHTSA Form 1844—Session 1 Post-Condition Questionnaire; NHTSA Form 1845—Session 1 Post-Session Questionnaire; NHTSA Form 1846—Session 2 Post-Route Questionnaire LDW; NHTSA Form 1847—Session 2 Post-Route Questionnaire LDW/LKA

Type of Request: New information collection

Type of Review Requested: Regular

Length of Approval Requested: 3 years from date of approval

Summary of the Collection of Information:

The National Highway Traffic Safety Administration (NHTSA) is seeking approval to conduct 11 voluntary information collections as part of a one-time research study involving up to 80 licensed drivers of various ages to examine the effectiveness of LDW and LKA ADAS for improving driver response.

Recruitment of study respondents will be from the area near the testing facility in Blacksburg, Virginia, and surrounding areas. The target for the study is a total of 50 participants; however, the research team has provided sufficient additional recruitment such that the target sample will be achieved given expected reductions in respondents due to ineligibility and attrition. The respondents will participate in two separate driving data collection sessions during the course of the research after undergoing a series of evaluations for suitability of inclusion in the study.

Respondents will be asked to complete a brief questionnaire related to their previous knowledge of, and experience with, LDW systems and LKA systems. Respondents will next perform a series of controlled driving tests on the Virginia Smart Roads facilities with one of the test vehicles that has been instrumented with a Data Acquisition System (DAS). The DAS includes video cameras and sensors that allow for collecting continuous data that encompasses driver behavior and vehicle performance. Each series of controlled driving tests on the Smart Roads will last about 2 hours and will be preceded by a 15-minute familiarization with the vehicle, followed by a 30-minute post-driving questionnaire and debriefing session. The drivers who complete the first session will return a different day for a second driving session in which they will be instructed to drive a prescribed route on public roads in Southwest Virginia. This second driving session will last approximately 4 hours, with a 15-minute break in the middle of the session; this will be preceded by a 45-minute preparation and followed by a 30-minute post-driving questionnaire and debriefing. The planned data collection activities discussed herein have been approved by an Institutional Review Board.

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

As part of NHTSA's mission to save lives, prevent injuries, and reduce traffic-related health care and other economic costs, the agency conducts research as a foundation for the development of motor vehicle standards and traffic safety programs. Lane departure crashes, including single-vehicle run-off-road crashes, non-collision rollovers, sideswipe crashes, and head-on crashes between two vehicles traveling in opposite directions, account for a large proportion of fatal and injury crashes on U.S. roads. LSS, a type of lateral-control ADAS, predominantly comprise two complementary technologies: LDW and LKA systems. LDW detects and alerts drivers when their vehicle is about to leave the current travel lane, whereas LKA redirects the lateral movement of the vehicle to prevent it from leaving the current travel lane.

Numerous studies have found that LSS reduce the likelihood of a crash. Based on the comparison of multiple prevention systems and warning-only systems, studies have suggested that prevention systems are more effective than warning-only systems. Crash situations typically unfold quickly; thus, a driver's response to the warning may be too late to prevent a crash, particularly when the driver is distracted, drowsy, or fails to notice the warning quickly. While studies have demonstrated the effectiveness of LSS at reducing the intended crash types and the potential of LSS to save countless lives with widespread use, these systems are unfortunately associated with a "nuisance" factor resulting from false or unnecessary alerts. This leads to system deactivation, with indications that drivers turn LDW systems off as much as 50 percent of the time due to annoying alerts and overly aggressive steering corrections. Once deactivated, all potential safety benefits of LSS are lost, highlighting the importance of reducing false or unnecessary alerts to maximize driver acceptance and the likelihood that the system remains enabled. LSS, if properly designed, evaluated, and used, have the potential to reduce the occurrence of, or at the very least mitigate the severity of, a significant number of lane-departure crashes. NHTSA needs to learn more about the effectiveness of LSS, the human factors that affect LDW and LKA performance, and the system characteristics that will favor better

acceptance. This data collection has been designed to evaluate key LSS-related technologies, with a particular focus on driver and system performance, as well as driver acceptance. The outcomes will provide a wide variety of stakeholders with valuable information about LSS design features to maximize the safety benefits of these systems and will inform NHTSA in future activities involving these systems.

NHTSA will use the information collected to produce a technical report containing summary statistics and tables that will be made available publicly through the agency website and the National Transportation Library.

60-Day Notice:

A Federal Register notice with a 60-day comment period soliciting public comments on the following information collection was published on September 3, 2024 (89 FR 71777). NHTSA received one public comment from the Texas Department of Transportation (TxDOT). The commenter began with, "TxDOT agrees with NHTSA's conclusion that more research is required to understand the effectiveness of lane support systems, the human factors affecting LDW and LKA technologies, and the features in these systems that lead to increased acceptance and adoption. TxDOT requested that NHTSA "consider asking participants if they received any specialized training, at the time of a new vehicle's purchase, on the use and operations of LDW and LKA systems. TxDOT stated its belief that this information will provide a more comprehensive view of the efficacy of these technologies. NHTSA concurs with this comment and has added a question to NHTSA Form 1843—Knowledge Experience Questionnaire to that effect. While this question has been added to the collection, NHTSA does not anticipate a notable increase in the length of time to complete NHTSA Form 1843 and, therefore, there are no changes in burden from that which was published in the 60-day notice.

Affected Public:

Respondents to this collection will be members of the public recruited from Blacksburg, Virginia, and surrounding areas. Effort will be made to recruit equal numbers of adult males and

females, including participants aged 25 to 65 with different levels of experience owning or driving a vehicle with LSS. A representative sample is not necessary to satisfy the objectives of the study; therefore, a convenience sample of individuals meeting eligibility criteria will be sufficient.

Estimated Number of Respondents:

The target for the study is for 50 participants total to complete both sessions with valid data collected for each. However, eligibility and attrition must be accounted for throughout the individual information collections included in this request. As previously stated, there are 11 individual information collections in this request. The number of respondents annually for each collection is as follows: Recruitment Screener—113; Informed Consent—28; Vision-Hearing Form—27; Knowledge Experience Questionnaire—27; Session 1 Controlled Driving—27; Session 1 Post-Condition Questionnaire—27; Session 1 Post-Session Questionnaire—27; Session 2 Naturalistic Driving: LDW Subset—16; Session 2 Post-Route Questionnaire LDW—16; Session 2 Naturalistic Driving: LDW/LKA Subset—11; Session 2 Post-Route Questionnaire LDW/LKA—11.

Frequency: This is a one-time information collection.

Estimated Number of Responses: 654

Estimated Annual Burden Hours:

The estimated annual burden for this one-time information collection is 272 annual burden hours (based on a 3-year approval period). Further details are provided below. This ICR includes 11 individual information collections described below.

1. Recruitment Screener

An estimated 113 respondents annually will answer a Recruitment Screener over the phone to determine if they qualify for the study. Participants will be screened over the phone to determine eligibility, with recruitment personnel recording responses on a paper form using an

anonymized identifier. Respondents are expected to take an average of 15 minutes to complete the questionnaire and will complete this questionnaire once, resulting in 28 annual burden hours.

2. Informed Consent

Based on an estimate that 25 percent of those who begin the screening process will be eligible and interested in participating in the study, 28 respondents annually will be scheduled for an appointment to go to the contractor's facilities in Blacksburg, Virginia, for the consenting process and, subsequently, the full study. The consenting process includes an overview of the study, an explanation of the consent form, and an opportunity for the potential participants to ask questions and get clarification. Those individuals who consent to the study and enroll will complete the Informed Consent form and move on to the next process. This consenting process is expected to take 30 minutes, resulting in 14 annual burden hours.

3. Vision-Hearing Form

NHTSA anticipates a minimal amount of attrition following the consenting process; thus 27 respondents annually are expected to complete the Vision-Hearing Form. This collection involves an experimenter administering a vision and hearing evaluation to ensure that respondents meet the basic vision requirements of driver's licensure in Virginia (20/40) and to confirm that they can hear instructions provided by the experimenter when looking away. This evaluation is expected to take 5 minutes, resulting in 2 annual burden hours.

4. Knowledge Experience Questionnaire

Following the vision and hearing evaluation, the 27 annual respondents will be asked to complete a 10-minute Knowledge Experience Questionnaire related to their previous knowledge of and experience with the systems under evaluation. Completion of this form will take 10 minutes per respondent and is to be completed once, resulting in 5 annual burden hours.

5. Session 1 Controlled Driving

To assess preferences regarding LDW modality and timing under dynamic scenarios, study participants will experience a series of controlled driving tests with the LDW mockup vehicle on the Smart Roads test track at the contractor's facility. Each participant will drive continuously on closed loops while experiencing modality and timing conditions (independent and in combination, where applicable) incorporated in the LDW mockup vehicle, while data are collected by the DAS. No other traffic will be present on the part of the Smart Roads in use during participant sessions. After the participant performs a few loops to become familiar with the vehicle and the test track without instructions to depart the lane, they will be instructed to gradually deviate towards one of the lines until the departure warnings are triggered. Drivers will then be instructed to carefully perform a corrective maneuver back to the center of the lane after the warning. Not including the questionnaire elements referenced below, this driving session is expected to take 100 minutes, including vehicle familiarization, drive time, and breaks. For 27 respondents annually, this results in 45 annual burden hours.

6. Session 1 Post-Condition Questionnaire

During the behind-the-wheel session, drivers will verbally answer questions administered by the experimenter. This "post-condition" questionnaire, with an estimated completion time of 5 minutes, will be administered up to 12 times for a total time of 60 minutes per participant. Note that this allotted time is in addition to the actual driving time. Administered to 27 respondents annually, this results in a total of 27 annual burden hours.

7. Session 1 Post-Session Questionnaire

Following completion of the full driving session, respondents will be asked to complete a final post-drive questionnaire, capturing feedback pertaining to all conditions experienced. The estimated completion time is 5 minutes. Administered to 27 respondents annually, this results in 2 annual burden hours. At the conclusion of this first driving session and questionnaires, participants will receive instruction to return on another day for the second session.

To assess driver response to *naturally* occurring LDW and LKA actuations, two independent driving data collection efforts will be conducted on public roads in Southwest Virginia (the community surrounding the VTTI facility). The drivers who have completed the controlled driving sessions will return to the contractor's facilities for a second session, during which they will be assigned to one of two groups (16 respondents in the first group and 11 respondents in the second group) and asked to individually drive a prescribed route using one of the test vehicles, experiencing different modality, activation timing, and variation of LDW, LKA, and LDW/LKA conditions while driving as they normally would. The respondents will not need to repeat the consent form, evaluations, or instructional processing prior to this semi-naturalistic driving session.

8. Session 2 Naturalistic Driving: LDW Subset

Each respondent in the first group, 16 respondents annually, will drive a prescribed route using the LDW mockup vehicle. Each driving session will be part of a sub-study that aims to clarify the effects of the two independent LDW design variables (modality and activation timing) on driver performance safety indicators (e.g., frequency of lateral excursions and unintended departure events, and the magnitudes of these events). At the halfway point, a member of the research team will switch the modality/timing combination. A remote experimenter tool will allow the experimenter to monitor the session and allow interfacing with the DAS. The total driving session duration for each participant will be approximately 4 hours. With orientation to the research vehicle and prescribed route, along with a 15-minute break at the halfway point, the total estimated time to complete this driving session is approximately 5 hours and 10 minutes. For 16 respondents annually, this equates to 83 annual burden hours.

9. Session 2 Post-Route Questionnaire LDW

At the halfway point, when the respondents take their 15-minute break, they will also complete the "post-route" questionnaire. This is estimated to take 10 minutes but is distinct from

their break time. They will complete this same questionnaire after completing their second half of the drive. For 16 respondents annually, this equates to 5 annual burden hours.

10. Session 2 Naturalistic Driving: LDW/LKA Subset

Each participant from the second group, 11 respondents annually, will complete the same prescribed drive but will use the LDW/LKA factory vehicle rather than the LDW mockup vehicle. This experiment will address objective driver performance and subjective qualitative preferences under four system activation modes (none, LDW only, LKA only, and LDW with LKA). At the halfway point, a member of the research team will switch the modality/timing combination. A remote experimenter tool will allow the experimenter to monitor the session and allow interfacing with the DAS. The total driving session duration for each participant will be approximately 4 hours. Including orientation to the research vehicle and prescribed route, along with a 15-minute break at the halfway point, the total estimated time to complete this driving session is approximately 5 hours and 10 minutes. For 11 respondents annually, this equates to 57 annual burden hours.

11. Session 2 Post-Route Questionnaire LDW/LKA

At the halfway point when respondents take their 15-minute break, they will also complete the "post-route" questionnaire. This is estimated to take 10 minutes but is distinct from their break time. They will complete this same questionnaire a second time after completing their second half of the drive. For 11 respondents annually, this equates to 4 annual burden hours.

The 11 information collections described above are summarized in the following table, showing the number of annual respondents, frequency of response, time per response, and associated burden.

Information collection	Number of Respondents	Frequency of Response	Time per Response (minutes)	Burden Hours

Recruitment Screener	113	1	15	28
Informed Consent	28	1	30	14
Vision-Hearing Form	27	1	5	2
Knowledge Experience Questionnaire	27	1	10	5
Session 1: Controlled Driving	27	1	100	45
Session 1 Post-Condition Questionnaire	27	12	5	27
Session 1: Post-Session Questionnaire	27	1	5	2
Session 2 Naturalistic Driving: LDW Subset	16	1	310	83
Session 2 Post-Route Questionnaire LDW	16	2	10	5
Session 2 Naturalistic Driving: LDW/LKA Subset	11	1	310	57
Session 2 Post-Route Questionnaire LDW/LKA	11	2	10	4
Total				272

Estimated Total Annual Burden Cost: $0

The respondents will not incur any reporting or recordkeeping cost from the information collection.

Public Comments Invited: You are asked to comment on any aspects of this information collection, including (a) whether the proposed collection of information is necessary for the

proper performance of the functions of the agency, including whether the information will have practical utility; (b) the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submission of responses.

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

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