

Supporting Statements: Part B
Field Study of Heavy Vehicle Crash Avoidance Systems
OMB Control Number: 2127-00741

Abstract:¹

This information collection request (ICR) is for an extension without modification of an ongoing study titled “Field Study of Heavy Vehicle Crash Avoidance Systems” that received OMB approval in 2019. Participation in this information collection is voluntary and respondents will be justly compensated for any participation in the study. Respondents may elect to stop participation at any time during the study but are only compensated for the time they actively participate in the study. The respondent pool consists of individuals who hold a valid Class A commercial driver’s license and are currently employed as a commercial vehicle driver. These respondents are selected through a network of commercial driver fleets that have signed agreements with Virginia Tech Transportation Institute (VTTI). The information collection is for reporting purposes, as data is collected through a pre-field study survey and a post-field study survey. In the first stage, the respondents will complete an Informed Consent Form, a Demographic Questionnaire, and an Initial Crash Avoidance System (CAS) Technology Questionnaire prior to the start of the field study. In the second stage, the field study data is collected through a data acquisition system (DAS) installed in the vehicle and does not impose any additional burden on respondents because data collection through the DAS requires no additional effort from the driver. The DAS is installed during non-work hours and does not require attendance by the driver. The DAS collects data during the respondent’s normal driving for work and does not require any additional driving. After approximately three months of the field study, the final stage of the study involves the participants completing a Final CAS Technology Questionnaire at the end of participation. Each respondent is asked to go through the three stages only one time and each questionnaire is completed only once. The overall study is performed once with a goal of 150 respondents completing the study and questionnaires. Information collected during the study includes demographic information (e.g., age, self-identified gender, driving experience, and experience with CAS technology) and prior experience with crash avoidance technologies. Opinions about crash avoidance technologies are asked in the first and final stages of the study during the pre- and post- field study CAS questionnaires to see if there are changes over time. The DAS will record data from the vehicle and driver in a naturalistic driving environment. VTTI will receive the information from participants. VTTI will de-identify, analyze, and securely store the information. VTTI will provide NHTSA with summary information and analyses that will be used in a final report and presentations available to the general public. The purpose of the collection is to gather demographic information about the drivers and learn whether they trust crash avoidance technology or believe that it will improve their safety. The survey data will be used with naturalistic data from the driver’s vehicle to determine whether a

¹ The Abstract must include the following information: (1) whether responding to the collection is mandatory, voluntary, or required to obtain or retain a benefit; (2) a description of the entities who must respond; (3) whether the collection is reporting (indicate if a survey), recordkeeping, and/or disclosure; (4) the frequency of the collection (e.g., bi-annual, annual, monthly, weekly, as needed); (5) a description of the information that would be reported, maintained in records, or disclosed; (6) a description of who would receive the information; (7) if the information collection involves approval by an institutional review board, include a statement to that effect; (8) the purpose of the collection; and (9) if a revision, a description of the revision and the change in burden.

driver's experiences with crash avoidance technology affects their opinions regarding that technology (i.e. if drivers who experience more alerts have different opinions of the technology). The information collection has received approval by an Institutional Review Board (IRB) per VTTI protocol. This document is an extension to a currently approved ICR. The extension is necessary due to initial delays due to COVID-19 and resulting difficulties in procuring hardware for the DAS. Those delays have been resolved and the VTTI research team has begun collection. As of December 31, 2021, one respondent has completed the study, three are in the field study portion, and one has completed the informed consent document and the pre-field study surveys but still needs to go through the installation portion of stage one and stages two and three of the study.

B. JUSTIFICATION

B.1 Describe the potential respondent universe and any sampling or other respondent selection to be used.

NHTSA is seeking an extension to a currently approved ICR and completing an ongoing study regarding Heavy Vehicle Crash Avoidance Systems.

The study examines the real-world performance of 150 tractor trailers equipped with the latest generation of Bendix[®] or Detroit Assurance CAS technology and the interaction and feedback regarding the system by the truck drivers. These CAS incorporate Lane Departure Warning, Forward Collision Warning, and Automatic Emergency Braking. The information collection involves collecting demographic information, naturalistic data, and subjective experiences while using CAS technology.

Respondents for this study will be drawn in a convenience sample from trucking fleets across the United States. Drivers are recruited from fleets that have signed agreements with the research team at VTTI and have trucks that are outfitted with CAS technologies. Recruitment will attempt to balance the number of vehicles using particular brands of CAS technology but will be subject to fleet availability and scheduling constraints. Requirements of drivers involved in the study do not extend beyond employment requirements for each fleet.

B.2 Describe the procedures for the collection of information.

Data collection is set in three stages. The first stage is the pre-field study data collection directly from the consenting respondent. The respondent first signs a consent form prior to any data collection. Subsequently, the respondent is asked for demographic information and subjective questions about CAS technology. The second stage of data collection is through a Data Acquisition System (DAS) installed in the vehicle and records during the driver's working hours. The third stage of the study involves post-field study data collection and the respondent is again

asked subjective questions about CAS technology. This information will be used to investigate the real-world performance and provide information about the safety benefits of CAS technologies. The results of the study will help NHTSA understand the real-world safety impacts of the technology and if there are any unintended consequences that might be impacting safety negatively.

As previously stated, the sample is a convenience sample and while demographic data is collected, post-sample stratification may not be necessary and therefore stratification methods are not a requirement for data collection or analysis.

Potential stratifications could be based on the results of the Demographic Questionnaires when the sample is sufficiently diverse. It is expected that age, driving experience, experience using CAS technology, and type of operation could be sufficiently diverse and stratified for analyses. Regression models would be created to identify any potential differences among stratified subgroups in their responses to the Initial CAS Technology Questionnaire and Final CAS Technology Questionnaire. Generalized linear mixed models will be used to analyze any potential differences in CAS activation rates or general driving behaviors over time. The proposed data collection is a one-time occurrence for each participant and will not recur.

The procedure for the collection of information is summarized as follows:

- Fleets using appropriate CAS technology and are willing to allow DAS equipment to be installed in their vehicles are asked to sign agreements that they will not tamper with equipment.
- VTTI personnel travel to company terminals to recruit drivers in person.
- VTTI acquires informed consent from drivers who wish to participate (paper form).
- Participating drivers complete the Demographic Questionnaire and Initial CAS Technology Questionnaire (both paper forms).
- VTTI technicians install a DAS in the participant's vehicle.
- Participants operate their vehicle as they normally would for approximately three months. The data acquisition system collects video data and vehicle network data whenever the vehicle is in motion. VTTI contacts the participant monthly via phone in order to ensure they are still employed by the company, still using the same vehicle on the same route, that the DAS appears to be in good condition, and to confirm payment details.
- After three months (or participation has ended for other reasons), a VTTI technician removes the DAS. The participant then completes the Final CAS Technology Questionnaire either online or in-person on paper and receives their final payment.

B.3 Describe methods to maximize response rates.

Participants are paid for their time, which includes completion of the questionnaires. Participants are offered the opportunity to complete online or paper versions of the questionnaires, whichever is more convenient. Participants are paid \$100 for completing the questionnaires and allowing VTTI's equipment to be installed in the truck at the start of the study, \$100 per month for remaining in the study during objective data collection, and \$100 at the end of the study for

completing the final questionnaire and allowing VTTI to remove its equipment. This payment structure is in line with similar research efforts involving commercial truck drivers². Participants are free to leave the study at any time without completing one or more of the questionnaires, but their initial and final payments are tied to completion of questionnaires in order to improve response rates. Due to the size of the study and flexible nature of the analysis, non-responses are not expected to have a major impact on the analyses.

B.4 Describe any tests of procedures or methods to be undertaken.

Data processing will consist of tabulation of quantitative questions and coding of open-ended responses. Data analysis will be conducted by NHTSA's contractors, VTTI. Summary statistics will be analyzed to determine whether or not significant differences exist, if stratification is feasible, based on age, experience, previous CAS usage, type of route, or other demographic information. Open-ended responses will also be analyzed to add context to the quantitative responses of participants.

The questionnaires have not been distributed to anyone who is outside of this research team or that has not participated in the study thus far. The designed questionnaires have been distributed to the research team members (less than ten individuals) and NHTSA for validation prior to initiating the study and distributed to those drivers who have agreed to participate in the study.

Data tables, including important cross-tabulations, will be prepared along with a final report of the key findings.

B.5 Provide the name and telephone number of individuals consulted on statistical aspects of the design.

The study does not adhere to statistical methodology for sampling methods or selection. Analysis is expected to be summary statistics, but the research team will consider post-sample stratification if appropriate. The following individuals are primarily responsible for data collection and analysis:

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² <https://www.federalregister.gov/documents/2017/10/27/2017-23350/agency-information-collection-activities-approval-of-a-new-information-collection-request-flexible>

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