

Department of Transportation

SUPPORTING STATEMENT Part A

Title: Field Study of Heavy Vehicle Crash Avoidance Systems

INTRODUCTION

This is to request the Office of Management and Budget's (OMB) three-year approval clearance for the information collection entitled, Field Study of Heavy Vehicle Crash Avoidance Systems (OMB Control No. 2127-New. Below is a summary of the proposed collection:

1. Responding to the collection is required to receive compensation. Participation is voluntary, and participants may elect to stop participation at any time and forego remaining compensation (participants will be partially compensated for any collection activities completed).
2. Individuals who hold a valid Class A commercial driver's license and are currently employed as a commercial vehicle driver are eligible to participate.
3. This is a reporting survey.
4. The collection will be conducted in two stages. Participants will complete a consent process, (1) Demographic Questionnaire, and (2) Initial CAS Technology Questionnaire at the start of the study. After three months, participants will be asked to complete (3) Final CAS Technology Questionnaire at the end of participation.
5. The information includes demographic information (age, experience, etc.) and opinions about crash avoidance technologies. Opinions about crash avoidance technologies are asked at the beginning and end of participation to see if there are changes over time.
6. The Virginia Tech Transportation Institute (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.
7. 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 see if a driver's experiences with crash avoidance technology affects their opinions (i.e. if drivers who experience more alerts have different opinions of the technology).
8. This document is not a revision.

Part A. Justification.

1. Circumstances that make collection of information necessary.

From 2012-2016 NHTSA contracted the VTTI to investigate the real-world performance of collision avoidance system (CAS) technology. This technology was becoming commercially available on heavy duty commercial vehicles and has the potential to save lives by automatically

engaging the brakes to mitigate or prevent a collision. VTTI recruited the drivers of 150 commercial vehicles that were equipped with CAS technology to participate in a naturalistic study for up to 15 months of data collection. Drivers were recruited and installed with data collection equipment in batches from seven different fleets across the United States. In order to accommodate team operations and compensate for dropouts, a total of 169 drivers were recruited, and their data collection spanned a total of 2.5 years from the install of the first participant to the completion of the final participant. The data from the study showed that while the technology could prevent collisions, there might be some technical issues that generate false activations and some usability issues with excessive alerts. These issues could lead to resistance in adopting a safety technology or lower safety benefits if drivers do not heed alerts.

CAS technology has been advancing rapidly since the conclusion of the previous study, with new products for heavy commercial vehicles from Bendix[®], Meritor WABCO, and Detroit Diesel becoming commercially available. These systems present opportunities for improving driver awareness and behavior, improving drivers' responses to potential collisions, and mitigating or preventing collisions when drivers do not respond. The newest generation of CAS technology includes several new features, such as multiple sensors, improvements to radar algorithms, and new features such as speed alerts. However, there is also the possibility for unintended consequences with CAS technologies. It is unknown if this newest generation of products has been able to reduce the prevalence of false or nuisance alerts observed in the previous study, if there are any issues with new types of alerts that have been added since the previous study, or whether driver have negative perceptions of the technology due to these issues. As the technology becomes more popular with fleets it is important to understand its real-world performance and any unintended consequences that may arise from it.

The proposed study will closely mirror the previous study and examine the real-world performance of 150 tractor trailers equipped with the latest generation of Bendix[®], WABCO, or Detroit Assurance CAS technology. The information collection involves collecting demographic information, naturalistic data, and subjective experiences while using CAS technology. Due to the dropout rates experienced in the previous study, the proposed study will only collect three months of naturalistic data per participant. This will reduce the chances of drivers leaving the study for work-related reasons. However, it is still expected that up to 175 commercial vehicle drivers may need to be recruited in order to meet the goal of 150 trucks with three months of data each. Like the previous study, recruitment and installation will be staggered into batches, with a total planned data collection window of 15 months as new participants are added and existing participants complete the study over time. Drivers will again be recruited from 6-12 fleets across the United States. 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. The participants will be asked for demographic information and subjective questions about CAS technology prior to participation, and will again be asked subjective questions about CAS technology at the completion of participation. This information will be used to investigate the real-world performance and provide information about the safety benefits of CAS technologies, in support of the DOT Strategic Goal of Safety. 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.

Further, 49 U.S.C. 30181, 30182, and 30183 authorize the Secretary of Transportation to conduct research, development, and testing programs, including activities related to new and emerging

technologies that impact or may impact motor vehicle safety. This authority has been delegated to NHTSA.

2. How, by whom, and for what purpose is the information used.

The Virginia Tech Transportation Institute (VTTI) will conduct this study under an Indefinite Delivery Indefinite Quantity (IDIQ) with NHTSA. There are three instruments that will be used for the study: one demographic questionnaire, and two instruments to measure participants' subjective experience using CAS technology. Participants will be recruited from participating trucking companies. Recruitment will take place on-site with VTTI personnel.

During the on-site visit by VTTI personnel, participants will be asked to provide VTTI with informed consent for their participation through a process approved by Virginia Tech's Institutional Review Board, provide responses to the (1) Demographic Questionnaire via pen and paper, and provide responses to the (2) Initial CAS Technology Questionnaire. Data collected using the (1) Demographic Questionnaire will be used for description of the participant sample (e.g., number of males and females in the dataset, final age range for all participants, driving experience range for all participants). This is necessary to compare the sample collected to the general driving population. The information is also expected to aid in the analysis of specific groups of truck drivers.

Once the (1) Demographic Questionnaire is completed subjects will provide responses to the (2) Initial CAS Technology Questionnaire. This questionnaire will be used to analyze the perceptions and opinions of CAS technology within the participant sample. This data will be used to determine which features of the CAS technology participants like or dislike, how much they trust or rely on the technology, and how they perceive any benefits the technology provides. This data is necessary to determine the subjects' initial feelings towards the technology before participating.

After participants have completed three months of naturalistic data collection, they will meet with VTTI personnel again to remove the naturalistic data collection equipment from their truck. At this time the subjects will complete the (3) Final CAS Technology Questionnaire. The (3) Final CAS Technology Questionnaire will be used to analyze how each subject's perceptions and opinions of CAS technology may have changed over the course of participation. (3) Final CAS Technology Questionnaire will include a question about the participants' specific experiences using CAS technology within the last three months that affected their opinions.

In summary, the information to be collected will be used by VTTI to:

- (a) Describe the sample population
- (b) Measure participants' perceptions and opinions of CAS technology
- (c) Measure any changes in participants' perceptions and opinions of CAS technology

3. Extent of automated information collection.

Informed consent will be completed in person with paper copies in order to ensure drivers have an opportunity to ask questions and receive satisfactory answers with VTTI personnel before participating. After consent participants will be offered the option of completing an online version of the data collection instruments or a paper version of the data collection instruments,

whichever they prefer. Authorized VTTI personnel will be present when installing or removing equipment from the participants' trucks for naturalistic data collection, and can provide paper versions of the survey at this time if convenient to the participant. The population of commercial vehicle drivers may have difficulties completing online versions of the survey due to unreliable access to the internet while on the road for work. Therefore, it is expected that paper versions will be convenient or preferred for some portion of the participants. Participants will be offered the choice and be free to choose any combination of paper or online surveys for the three instruments.

4. Efforts to identify duplication.

This is a one-time collection and is only applicable to the study described above. The information collected by (1) Demographic Questionnaire, (2) Initial CAS Technology Questionnaire, and (3) Final CAS Technology Questionnaire is specific to the particular individuals that will be participating in this study. Similar information collected from other individuals is not applicable. The agency is also not aware of any other sources of this information.

5. Efforts to minimize the burden on small businesses.

The participants in this study may be employees of trucking fleets that are small businesses. Prior to recruiting any drivers at a fleet, VTTI will enter into a signed agreement with the fleet in which the fleet states they will allow VTTI to install equipment and will not tamper with it. This is to ensure the privacy of drivers' data collected as part of the study. VTTI will then work with the fleets in order to schedule activities so that they do not interfere with the driver's job responsibilities or the fleet's operations. Typically, this means VTTI will schedule activities at a fleet's terminal prior to a driver leaving or after a driver returns from a scheduled trip. VTTI will coordinate directly with any fleets whose drivers participate in the study to ensure activities do not interfere with operations.

6. Impact of less frequent collection of information.

As described above, the technical issues that lead to false activations or nuisance activations may be affecting driver perceptions or trust in the technology. This collection will not only collect information about driver perceptions and trust, but allow that information to be compared to each driver's real-world experiences with the technology. Without the collection, it will not be possible to know if driver perception or trust is affected by real-world performance or what aspects of CAS technology are affecting it.

7. Special circumstances.

This collection will not be conducted in a matter that:

- Requires respondents to report information to the agency more often than quarterly;
- Requires respondent to prepare a written response to a collection of information in fewer than 30 days of receipt of it;

- Requires respondents to submit more than an original and two copies of any document;
 - Requires respondents to retain records, other than health, medical, government contract, grant-in-aid, or tax records for more than three years;
 - Is not designed to produce valid and reliable results in connection with a statistical survey that can be generalized to the universe of study;
 - Requires the use of a statistical data classification that has not been reviewed and approved by OMB;
 - That includes a pledge of confidentiality that is not supported by authority established in statute or regulation, that is not supported by disclosure and data security policies that are consistent with the pledge, or which unnecessarily impedes sharing of data with other agencies for compatible confidential use; or
 - Requires respondents to submit proprietary trade secrets, or other confidential information unless the agency can demonstrate that it has instituted procedures to protect the information's confidentiality to the extent permitted by law.
9. **Compliance with 5 CFR 1320.8: PROVIDE AN ELECTRONIC COPY AND IDENTIFY THE DATE, VOLUME NUMBER AND PAGE NUMBER OF THE PUBLICATION IN THE FEDERAL REGISTER OF THE AGENCY'S NOTICE (FOR A 60-DAY AND A 30-DAY NOTICE), REQUIRED BY 5 CFR 1320.8(d), SOLICITING COMMENTS ON THE INFORMATION COLLECTION PRIOR TO SUBMISSION TO OMB.**
- NHTSA published a notice in the Federal Register with a 60-day public comment period to announce this proposed information collection on August 8, 2017: Federal Register / Vol. 82, No. 151 / Tuesday, page 37162.
 - NHTSA published a notice in the Federal Register with a 30-day public comment period on September 25, 2018: Federal Register/Vol. 83, No. 186, page 48509.
- **SUMMARIZE PUBLIC COMMENTS RECEIVED IN RESPONSE TO THAT NOTICE AND DESCRIBE ACTIONS TAKEN BY THE AGENCY IN RESPONSE TO THOSE COMMENTS. SPECIFICALLY ADDRESS COMMENTS RECEIVED ON COST AND HOUR BURDEN.**
 - There were no comments received in response to the 60-Day Notice.
 - **DESCRIBE EFFORTS TO CONSULT WITH PERSONS OUTSIDE THE AGENCY TO OBTAIN THEIR VIEWS ON THE AVAILABILITY OF DATA, FREQUENCY OF COLLECTION, THE CLARITY OF INSTRUCTIONS AND RECORD KEEPING, DISCLOSURE, OR REPORTING FORMAT (IF ANY), AND ON THE DATA ELEMENTS TO BE RECORDED, DISCLOSED, OR REPORTED.**
 - The Agency has not consulted with anyone regarding this data collection.

- **CONSULTATION WITH REPRESENTATIVES OF THOSE FROM WHOM INFORMATION IS TO BE OBTAINED OR THOSE WHO MUST COMPILE RECORDS SHOULD OCCUR AT LEAST ONCE EVERY 3 YEARS--EVEN IF THE COLLECTION OF INFORMATION ACTIVITY IS THE SAME AS IN PRIOR PERIODS. THERE MAY BE CIRCUMSTANCES THAT MAY PRECLUDE CONSULTATION IN A SPECIFIC SITUATION. THESE CIRCUMSTANCES SHOULD BE EXPLAINED.**
 - There are no circumstances that would preclude consultation according to this schedule.

9. Payments or gifts to respondents.

Participants will receive compensation in three stages. First, participants will receive \$100 after completion of the (1) Demographic Questionnaire, completion of the (2) Initial CAS Technology Questionnaire, and authorized VTTI personnel have installed the naturalistic data collection equipment in their truck. All three conditions must be met to receive the first \$100. Second, the participants will receive \$100 per month for keeping the naturalistic data collection equipment in their vehicle, up to a total of three months and \$300. Participants will receive three separate payments of \$100 at the end of each month. Participants who choose to leave the study early will receive prorated payments equal to the portion of the last month completed and full payments for any full months completed. Finally, participants will receive \$100 for completing the (3) Final CAS Technology Questionnaire and allowing authorized VTTI personnel to remove the naturalistic data collection equipment from their truck. Both conditions must be met to receive payment, and participants who choose to leave the study early will not be asked to complete the (3) Final CAS Technology Questionnaire or eligible to receive the last \$100 compensation. This payment structure is to encourage participants to complete the study and is comparable with other studies involving naturalistic data collection from commercial vehicle drivers¹.

10. Assurance of confidentiality:

No assurance of confidentiality is provided by the agency.

11. Justification for collection of sensitive information:

The questionnaires do not contain questions related to matters that are commonly considered sensitive or private. The questions focus on demographic information; drivers' beliefs; perceived benefits or issues; and attitude towards the CAS technologies equipped on their vehicles.

12. Estimate of burden hours for information requested:

The study approach consists naturalistic data collection in order to obtain objective and subjective data. An expected total of 175 commercial vehicle drivers will be recruited to participate in the study. The drivers will perform their normal driving duties while participating in the study.

Table 1 shows the estimated burden hours for 175 respondents, this is an estimate which accounts for the estimated drop-out rate.

¹ <https://www.federalregister.gov/documents/2017/10/27/2017-23350/agency-information-collection-activities-approval-of-a-new-information-collection-request-flexible>

Table 1: Estimated Burden Hours

Instrument	Number of Respondents²	Frequency of Responses	Number of Questions	Estimated Individual Burden	Total Estimated Burden Hours	Salary Cost of Respondents³
Informed Consent Form	175	1	N/A	10 minutes	29 hours	\$ 585.00
Demographic questionnaire	175	1	14	10 minutes	29 hours	\$ 585.00
Initial CAS Technology Survey	175	1	33	25 minutes	73 Hours	\$ 1472.00
Final CAS Technology Survey	150	1	34	25 minutes	63 hours	\$ 1260.00
TOTAL					194 hours	\$3902.00

13. Estimate of total annual costs to respondents.

There are no costs to respondents.

14. Estimate of cost to the Federal government.

The full costs of this information collection are included in a contract awarded to the VTTI which includes analysis and report preparation. The specific cost to collect the information is estimated as: (204 hours) (\$42.76⁴/hours) = \$8,723.04. The specific cost to analyze the questionnaire information is estimated as: (40 hours) (\$42.76⁶/hours) = \$1,710.40. The costs for agency program management is estimated at \$29,901, which represents three months of COTR management. There are no other costs to the government.

15. Explanation of program changes or adjustments.

This a new information 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. This new collection will be a program change of adding of adding an additional 194.

16. Publication of results of data collection.

Personal information will not be published. An exact publication date has not been established but would occur no sooner than 2019. Findings will not be linked to any individuals.

17. Approval for not displaying the expiration date of OMB approval.

² The number of respondents in this table includes anticipated drop-out rates. Additional participants will be recruited as necessary in order to reach 150 who complete a full three months of data collection and complete the Final CAS Technology Survey.

³ Estimated based on the mean hourly rate nationwide for Heavy and Tractor-Trailer Truck Drivers of \$20.16 as reported in the May 2014 Occupational Employment and Wage Estimates, Bureau of Labor Statistics. http://www.bls.gov/oes/current/oes_nat.htm#35-0000

⁴ Estimated average hourly cost for Assistant Researcher which includes overhead.

NHTSA and VTTI are not seeking such approval.

18. Exceptions to certification statement.

There are no exceptions.