

Department of Transportation

SUPPORTING STATEMENT Part B

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.)

Part B. Collections of Information Employing Statistical Methods.

1. Describe potential respondent universe and any sampling selection method to be used.

In the previous study conducted by NHTSA from 2012-2016 on CAS technologies, drivers were not surveyed with subjective instruments and objective data collected lasted up to 15 months. There was a high dropout rate due to driver turnover that is normal to the trucking industry. The current experiment was designed to collect both subjective and objective data on real-world CAS performance, but has made some changes in order to reduce the incidence of dropouts. The goal of the current study is to collect objective data from 150 trucks equipped with the appropriate technology and subjective data from the drivers of those vehicles. Objective data collection will only last three months, so that participants are more likely to complete the study before changing vehicles, routes, or jobs. However, this will not eliminate the problem and the trucking industry's high turnover rate will need to be taken into account. In order to complete data collection, it may be necessary to survey up to 175 drivers in order to account for dropouts. The participants will be selected from companies who sign agreements with VTTI to allow data acquisition systems to be placed in their company's vehicles. These agreements also prohibit companies from tampering with data acquisition systems or the data they collect, protecting participant privacy. The only selection criterion is that the participant must be employed as a driver for their company and their vehicle must be equipped with one of three possible CAS technologies which are being studied. Efforts will be made to recruit participants using each of the three possible CAS technologies, but there are no limits on how many participants will be recruited who use each technology. It is expected that some attrition will take place due to participants changing employment or leaving the study. It is also possible that some team operations will be recruited, in which two drivers are responsible for operating a single truck in shifts. To account for these situations an additional 25 replacement participants are expected to be necessary, which is why 175 drivers may be necessary to recruit for only 150 trucks. Descriptive statistics, tables, and plots will be used to understand the data collected.

2. Describe procedures for collecting information, including statistical methodology for stratification and sample selection, estimation procedures, degree of accuracy needed, and less than annual periodic data cycles.

Questionnaire data will be collected at the beginning and end of participation for each driver.

Objective data will be collected via the data acquisition system throughout three months of participation. All demographic data collected at the beginning of participation will potentially be used to stratify participants. However, there are no demographic criteria for recruitment, and it is therefore unknown if enough data will be collected to stratify on any particular variable. For example, a large majority of commercial vehicle drivers are male, and it is not known if female drivers will be available or willing to participate. Stratifications will be created based on the results of the **(1) Demographic Questionnaires** where the sample is sufficiently diverse. It is expected that age, driving experience, experience using CAS technology, and type of operation will be sufficiently diverse and stratified for analyses. Regression models will be created to identify any potential differences among stratified subgroups in their responses to the **(2) Initial CAS Technology Questionnaire** and **(3) 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 will be 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 data acquisition equipment to be installed in their vehicles will be asked to sign agreements that they will not tamper with equipment.
- VTTI personnel will travel to company terminals to recruit drivers in person.
- VTTI will acquire informed consent from drivers who wish to participate
- Drivers willing to participate will the **(1) Demographic Questionnaire** and **(2) Initial CAS Technology Questionnaire**.
- VTTI technicians will install a data acquisition system in the participant's vehicle.
- Participants will operate their vehicle as they normally would for up to three months. The data acquisition system will collect video data and vehicle network data whenever the vehicle is in motion. VTTI will contact the participant monthly via phone in order to ensure he/she is still employed by the company, is still using the same vehicle on the same route, that the data acquisition system appears to be in good condition, and to confirm payment details.
- After three months (or participation has ended for other reasons) a VTTI technician will meet the participant to remove the data acquisition system. The participant will then complete the **(3) Final CAS Technology Questionnaire** and receive their final payment.

3. Describe methods to maximize response rate.

Participants are being paid for their time, which includes completion of the questionnaires. Participants will be offered the opportunity to complete online or paper versions of the questionnaires, whichever is more convenient. Participants will be 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 drivers¹. 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

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

analysis, non-responses are not expected to have a major impact on the analyses.

4. Describe tests of procedures or methods.

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 when stratifying the participants 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. The designed questionnaires have been distributed to the research team members (less than ten individuals) for validation.

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

5. Provide name and telephone number of individuals who were consulted on statistical aspects of the information collection and who will actually collect and/or analyze the information.

In preparation of sending this package to OMB for approval, NHTSA provided contacts at various agencies the opportunity to comment on the approach for this plan. The following individuals are primarily responsible for data collection and analysis:

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