DEPARTMENT OF TRANSPORTATION

INFORMATION COLLECTION SUPPORTING STATEMENT

TITLE OF INFORMATION COLLECTION: Evaluation of Heavy Vehicle Collision
Warning Interfaces

OMB CONTROL NUMBER:

INTRODUCTION

This is to request the Office of Management and Budget's (OMB) renewed three-year approved clearance for the information collection entitled, Evaluation of Heavy Vehicle Collision Warning Interfaces.

Part B. Collections of Information Employing Statistical Methods

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

   This experiment is designed to collect both subjective and objective data on how participants interact with collision warning interfaces in heavy vehicles. The respondent universe will consist of individuals that hold a valid Class A interstate commercial driver's license (CDL). These driver's will come from the Blacksburg, VA and surrounding areas up to three hours away. This includes all of southwestern Virginia as well as bordering areas of West Virginia, Tennessee, and North Carolina. There are no restrictions or limitations on gender or age (other than being at least 21 to hold a valid interstate CDL); however, there are other specific criteria that must be meet in order to participate. Those criteria are as follows:

   a. Must have a valid Class A interstate CDL
   b. Must have a valid DOT medical card
   c. Must not have airbrakes or automatic transmission only restrictions
   d. Must be currently driving a tractor-trailer or have driven one within the past six months
   e. Must be able to pass a basic color vision test
   f. Must be a U.S. citizen
   g. Have not been involved in a DOT-reportable collision within the past year
   h. Have not previously participated in a study with a surprise event at VTTI
   i. Health Questions:
      i. Cannot have a history of neck or back conditions which still limit their ability to participate in certain activities.
      ii. Cannot have a history of brain damage from stroke, tumor, head injury, recent concussion, or disease or infection of the brain
      iii. Cannot have a current heart condition which limits their ability to participate in certain activities

iv. Cannot have current uncontrolled respiratory disorders or disorders requiring oxygen
v. Cannot have had epileptic seizures or lapses of consciousness within the last 12 months
vi. Cannot have chronic migraines or tension headaches (no more than one per month during the past 12 months).
vii. Cannot have current problems with motion sickness, inner ear problems, dizziness, vertigo, or balance problems
viii. Cannot have uncontrolled diabetes (have they been recently diagnosed or have they been hospitalized for this condition, or any changes in their insulin prescription during the past 3 months)
ix. Must not have had any major surgery within the past 6 months (including eye procedures).
x. Cannot currently be taking any substances that may interfere with driving ability (cause drowsiness or impair motor abilities)
j. If pregnant, encourage them to speak with their doctor first.
k. Must have normal (or corrected-to-normal) hearing and vision.
l. Must be able to drive without sunglasses or lenses that darken in the sunlight.
m. Must be able to read, write and speak English well.

A total of 60 participants are needed to complete data collection for this study. However, based on prior experiences in conducting driving studies with human subjects, it is expected there will be some cancelations due to inclement weather as well as an occasional participant that does not meet the vision acuity or color vision standards. The attrition rate due to these factors is expected to be around 25%. Additionally, this study requires the participants to perform a task during the surprise event. This task has been identified in naturalistic driving as a task that truck drivers perform in the real world. Due to the nature of this study, the driver's eyes must be off the road prior to and as the collision warning interface is activated. Based on previous studies of similar nature conducted by VTTI, not all drivers will meet this criteria.

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

The sample will be selected from participants who volunteer to participate and meet the requirements described above. Once recruited and screened, potential participants who are eligible will be scheduled for a test session and randomly assigned to one of the two test conditions. Estimation procedures will use inferential statistical methods. Driving performance data will be estimated using ANOVA (f distribution), and results from the post-drive questionnaire will be analyzed with non-parametric statistics. All inferential testing methods will use an alpha level of .05.

The proposed data collection will be a one-time occurrence for each participant and will not recur. The impacts of data collection in the proposed study are expected to be stable over time and will not require annual data collection cycles.
The procedure for the collection of information for this research is summarized as follows:

- Participant population is defined.
- Recruitment advertisement will be listed in local and regional newspapers and flyers will be circulated at local and regional trucking companies and public bulletin boards. Potential participants will also be recruited from VTTI's participant database.
- Personnel from VTTI's recruitment team will go through the eligibility questionnaire over the phone to deter if the person is eligible to participate (criteria listed above).
- Qualified participants will then be scheduled for a test session at VTTI.
- Upon arrival, the participant will show the researcher their valid driver's license and go over the consent form. Then the participant will fill out the paper based **Demographic Questionnaire**. It will take approximately 2 minutes to complete the questionnaire.
- Participants will then proceed to the test track to drive a tractor-trailer and complete the test session. All participants will experience the same distraction tasks in the same order. Data collected will include driving performance data as well three **Mid-Study Questionnaires** completed after each of the first three distraction tasks. These questionnaires are used to set up the surprise event and will not be analyzed.
- During the fourth and final distraction task, the participants will experience a surprise event. This event will require a hard braking maneuver. In addition to the driving performance data captured, the participants will complete the **Post Study Questionnaire**.
- **Observation/test track time** is the portion of time the participant is driving the tractor-trailer on the test track. This time is approximately 60 minutes per participant.
- A total sample size of up to 60 participants with valid data will be collected and analyzed.
- The questionnaires will only be conducted in English.
- This is a one-time data collection in which participants will complete all testing in the same data collection session.

3. Describe methods to maximize response rate.

To maximize response rate, participants will be screened over the phone prior to their participation to ensure eligibility for full participation. Also, participants will be compensated for their time. This study is designed to take place in one data collection session. Based on previous experiences, participants are unlikely to drop out mid-study. In the event that a session might need to be cancelled prior to the start of participation due to weather (i.e., unfavorable weather forecast), VTTI will make every effort to reschedule the participant prior to their arrival.

4. Describe tests of procedures or methods

Questionnaire responses will be initially collected on paper during the study session with each participant. Data processing will consist of tabulation of quantitative and coded open-ended responses. Descriptive statistics will be used to summarize participant demographics while non-parametric statistics will be used to determine whether significant differences exist between the self-reported rating evaluations of the features, acceptance, feasibility, and timing of the collision warning interfaces. These self-reported ratings will be in a Likert-type format. Open-ended responses will also be analyzed to add context to the evaluations participants have provided and can help in assessing the collision warning interface features.

None of the questionnaires have 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 and graphs 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 IC and who will actually collect and/or analyze the information.

The following individuals are primarily responsible for data collection and analysis:

Myra Blanco, Ph.D	540-231-1551	Center Director & Principle Investigator
Scott Tidwell	540-231-7761	Project Manager
Susan Soccolich	540-231-1032	Statistician
Jon Atwood	540-231-1034	Statistician

All personnel listed above are located at VTTI in Blacksburg, Virginia.