

DEPARTMENT OF TRANSPORTATION

**INFORMATION COLLECTION
SUPPORTING STATEMENT**

Title: Head-Up Displays and Distraction Potential

OMB CONTROL NUMBER: 2127-NEW

INTRODUCTION

This is to request the Office of Management and Budget's (OMB) review and approval of a new National Highway Traffic Safety Administration (NHTSA) information collection request (ICR) titled, "Head-Up Displays and Distraction Potential." The overall purpose of this collection is to determine if there are safety risks to in-vehicle head-up displays. This information collection is completely voluntary and All participants will be compensated for their time. This research will consist of a single data collection session in which members of the public perform driving related tasks and electronic device use tasks while their eye glance and driving behavior is recorded. The volunteer drivers will be recruited from the southwest Virginia area. All data will be stored on a secure, password protected server. The collection will occur during a single period that will end once the total number of participants has been reached. Each entity will only participate once. The results will be submitted to the National Highway Traffic Safety Administration and upon agency review, will be published and made available to the general public.

Part A. Justification

- 1. Explain the circumstances that make the collection of information necessary. Attach a copy of the appropriate section of each statute and regulation mandating or authorizing the collection of information.**

Subchapter V of Title 49 of the United States Code (U.S.C.) authorizes the Secretary of Transportation to conduct "motor vehicle safety research, development, and testing programs and activities, including activities related to new and emerging technologies that impact or may impact motor vehicle safety." 49 U.S.C. § 30182. Pursuant to Section 1.95 of Title 49 of the Code of Federal Regulations (CFR), the Secretary has delegated this authority to the National Highway Traffic Safety Administration (NHTSA).

Head-up display (HUD) technology presents many opportunities and challenges for mitigating driver distraction, improving driver comfort, and engaging drivers with their vehicles. On one hand, the reduction of the distance that the eyes need to travel between a focal point on the forward road and a focal point on an in-vehicle display can minimize the

amount of time required to view a display relative to a traditional Head-Down Display (HDD). There is also an added benefit in that peripheral roadway information can be processed while viewing a HUD, allowing partial support of some aspects of vehicle control, like lane keeping. On the other hand, humans have difficulty simultaneously processing two visual displays overlaid on each other. Viewing HUDs while driving may therefore prevent drivers from perceiving events in the environment, particularly centrally located hazards such as a braking lead vehicle. There is a concern that if drivers perceive HUDs to be safer than HDDs that they may not regulate the length of time they spend looking at the HUD. The HUD may therefore negatively alter drivers' visual scanning behavior. The benefits and drawbacks of using a HUD in a vehicle must therefore be fully investigated and properly understood.

The proposed study will examine the distraction potential of HUD use on driving performance and driver acceptance of this display technology. The information collection involves collecting eligibility information, demographic information, and subjective experiences while using HUD technology. The study focuses on HUD technologies that display information about the state of the vehicle (e.g., vehicle speed, navigation information) near the drivers forward field of view (e.g., projected into the lower portion of the windshield in front of the driver).

Further, 49 U.S.C. 30181, 30182, and 30183^a 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.^b

2. Indicate how, by whom, and for what purpose the information is to be used. Indicate the actual use the agency has made of the information received from the current collection.

The Virginia Tech Transportation Institute (VTTI) will conduct this study under an Indefinite Delivery Indefinite Quantity (IDIQ) with NHTSA.

There are four instruments that will be used for the study: one screening questionnaire, one demographic questionnaire, and two instruments to measure participants' subjective experience using the displays. Prior to participation, participants will be screened via telephone using the **(1) Eligibility Questionnaire**. Candidate subjects will be asked questions about their driving history, previous participation in driving studies, and general health. The

^a [49 USC Subtitle VI, Part A, Chapter 301, Subchapter V: Motor Vehicle Safety Research and Development](http://uscodebeta.house.gov) <http://uscodebeta.house.gov>

^b [49 CFR Subtitle A, Part 1, Subpart D, Section 1.95: Delegations to the National Highway Traffic Safety Administrator](http://www.gpo.gov). <http://www.gpo.gov>

general health questions will be used to screen out individuals that may incur harm while participating in an on-road driving study, such as those with back or neck injuries.

Individuals must meet the criteria listed below to be eligible to participate in the study:

1. Must hold and able to present a valid U.S. driver's license at time of participation.
2. Must be 18 or older.
3. Must be a U.S. citizen or permanent resident (green card holder).
4. Must be willing to provide SSN or Virginia Tech ID #.
5. Must be able to drive an automatic transmission without assistive devices or special equipment.
6. Must currently drive at least 3 times a week.
7. Must not have participated in a similar study
8. Must not have more than two driving violations in the past 3 years.
9. Must not have caused an injurious accident within the past 3 years.
10. Must be in good health
11. Must have normal (or corrected to normal) hearing and vision in both eyes.
12. Eyeglasses must not tint or darken in the sunlight while sitting inside the research vehicle. Must be able to drive without sunglasses.
13. Must be able to fluently read, write, and speak English.
14. Must not be involved/employed in the design, engineering, or development of automotive-related technologies.

Responses to **(1) Eligibility Questionnaire** will be used to identify eligible subjects for this study and will not be kept nor analyzed. Candidates who are selected for this study will be selected for a study visit to participate in the on-road experiment. Individuals that do not meet the eligibility requirements listed above will be excluded because they may introduce too much variability and mask the effects of the independent variables which are the principle focus of the study.

During the study visit, prior to the on-road portion of the study, participants will complete the **(3) Information Sheet** to obtain their consent to participate. After completing the information sheet, the subjects will provide responses to the **(2) Demographic Questionnaire** via pen and paper. Data collected using the **(2) 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, and number of colorblind individuals). This is necessary to compare the sample collected to the general driving population. The information is also expected to aid in the analysis of eye glance behavior. **(4) On-Road Collection** will then be conducted in which participants interact with Head-Up Display (HUD) technology on public roads and on a closed test track. Finally, the **(5) Informed Consent Document** will be administered at the end of data collection, in order to obtain final consent to use the data. In summary, the information to be collected will be used to:

- (a) Screen individuals meeting the eligibility criteria for the study
- (b) Obtain consent prior to participation

- (c) Describe the sample population
- (d) Record interactions with HUD technology of interest
- (e) Obtain final informed consent

3. Describe whether the collection of information involves the use of technological collection techniques or other forms of information technology.

Recruitment flyers will be circulated on public sites such as college campuses, coffee shops, restaurants/fast food establishments, and sports venues. VTTI may also put ads online and in the newspaper and/or contact potential subjects from the subject pool from previous VTTI studies. Eligibility questionnaires will be completed primarily via telephone. The demographic questionnaire will be collected via pen and paper and does not involve technological collection techniques or other forms of information technology.

4. Describe efforts to identify duplication. Show specifically why any similar information cannot be used.

This is a one-time collection and is only applicable to the study described above. The information collected by **(1) Eligibility Questionnaire, (2) Demographic Questionnaire, (3) On-Road Collection** 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. If the collection of information involves small businesses or other small entities, describe the methods used to minimize burden.

This collection of information involves individuals and does not involve small businesses.

6. Describe the consequences to Federal program or policy activities if the collection is not conducted or is conducted less frequently.

The researchers would not be able to reduce potential between-subjects variance in the study if it were not possible to ask questions to confirm that respondents meet the eligibility criteria. If the exclusion criterion is not verified then it will not be possible to reduce liability and potential crashes of the research vehicles. Demographic information allows collecting information about factors that are relevant to Head-Up Display use and that can help in describing participant behavior when interacting with the systems.

7. Explain any special circumstances that require the collection to be conducted in a manner inconsistent with the guidelines set forth in 5 CFR 1320.6.

The information collection is consistent with the guidelines set forth in 5 CFR 1320.6.

8. Provide a copy of the Federal Register document soliciting comments on extending the collection of information, a summary of public comments responding to the notice, and a description of the agency's actions in response to the comments. Describe efforts to consult with persons outside the agency to obtain their views.

NHTSA published a notice in the Federal Register with a 60-day public comment period to announce this proposed information collection on January 4, 2016 (NHTSA-2015-0116).

NHTSA published a notice in the Federal Register with a 30-day public comment period that announced this information would be sent to OMB for approval on July 5, 2016 81FR43710 .

9. Explain any decision to provide any payment or gift to respondents, other than remuneration of contractors or grantees.

Respondents will not receive any compensation for responding to this information collection. Respondents who are not selected to participate will not receive any compensation. Respondents who are selected to participate in the study will be compensated for the time spent participating in the experiments but will not receive any additional compensation for responding to the information collection.

Participants are paid for their time and effort to attend study visits, not per protocol procedure such as a questionnaire. Participants will receive \$70 based on full participation. Total compensation for all participants that complete the study will be \$3,360.

If a participant arrives for the study visit but is not eligible to participate, they will receive partial compensation. Partial compensation is will be at a rate of \$30.00 per hour, pro-rated to the 1/2 hour of participation. Participants that choose to withdraw prior to completion of the study will also receive partial compensation, at a rate of \$30.00 per hour, pro-rated to the 1/2 hour of participation.

10. Describe any assurance of confidentiality provided to respondents.

VTTI will provide each participant with an informed consent form which explains to participants that the VTTI, WTI, and NHTSA will maintain the confidentiality of all personally identifying data and information collected in connection with this study to the extent provided by law.

11. Provide additional justification for any questions on matters that are commonly considered private.

The questionnaires do not contain questions related to matters that are commonly considered sensitive or private. The questions focus on demographic information and drivers' opinions of vehicle technology. However, individuals will be screened for certain medical conditions. This information is only used for screening purposes and will not be analyzed or kept. This exclusion criterion is needed to reduce the liability and potential crashes of the research vehicles. VTTI will provide each participant with an informed consent form.

12. Provide estimates of the hour burden of the collection of information on the respondents.

The study approach consists of an on road tests to collect objective and subjective data. A total of 48 drivers from two age groups will be recruited to participate in the study, 24 young drivers; and 24 middle-aged drivers.

The study sample will have equal numbers of male and female drivers from each age group. Table 1 shows the estimated burden hours for 100 respondents, to the Eligibility questionnaire. It is estimated that 100 responses will be needed in order to identify 60 eligible participants. Table 1 also shows the estimated burden hours for 60 respondents to the remaining instruments. It is estimated that of the 60 eligible participants, 12 will be lost due to ineligibility or participant drop out. For example, a participant could arrive for a study visit but not pass a basic vision test, and would be ineligible. A total of 48 eligible participants will complete the on-road portion of the study, and then the Informed consent process. Total costs were calculated using a value of \$25.53, the mean hourly rate for all occupations in Virginia according to the most recently published data.

Table 1: Estimated Burden Hours

Instrument	Number of Respondents^c	Frequency of Responses	Number of Questions	Estimated Individual Burden	Total Estimated Burden Hours	Total Annualize Cost to respondents^d
Eligibility questionnaire	100	1	15	10 minutes	17 hours	\$ 434.01
Demographic questionnaire	60	1	8	3 minutes	3 hours	\$ 76.59
Information sheet	60	1	1	10 minutes	10 hours	\$ 255.30
On-Road Observation	48	1	N/A	70	56 hours	\$ 1429.68

^c The number of respondents in this table includes attrition due to participant ineligibility and drop-out.

^d Estimated based on the mean hourly rate for Virginia (all occupations) is \$25.53 as reported in the May 2016 Occupational Employment and Wage Estimates, Bureau of Labor Statistics. http://www.bls.gov/oes/current/oes_va.htm

Portion				minutes		
Informed consent	48	1	1	5 minutes total	5 Hours	\$ 127.65
TOTAL					91 hours	\$ 2323.23

13. Provide estimates of the total annual cost to respondents or record keepers resulting from the collection of information. (Do not include the cost of any hour burden shown in Question 12 or 14).

There are no additional costs to respondents or record keepers.

14. Provide estimates of annualized cost to the Federal government.

Update with new info

Costs incurred by the Federal Government are limited to the payment to test participants for time spent responding to the eligibility, demographic, consent form, and informational form. As indicated in Question #12, the total time spent responding to questions is estimated to be 45 hours. As stated in Question #9, test participants will be monetarily compensated for time spent participating in the research. Forty-five (45) hours at a pay rate of \$24.08 gives a total cost of \$1083.60. The overall cost to the government for collecting the HUD information is \$304,424.00.

15. Explain the reasons for any program changes or adjustments reported in Items 13 or 14 of the OMB Form 83-I.

This is a new data collection request to determine if there are safety risks to in-vehicle head-up displays. This new collection results in a program change of adding an additional 91 hours to NHTSA's overall burden hour total.

16. For collections of information whose results will be published, outline plans for tabulation and publication.

Personal information will not be published. An exact publication date has not been established but would occur no sooner than 2016. Findings will not be linked to any individuals.

17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons that the display would be inappropriate.

NHTSA and VTTI are not seeking such approval.

18. Explain each exception to the certification statement identified in Item 19, "Certification for Paperwork Reduction Act Submission," of OMB Form 83-I.

There are no exceptions.