

DEPARTMENT OF TRANSPORTATION

**1 INFORMATION COLLECTION
SUPPORTING STATEMENT**

Title: Head-Up Displays and Distraction Potential

Part B. Justification

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

No statistical methods will be used in selecting test participants.

Eligibility requirements are as follows:

1. Must hold and be able to present a valid U.S. driver's license at time of participation and must be an experienced driver (at least 2 years).
2. Must be in one of the established age groups.
3. Must be a U.S. citizen or permanent resident (green card holder)
4. Must be willing to provide SSN or VT ID number for payment.
5. Must be able to drive an automatic transmission without special equipment.
6. Must currently drive at least 3 times a week.
7. Must not have participated in a similar study (one using a surprise event or deception).
8. Must not have more than two driving violations in the past 3 years.
9. Must not have caused an injurious accident in the past three years.
10. Health Questions:
 - a. Cannot have a history of neck or back conditions which still limit their ability to participate in certain activities.
 - b. Cannot have a history of brain damage from stroke, tumor, head injury, recent concussion, or disease or infection of the brain
 - c. Cannot have a current heart condition which limits their ability to participate in certain activities
 - d. Cannot have current uncontrolled respiratory disorders or disorders requiring oxygen
 - e. Cannot have had epileptic seizures or lapses of consciousness within the last 12 months
 - f. Cannot have chronic migraines or tension headaches (no more than one per month during the past 12 months).
 - g. Cannot have current problems with motion sickness, inner ear problems, dizziness, vertigo, or balance problems
 - h. 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)

- i. Must not have had any major surgery within the past 6 months (including eye procedures).
 - j. Cannot have advanced osteoporosis (softening or weakening of the bones)
 - k. Cannot currently be taking any substances that may interfere with driving ability (cause drowsiness or impair motor abilities)
11. If pregnant, encourage them to speak with their doctor first.
 12. Must have normal (or corrected-to-normal) hearing and vision.
 13. Must be able to drive without sunglasses or lenses that darken in the sunlight.
 14. Must be able to read, write and speak English well.
 15. Must not be involved/employed in the design, engineering, or development of automotive-related technologies.

Test Participant Impartiality. Test participants should be impartial with regard to the testing. To ensure fairness, test participants should not have any direct interest, financial or otherwise, in whether any of the devices being tested meets or does not meet the acceptance criteria.

Mix of Ages in Each 24-Participant Sample.

Participants will be recruited from two different age groups (20–35 years old & 50–65 years old) with an equal gender balance as summarized in Table 1. There are a total of 48 participants.

Table 1. Participant Target Sample.

| | Gender | |
|--|--------|------|
| | Female | Male |
| Younger Drivers (20 - 35 years old) | n=12 | n=12 |
| Older Drivers (50 - 65 years old) | n=12 | n=12 |

The participants will be selected through convenience sampling method. Recruitment advertisements will be posted online (e.g., craigslist) and flyers will be circulated on public sites in Montgomery County, Virginia, such as college campuses, coffee shops, restaurants/fast food establishments, and sports venues.

Information collected pertaining to the above criteria will be solely used to assess individuals' suitability for study participation and will be obtained using a standard set of demographic,

driving behavior, and general health questions developed by NHTSA through an ongoing process.

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.

No such statistical methods will be employed.

3. Describe methods to maximize response rate.

Members of the public will be invited to participate in the research study through web-based and print newspaper advertisements. Test participants will be monetarily compensated at an hourly rate corresponding to a civilian, non-professional federal government employee in the locality in which the study is conducted. Monetary compensation is consistent with normal experimental practice and should encourage study participation. The experiment was designed to collect both subjective and objective data on how participants interact with and are affected by Head-Up Display (HUD) technology when driving on public real roads and in a test track scenario. A total of 48 drivers will be recruited for participation in the study.

This sample size exceeds the minimum sample size based on a priori power analyses ($\alpha = .05$, power = .8; estimated reaction time difference 0.5 seconds, SD = 0.3 seconds) using best estimates of response differences.

4. Describe tests of procedures or methods.

Questionnaire responses will be initially collected on paper. Data processing will consist of tabulation of quantitative and coded open-ended responses. Data analysis will be conducted by NHTSA's contractors, VTTI. Since individual differences may not be randomly distributed across conditions, VTTI plans to use non-parametric statistics and descriptive statistics to test observed effects between different display technologies. Summary statistics will be analyzed to determine whether or not significant differences exist between the rating evaluations of different display technologies based on reported acceptance, satisfaction, and self-reported distraction. Open-ended responses will also be analyzed to add context to the evaluations participants have provided and can help in assessing the display features.

All 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 IC 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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