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Visual-Manual Driver Distraction Guidelines

Test Procedures – Task Acceptance Testing

Occlusion and Eye Glance Measurement Using Driving Simulator Testing

TEST PROCEDURES – TASK ACCEPTANCE TESTING

Occlusion Testing

Test Procedures for Guidelines for Reducing Visual-Manual Driver Distraction During Interactions With Integrated, In-Vehicle, Electronic Devices, Version 1.01

This document presents the test procedure for NHTSA Driver Distraction Guidelines task acceptance conformance testing using the "Occlusion Testing" method. Occlusion testing involves the use of electronic, shuttered glasses that approximate the experience of a driver looking back and forth between the forward roadway and an in-vehicle display by alternating between timed intervals that block and permit viewing of the in-vehicle display. While performing in-vehicle tasks, intermittent viewing of the task's electronic device interface is accomplished using these shuttered glasses. Task-conformance testing may also be accomplished using the "Eye Glance Measurement Using Driving Simulator Testing" method, described in a companion test procedure document.

A. Definitions

1. Testable Task means a pre-defined sequence of interactions performed using a specific method leading to a goal toward which a driver will normally persist until the goal is reached. A testable task begins with the device at a previously defined start state and proceeds, if successfully completed, until the device attains a previously defined end state. It is called a testable task because it is a completely defined secondary task that can be tested for adherence with these guidelines.

Additional definitions are listed in Driver Distraction Guidelines Section IV.

B. Occlusion Apparatus Description

The occlusion test apparatus should include the following:

1. The occlusion apparatus (typically modified eyeglasses with variable-transmittance lenses) should control the test participants' vision by alternating between viewing (or vision) intervals during which the lenses are transparent and occlusion intervals during which the lenses are opaque.
2. The occlusion apparatus should be electronically controlled.
3. During the occlusion interval, neither the electronic device interface displays nor the device controls should be visible to a test participant.
4. The switching process between the viewing interval and the occlusion interval should occur in less than 20 milliseconds and vice versa.
5. The viewing interval (shutter open time) should be 1.5 seconds followed by a 1.5-second occlusion interval (shutter closed time). The sequence of viewing intervals followed by occlusion intervals should occur automatically without interruption until the task is completed or the trial is terminated.

C. Occlusion Test Protocol

Testing is performed in accordance with International Standard ISO 16673:2007(E), "Road vehicles – Ergonomic aspects of transport information and control systems – Occlusion method to assess visual demand due to the use of in-vehicle systems," with the exceptions noted below. The following steps shall be performed for each of 24 test participants.

1. Electronic Device Facilitating Secondary Tasks. The electronic device under evaluation should be operational and fitted to a vehicle, driving simulator, or vehicle mock-up in a design that duplicates the intended size and location of the interface in the vehicle (i.e., the viewing angle and control placement relationships should be maintained).
2. Test Participants. Twenty-four test participants should be enrolled using the criteria described in the Driver Distraction Guidelines (balanced gender, four age groups; see Appendix A).
    a. This differs from ISO 16673, which states that at least 10 participants are to be tested; the NHTSA Driver Distraction Guidelines recommend that 24 participants be tested.
3. Training. Each test participant should be given training on the use of the occlusion goggles, performance of each testable task, and performance of each testable task while using the occlusion apparatus (see Section D below).
4. Practice. Each test participant should practice each testable task and use of the occlusion apparatus as many times as needed until he or she becomes comfortable performing the task and using the occlusion apparatus.
    a. This differs from ISO 16673, which states that each test participant should be given at least two and up to five practice trials for each testable task.
5. Test Stimuli. Different task stimuli (addresses, phone numbers, etc.) should be used for each instance (trial) of a testable task for a test participant. Task stimuli should be provided to a test participant immediately prior to the beginning of each trial. Procedures for selecting tasks are presented in Appendix C.
6. Procedure. Testing starts when a test participant informs the experimenter that he or she is ready to begin the trial. The experimenter then explains the task instructions. The task-instruction interval is immediately followed by the alternating sequence of viewing and occlusion intervals, which begins with a single 5-second occluded interval. Task stimuli to be entered during the upcoming trial are given to the test participant as part of the task instruction interval.
    a. ISO 1673 states that timing starts at the end of the task instruction and that the participant's vision shall be occluded immediately before task performance and task timing begin.
    b. The training recommendations (section D.1 below) indicate that the interface controls and displays should be visible during the task-instruction interval.
    c. To accommodate these requirements, we give the instruction and stimulus material to the participant with the occlusion goggles unoccluded so the participant can hear and read the stimulus material and see the interface controls and displays during the instructions. After the instructions are given, the glasses are then occluded for a fixed interval (we use 5 seconds) ending with an audible command to "Begin." Timing begins after the audible command with the onset

of the next unoccluded interval, which is the first viewing interval during which task performance is permitted.

d. After the "Begin" command, operation of the device controls by a test participant should be permitted during the occlusion intervals.

7. Timing. The timing ends when a test participant completes the trial and says he or she is "done" (or other standardized word). The experimenter stops the occlusion apparatus operation at this time.
8. There should be an automatic means of recording the elapsed time or the number of viewing intervals a test participant needed to complete the task.
9. Each test participant performs each testable task five times to provide the data necessary to determine whether that task meets the acceptance criterion.

D. Test Participant Training Recommendations

This section provides specific details concerning training.

1. Test instructions should be standardized and read to the participant. The display and controls of the system interface used for secondary-task performance should be visible during task instruction. An instruction may be repeated at the request of a test participant.
2. Test participants should be given specific detailed instructions and allowed to practice performing each testable task of interest on each device being studied. A test participant should practice a task as many times as needed until he or she becomes comfortable in performing the task.
3. The participant should become familiar with the occlusion apparatus operation while performing a visual-manual task that resembles -- but is not identical to -- a specific testable task.
4. Test participants should practice each testable task on each device of interest without using the occlusion goggles and then while using the occlusion goggles.

E. Example Test Material and Training/Instruction Scripts

For the occlusion test protocol, the Experimenter Sheet and Checklist Template are presented below. They provide a time-ordered series of interactions between experimenters and participants to successfully train a participant and complete the main occlusion trials for a given set of tasks.

The following table contains a template for an experimenter sheet and checklist, providing pertinent information such as steps for completing the Informed Consent Form (ICF) and instruction material, and the secondary task stimuli files to load for each trial, as well as, providing indicators for the training and practice material that need to be accomplished before attempting each of the main trials. The experimenter sheet also provides fields for the experimenter to document information occurring during a trial.

Informed Consent Form, Occlusion Protocol

Informed consent is the process by which participants learn about the study to make an informed decision about whether to agree to participate. The ICF presents the essential details of the test protocol including the participant's rights and responsibilities, as well as the risks associated with

participation. The ICF is given to the participant to read and sign at arrival at the test facility. An example of an ICF for an occlusion protocol is given in Appendix B.

Experimenter Sheet / Checklist Template, Occlusion Protocol

Task Type	Training Description	Complete	Notes
Informed Consent Form	*Make sure Participant ICF is completed.*		
Occlusion Training	*Read Occlusion Protocol*. Demonstrate occlusion goggles by running a generic practice task with the goggles on.		
Secondary Task Overview	Read *Secondary Task Instructions*.		
Experimenter Sheet	Use Experimenter Sheet to determine In-Vehicle (Secondary) Task Main Trial Order.		
Breaks	Take breaks when most appropriate, after a block of trials.		
First Main Task	Follow Experimenter Sheet: unoccluded training, practice with occlusion, main trials with occlusion		
Nth Main Task	Follow Experimenter Sheet: unoccluded training, practice with occlusion, main trials with occlusion		
Trial Checks: Refresh vehicle's accessory power before each set of main trials (car shuts off after x time). Data collection system logging during trials? Start and stop individual tasks/trials.			

Study Info Here										
First Name: **Date:** **Filename / Info:**					**Tracking Number of Stimuli Completed**					
Trial	**Goggles**	**2ndary Task**	**2ndary Input File**	**Video File**	**1**	**2**	**3**	**4**	**5**	**Trial Notes**
T1	No									
P1	Yes									
M1	**Yes**									
T2	No									
P2	Yes									
M2	**Yes**									
T*	No									
P*	Yes									
M*	**Yes**									
Post-Brief: Pay participants (payment, receipt), make sure they have copy of Informed Consent Form.										

Occlusion Protocol, Procedures, and Instructions

An occlusion protocol training script is presented below. The experimenter reads it to the participant to explain the occlusion equipment and the sequence of secondary-task training and testing. This is followed by a generic script for a basic radio-tuning task, to show the flow from occlusion task overview procedures to a first secondary task (a testable task). For each secondary task, the participant would first be trained on the task in a "no occlusion" setting (including practice), and then practice the task with occlusion implemented, and then perform the main trials for that task. Refer to the latest version of the Driver Distraction Guidelines for guidance on the number of main trials to be completed for each testable task.

All tasks are first explained and then demonstrated by the experimenter. The experimenter sits next to the participant and offers assistance, showing the steps, and providing other task details. The experimenter moves to the next step only if the experimenter is certain the participant understands the task. Following the demonstration, the participant attempts the task while the experimenter gives detailed instructions and assistance if necessary. The participant can make as many attempts as necessary until the participant feels comfortable performing the task. After the initial training, the participant should feel comfortable doing the tasks, but might not remember the exact sequence of the steps.

For any practice and training, participants should be offered the opportunity to practice the given task as many times as needed until they have become comfortable in performing the task and using the occlusion apparatus. Participants can ask for repeats of both instructions and practice trials. See current applicable Driver Distraction Guidelines for clarification of any specific practice and training requirements.

Occlusion Protocol and Secondary Task Instructions Scripts

<u>OCCLUSION PROTOCOL</u>

> *The occlusion procedure simulates the visual demands of driving in a stationary setting.*
>
> *While sitting in this vehicle, you will be asked to perform a series of tasks, which we call "In-Vehicle Tasks." While performing these in-vehicle tasks, you will wear a set of glasses with lenses that can be made to be either transparent or opaque. When they are transparent, you will be able to see normally and be able to see the in-vehicle task controls and displays. However, when they are opaque, you will not be able to see through them and not be able to see the task controls and displays, but you may continue to work on the task if you are able. The opaque condition is intended to simulate the time during which you would need to look at the roadway ahead to maintain vehicle control in driving.*
>
> *At the beginning of each trial, after you tell me that you are ready to begin, the task stimulus will be presented auditorily and be displayed on the computer screen located to the right of the center console, for your use in case you forget. We call this the Task Screen. Once the task stimulus is presented, the glasses will become opaque for several*

seconds, during which time you will hear the word "Begin." At this time, the glasses will become transparent, and you should immediately begin working quickly and accurately to complete the secondary task. When you have completed the task, you should say "DONE" aloud. This is the end of the trial and you should wait for instructions to begin the next trial.

I want to say a few words about errors. Mistakes are inevitable. If you make a mistake while performing a secondary task, please try to correct the error before moving on. We will provide specific information about how to recover from errors for each in-vehicle task. It is important that you try to complete each task.

You will complete 5 main trials of each task, preceded by training and practice. To demonstrate the occlusion procedure, we will use a simple visual search task, called the "Circles" task [note: there is no specific reason to use this task, researchers just need a task unrelated to the testable task for getting used to the goggles]. *In this task, you will look at a series of displays presented one at a time on the small computer screen. Each display is a pattern of circles. One circle will be slightly larger than the others. The larger circle is called the target circle. Your task is to find the target circle and move a (virtual) vertical bar so that it covers the target circle. You will use the keypad to perform the task.*

When the display first appears, there will be no vertical bar. When you press the left or right arrow key on the keypad, the vertical bar will appear near the center of the screen. You will use the left and right arrows to move the vertical bar. When the target circle is covered by the vertical bar, press the up arrow. This will record your response and present the next set of circles.

[Run visual search task practice file.]
Do you have any questions or need a repeat of any instructions before we train you on the first task?

SECONDARY TASK INSTRUCTIONS (RADIO TUNING, OCCLUSION PROTOCOL)

In this task, you will use the touch screen and tuning controls below the center console to tune the radio to a designated frequency. During the trial, you will select several different radio frequencies, one at a time. The bands (AM or FM) and frequencies will be presented auditorily and will be visible on the Task Screen.

At the beginning of each radio-tuning task, you will hear the band (AM or FM) and the frequency. This will be followed by the word "Begin." When you hear "Begin," you should work quickly and accurately to complete the task. If you forget the band or frequency, you can look at the Task Screen. The information will be displayed there.

To select the radio station, first, press the AM or FM button located to the left on the touch screen. The current band will be highlighted in red. If you select the wrong band, press the correct button for the appropriate band. The current frequency will be shown in large font on the console screen. Use the tuning controls located below the screen (Tune

+ and Tune -) to adjust the frequency. When you have reached the specified frequency, say "DONE" aloud to indicate that you have completed the radio tuning task.

If you select the wrong band or frequency, try to fix it before saying "DONE." If you notice an error but have already said "DONE," you do not need to try to fix it. The task is considered complete when you say "DONE." Do you have any questions or need a repeat of any instructions before we practice this task?

Trial Data Collection, Main Tasks, Testable Tasks

After the secondary task instructions above have been completed, the experimenter is ready to commence with the trials specified on the experimenter sheet, starting with training and practice trials, followed by the main trial of the testable task.

F. Occlusion Test Trial Validation and Acceptance Criterion

1. Per ISO 16673:2007, invalid trials are removed. One option to identify extreme outliers presented therein recommends eliminating trials based on a comparison of the total task time occluded and total task time unoccluded. Because the current procedure does not include trials necessary to obtain data for computing the total task time unoccluded, this method of identifying and removing outliers cannot be used. Extreme outliers can be identified using the full distribution of total task time occluded from all trials, which is obtained in this procedure. To the extent that such identification is consistent with the intention of the option described in the ISO Standard, it can be used to remove trials. Otherwise, individual trials are considered invalid and should be removed if:
    - A test participant refuses to complete a trial,
    - A test participant says he or she is done with a trial but is not,
    - The experimenter judges that the participant cannot successfully complete a trial,
    - The experimenter judges that the participant is not genuinely attempting to perform the protocol and related tasks as instructed, or
    - A task-performance error is made by the test participant. The handling of task-performance errors is discussed in Subsection VI.H of the Driver Distraction Guidelines.
2. Per ISO 16673:2007, the mean Total Shutter Open Time (TSOT) for each test participant is calculated.
3. Acceptance Criterion. A task should be locked out for performance by drivers while driving unless the mean TSOT calculated above is 12.0 seconds or less for at least 21 of the 24 test participants.
4. Multiple Testable Task Testing. To improve testing efficiency, multiple (different) testable tasks may be performed by the same test participant during one or more sessions. There is no limit to the number of testable tasks that may be evaluated by a test participant. However, including multiple tasks in a single session may lead to performance degradation due to test-participant fatigue or confusion. Accordingly, shorter test sessions are preferable and sessions should generally not last longer than 4 hours. Additionally, to ensure that the testing of each task reflects the

demands of that task alone, all instructions, practice and testing for a single task should be completed before beginning a new task.

G. Task Performance Errors During Testing

1. "Error-Free" Performance During Testing. During testing, only data from "error-free" test trials (as defined in section IV.B.5 and IV.B.6 of the Driver Distraction Guidelines) performed by test participants should be used for determining whether a task is suitable for performance while driving.
2. An error means that a test participant has made an incorrect input when performing a requested task during a test trial. An error has occurred if the test participant must backtrack during performance of the task or delete already entered inputs. If the device can accommodate an incorrect entry without requiring backtracking and extra inputs beyond those necessary to reach the desired end state of the task, then no error is deemed to have occurred.
3. For occlusion testing, when an error is made, data from that trial should not be used to compute a test participant's mean TSOT to determine task acceptability for performance while driving. This data should be retained for the determination as to whether a task was unreasonably difficult.
    a. If a test participant makes errors on two or fewer of their five trials, then their average TSOT can still be computed and used to determine task acceptability for performance while driving.
    b. If a test participant makes errors on three or more of their five trials, then none of his or her data should be used to determine task acceptability (but all of it retained to determine whether a task was unreasonably difficult). In this situation, an additional test participant in the correct demographic group should be added.
    c. Testing should continue until 24 test participants have completed the task with two or fewer errors (or until four test participants do not meet the acceptance criteria).
4. Unreasonably Difficult Tasks. A record should be kept during testing as to whether one or more errors occurred during each test trial. If errors occur during more than 50 percent of all test trials, using combined data from all participants, including those who were replaced, then that task is deemed an "unreasonably difficult task" for performance by a driver while driving. Unreasonably difficult tasks are not recommended for performance while driving and should be locked out.

H. Task Conformance Determination Method

Task conformance on each criterion shall be determined separately for each participant for the single Guidelines acceptance criterion. The determination shall be based on the data aggregated over the successful task instances for each testable task.

A. TSOT $\leq$ 12.0 seconds

Each participant shall have completed at least three successful task instances. For each task instance, the TSOT will be computed either as the sum of all time from viewing intervals between the beginning and end of the task or as the total number of viewing intervals required

for task performance multiplied by 1.5 seconds. The mean TSOT for each participant shall be computed using the TSOT values from each of the 3-5 successful trials. If the mean TSOT value is less than or equal to 12.0 seconds, the participant has attained task conformance. If this mean TSOT value is greater than 12.0 seconds, the outcome for this participant is non-conformance. This computation shall be made for each of the 24 participants. The results for each participant shall be used together with the guidelines acceptance specification, which indicates that a task should be locked out for performance by drivers while driving unless the mean TSOT is 12.0 seconds or less for at least 21 of 24 test participants.

Appendix A. Test Participant Recruitment Procedures

Participant Recruitment Procedures for Guidelines for Reducing Visual-Manual Driver Distraction During Interactions With Integrated, In-Vehicle, Electronic Devices, Version 1.01

This document describes test participant recruitment procedures associated with testing of secondary task conformance to NHTSA's Guidelines for Reducing Visual-Manual Driver Distraction During Interactions With Integrated, In-Vehicle, Electronic Devices, Version 1.01.

A. Test Participant Recommendations

1. These test participant recommendations apply to both Eye Glance Measurement Using Driving Simulator Testing and Occlusion Testing. Each test method requires data collection from a sample of 24 test participants.
2. General Criteria. Each test participant should meet the following general criteria:
   a. Be in good general health,
   b. Be an active driver with a valid driver's license,
   c. Drive a minimum of 3,000 miles per year,
   d. Have experience using a cell phone while driving,
   e. Be unfamiliar with the devices being tested.
3. 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.
   a. NHTSA will not use any vehicle manufacturer employees in its guidelines monitoring testing.
   b. NHTSA considers it acceptable for vehicle manufacturers to test their own employees if the employees are unfamiliar with the product being tested.
4. Mix of Ages in Each Test Participant Sample. Out of each group of 24 test participants used for testing a particular in-vehicle device task, there should be:
   a. Six test participants 18 to 24 years old,
   b. Six test participants 25 to 39 years old,
   c. Six test participants 40 to 54 years old, and
   d. Six test participants 55 or older.
5. Even Mix of Genders in Each Test Participant Sample. Each sample of 24 test participants used for testing a particular in-vehicle device task, should contain:
   a. Twelve men and 12 women overall, and
   b. An equal balance of men and women in each of the age ranges 18 to 24, 25 to , 40 to 54, and 55 and older.

Eligibility criteria: To be eligible for participation in guidelines task-conformance testing, an individual must meet the criteria stated in points 2 through 5 above. First, there are general criteria to be met including impartiality. In addition, each group of 24 test participants must meet an even mix of age and gender as described above and shown in the following checklist.

Sample Recruitment Checklist to Balance Age & Gender, 24 Participants				
Age Groups	**18 to 24**	**25 to 39**	**40 to 54**	**55 & older**
24 Participants	6	6	6	6
12 Males	1	7	13	19
	2	8	14	20
	3	9	15	21
12 Females	4	10	16	22
	5	11	17	23
	6	12	18	24

In addition to these basic criteria, applicants should be screened for other test eligibility criteria using standardized recruitment material and a standardized recruitment process.

Recruitment material: Advertisements may be published in local newspapers, in online ads, and on posted flyers to recruit participants. These advertisements should include the basic eligibility criteria along with a brief description of the test protocol. Advertisements are the first step in the recruitment process; they are intended to attract interested candidates and direct them to a website or phone number for screening. An example advertisement is presented below.

Recruitment process: Following the prospective participant's response to advertising, the recruitment process consists of three steps, including: (1) initial screening questions to determine if the basic eligibility requirements described above have been met; (2) a follow-up set of eligibility questions covering the topics of health and availability for those who have met the basic eligibility criteria; and (3) a scheduling step to make arrangements with those who have met the criteria and have been selected for participation. Recruitment steps 1 and 2 are implemented by directing interested candidates either to complete an automated online survey or to complete the screening questions verbally via phone. Initial questions (Step/Part 1) cover basic eligibility criteria; follow-up questions (Step/Part 2) cover more detailed questions, including health-related topics related to the specific study requirements. They also determine specific availability in preparation for scheduling. An example list of test participant recruitment screening questions is presented below.

Introductory Study Description Used for Recruitment

Advertisement:

Receive $xx.xx per hour, plus mileage allowance, for approximately x hours of participation
We are seeking participants for a laboratory test study of driving performance
The study will be conducted by:
Insert Organization Name for *Insert Organization Name*
Insert Address Information
Weekday Sessions

MUST BE:
Licensed driver 18 to 70 years old
Good general health
3,000+ miles driven per year
Cell phone user while driving

PLEASE CALL: 7 a.m. – 5 p.m. weekdays
[Contact name] *Insert Phone Number*
OR REPLY ONLINE: *Insert Website*
OR E-MAIL: *Insert E-mail Address*

Study Description (to appear on website):

The *Insert Organization Name* is conducting a research study for the *Insert Organization Name*. The study will assess the potential for distraction associated with specific tasks performed with the in-vehicle information system in a specified vehicle. The assessment will involve use of a task-conformance test protocol developed by the National Highway Traffic Safety Administration as part of its Driver Distraction Guidelines. Participation involves one session of approximately x hours. Participants will *drive a driving simulator or wear glasses that can be transparent or opaque* and perform in-vehicle tasks like tuning a radio. If selected, you will be required to come to a laboratory facility located *Insert Location*. Participants will receive $xx.xx per hour for participating in the study. Participants will receive a monetary travel allowance for mileage to and from our facility.

Example Participant Recruitment Screening Forms/Questions

Phone Screen or Internet Introduction Material	
Introduction	Thanks for expressing interest in participating in our study.
Research Study Purpose	The study is being conducted by *Insert Organization Name* to assess the potential for distraction associated with specific tasks performed with the in-vehicle information system in a specified vehicle. The assessment will involve use of a task-conformance test protocol developed by the National Highway Traffic Safety Administration as part of its Driver Distraction Guidelines.
Purpose of Screening	The objective is to *(by phone or internet)* describe the study and gather information that can be used by the principal investigator to determine if you qualify for participation. This *call or internet survey* will take about 10 minutes.
Participation Commitment	Participants will (*drive a driving simulator or wear occlusion goggles*) and perform in-vehicle tasks like tuning a radio. Participation involves one session of approximately *x* hours. If selected, you will be required to come to a laboratory facility located at *Organization Name, Address*.
Participation Compensation	If selected, you will receive $*xx.xx* per hour for participating in the study. You will also receive a travel allowance for mileage to and from your home to our facility.
Information Being Requested & Confidentiality	I would now like to ask you a series of questions to determine your eligibility. Questions will cover: (1) personal information, (2) driving experience, (3) wireless phone usage, and (4) medical history. Note that we will not release any personal identifying information that you provide. The information gathered will be kept confidential and be stored in a password protected database. Responses to health-related questions will be maintained separately from your personal information and will be deleted at the end of the study. You do not have to answer any question that you do not want to answer and you may end this survey at any time.

Part 1. Initial Screening Questions: Contact Information and Questions for Determining Initial Eligibility (Internet or Phone Interview)	
NAME (first, last)	
GENDER (M/F)	
AGE (office note: must be 18 to 70 years old to participate)	
Have you participated in a previous research study with us? If yes, what year?	
How did you hear about our study? Which newspaper or online ad?	
Do you have a valid U.S. driver's license? (Y/N)	
Are there any restrictions on that license? (Y/N)	
Are you able to drive without the use of assistive devices? (Y/N)	
How many miles do you drive per year?	
What kind of vehicle do you normally drive (year, make, and model)?	
PHONE – daytime:	
E-mail Address:	
Home Address: Street Address:	Apartment No:
City:	State:
ZIP Code:	
Screening process ends here if: (1) age outside range, (2) driver's license not valid, (3) license restrictions other than corrective eyewear, (4) miles driven per year less than 3,000 miles.	

Part 2. Secondary Questions for Determining Eligibility and Availability (Internet or Phone Interview)
Do you wear prescription eye glasses or contacts while driving? (Y/N)
Do you require reading glasses to use a cell phone while driving? (Y/N)
How comfortable (on a scale of 0 to 10, with 0 being least comfortable) are you at multi-tasking while driving (e.g., eating, drinking, changing radio stations, talking on a cell phone, talking with passengers)?
Do you use a cellular phone while driving? (Y/N)
Do you regularly communicate using text messages (not during driving)? (Y/N)
Do you use a navigation system, computer, or any other similar devices in your car? (Y/N)
Do you have any health problems that affect driving? (Y/N) (If yes, please describe.)
Do you have high blood pressure that is not controlled by medicine? (Y/N)
Do you have a history of seizures or epilepsy? (Y/N)
Are you susceptible to motion sickness? (Y/N)
Do you have any difficulty hearing and understanding normal conversation? (Y/N)
Do you have any inner ear, dizziness, vertigo, or balance problems? (Y/N)
Do you have diabetes for which insulin is required? (Y/N)
Have you ever had a concussion, brain injury, or other injury resulting in decreased motor control or cognitive ability? (Y/N) (If yes, please describe.)
Are you taking any medications (over-the-counter or prescription) that may cause drowsiness or impact your driving ability? (Y/N)
Do you currently have any medical condition that might affect your ability to concentrate while driving, such as attention deficit hyperactivity disorder (ADHD), depression, anxiety, or claustrophobia? (Y/N) (If yes, please describe.)
Please indicate which days of the week you are available to participate in this study.
Are you available on short notice to participate in our study? Could we call you on the same day to schedule if necessary?
Can we use your e-mail address to help with scheduling? (Y/N)
Can we use text messaging to help with scheduling? (Y/N) If yes, obtain cell phone number: _____
How long would you like to be considered for this study?

Part 3. ***Phone Conversation for SCHEDULING PARTICIPANTS***
The principal investigator or a designated associate will determine which respondents are selected for participation.
Date Scheduled:
Hi, this is *Insert First Name* from *Insert Organization Name*. This is a call back to notify you that you have been selected to participate in our study. I have one additional question and then I would like to schedule a test session.
Since your initial screening, have you begun taking any over-the-counter medications or experienced any other issues that might affect driving? (Y/N)
I would like to schedule an appointment with you at this time. The first available openings are: _____ (calendar of events needed w/ date and time frame up to x hours - try to use previous call input for choices, before calling). Do any of those dates and times work for you? (If YES, schedule. If NO, then offer next available set of times, perhaps by week, until scheduled. If no good dates, find a time when best for them and say we will see what we can do and call back later.)
(Appointment Confirmation) Ok. I have you scheduled for *Insert Date and Time*. Please try to arrive promptly.
Please be sure to bring your valid, U.S. driver's license to the appointment for identification purposes. Dress comfortably for driving and weather conditions and wear comfortable driving shoes. Do not bring another guest with you, unless prior arrangements have been made with us.
The session will last between *x* and *y* hours. You will have one or more short breaks, during which you can *purchase food and soft drinks from vending machines in our lunchroom*, if needed.
Note that your personal wireless devices must be turned off while you are participating in this study. Cameras, firearms, and alcoholic beverages are not permitted at the data collection facility.
If your hair hangs in your face, you will be asked to pull it back out of the way so that we can see where you are looking during the experiment.
Please refrain from drinking alcohol or taking non-prescription drugs for at least the 24 hours preceding the session.
Do you understand these requirements? (Record "Yes" or "No")
DIRECTIONS: We will send a map link to you using the e-mail address you provided.
Do you have any questions at this time?
If you have any questions before your scheduled date, please feel free to call me at *Phone Number*. If you need to contact us on the day of your scheduled appointment, please call *xxx-xxx-xxxx*. Or you can send a text message to this number: *XXX-XXX-XXXX*.
If something comes up and you need to cancel or reschedule your appointment, please try to call at least 24 hours in advance. Otherwise, we look forward to seeing you on *Insert Date* at *Time*.

Appendix B. Example Occlusion Testing Participant Informed Consent Form

OVERVIEW

You are being asked to participate in a research study. Your participation in this research is strictly voluntary, meaning that you may or may not choose to take part. To decide whether you want to be part of this research, the risks and possible benefits of this study are described in this form so that you can make an informed decision. This process is known as informed consent. This consent form describes the purpose, procedures, possible benefits and risks of the study. This form also explains how your information will be used and who may see it.

The study investigator or study staff will answer any questions you may have about this form or about the study. Please read this document carefully and do not hesitate to ask anything about this information. This form may contain words that you do not understand. Please ask the study investigator or study staff to explain the words or information that you do not understand. After reading the consent form, if you would like to participate, you will be asked to sign this form. You will be offered a copy of the form to take home and keep for your records.

PURPOSE

This research study is being conducted by the *Insert Name*. The purpose of this study is to assess the potential for distraction associated with specific tasks performed with the in-vehicle information system in a specified vehicle. The assessment will involve use of a task-conformance test protocol developed by the National Highway Traffic Safety Administration as part of its Driver Distraction Guidelines.

STUDY REQUIREMENTS

You are being asked to participate in this research study because:

- You are at least 18 years old;
- You are in good general health;
- You are an active driver with a valid, unrestricted *Test Country (e.g., U.S.)* driver's license (except for restrictions concerning corrective eyeglasses and contact lenses);
- You drive at least 3,000 miles per year;
- You have experience using a wireless phone while driving; and
- You are unfamiliar with the devices being tested.

STUDY PROCEDURES

Before participating in this research study, you will be asked to read this Participant Informed Consent Form in its entirety. After all your questions have been answered, you will be asked to sign this form to show that you voluntarily consent to participate in this research study.

Your participation in this research study will consist of one session lasting approximately *x* hours. A member of the study staff will give you detailed instructions and will accompany you during your participation in this research study.

In-Vehicle Tasks:
During this session, you will be asked to perform various in-vehicle tasks that involve actions similar to those required to operate in-vehicle systems. The in-vehicle tasks will consist of tasks using the *Insert Descriptions* interface in the study vehicle.

You will be asked to perform the in-vehicle tasks while wearing visual occlusion glasses that temporarily block your vision to simulate a driver glancing at the roadway.

Visual Occlusion:
Visual occlusion is a technique used to simulate the visual demands of driving. For this technique, you will wear a set of glasses that have lenses that can be made to be either transparent or opaque. The opaque condition is intended to simulate the time during which you would need to look at the roadway ahead to maintain vehicle control while driving. The glasses are connected to a computer, which controls when the lenses change between opaque and transparent. When the glasses are transparent, you will be able to see the in-vehicle task controls and displays. When the glasses are opaque, you will not be able to see the in-vehicle task controls and displays.

Summary of Study Procedures:
The following procedures will take place at your session:

- After signing this consent form, you will get instructions and training on occlusion glasses operation and performing the in-vehicle tasks. You will also be able to practice before performing test trials.
- You will then complete *x* sets of trials, including approximately *x* occlusion trials, each lasting from *x* seconds to *x* minutes.
- After completing the occlusion trials, the session will end and your participation in this research study will be complete.

NEW INFORMATION

We do not anticipate that any changes to procedures will take place during this study. However, any new information developed during the research that may affect your willingness to participate will be given to you.

RISKS of STUDY PARTICIPATION

Most people enjoy wearing the occlusion glasses and do not experience any discomfort. If you ask to stop because of discomfort, you will be allowed to stop at once. You will be asked to sit and rest before leaving. There is no evidence that driving ability is hampered in any way; therefore, if you show minimal or no signs of discomfort after stopping, you should be able to drive home. If you experience anything other than slight effects, transportation will be arranged through other means. This outcome is considered unlikely since studies using similar devices

have shown no effects in recent investigations and evidence shows that any discomfort decreases rapidly after exposure is complete.

There are no known physical or psychological risks associated with participation in this study beyond those described above.

BENEFITS OF STUDY PARTICIPATION

This research study will provide data on driver behavior and in-vehicle task performance that will be used by researchers to *Insert Purpose/Benefits*.

You are not expected to receive direct benefit from your participation in this research study.

ALTERNATIVES

This study is for research purposes only. Your alternative is to not participate.

CONDITIONS OF PARTICIPATION, WITHDRAWAL, AND TERMINATION

Participation in this research is voluntary. By agreeing to participate, you agree to use the research equipment in accordance with all instructions provided by the study staff. If you fail to follow instructions, or if you behave in a dangerous manner, you may be terminated from the study. You may withdraw your consent and discontinue participation in the study at any time without penalty.

COSTS TO YOU

Other than the time you contribute, there will be no costs to you.

COMPENSATION

You will receive $*xx.xx* per hour for the time you spend at the data collection facility.
If you voluntarily withdraw or are terminated from this study, you will be compensated for the number of hours that you participated in the study.

QUESTIONS

Any questions you have about the study can be answered by the principal investigator or the study staff by calling *xxx-xxx-xxxx*.

If you have any questions regarding your rights as a research participant, or if you have questions, concerns, complaints about the research, would like information, or would like to offer input, you may contact: *Insert Information*.

INFORMED CONSENT

By signing the informed consent statement contained in this document, you agree that your participation is voluntary and that the terms of this agreement have been explained to you. Also, by signing the informed consent statement, you agree to use the study equipment in accordance with all instructions provided by the study staff. You may withdraw your consent and discontinue participation in the study at any time without penalty.

Insert Organization Name will retain a signed copy of this Informed Consent Form. A copy of this form will also be offered to you.

INFORMED CONSENT STATEMENT

I certify that:

- I have a valid, *Insert Test Country of Origin* driver's license.
- All personal and vehicle information, as well as information regarding my normal daily driving habits provided by me to *Insert Organization Name* employees associated with this study during the pre-participation screening and the introductory briefing was true and accurate to the best of my knowledge.
- I have been informed about the study in which I am about to participate.
- I have been told how much time and compensation are involved.
- I have been told that the purpose of this study is to *Insert Purpose*.
- I agree to use the research equipment in accordance with all instructions provided to me by the study staff.

I have been told that:

- Part of the study will be conducted using occlusion goggles and that the risk of discomfort associated with occlusion goggles is minimal.
- My participation is voluntary and I may refuse to participate or withdraw my consent and stop taking part at any time without penalty or loss of benefits to which I may be entitled.
- I have the right to ask questions at any time and that I may contact the study investigator or the study staff at *xxx-xxx-xxxx* for information about the study and my rights.

I have been given adequate time to read this informed consent form. I hereby consent to take part in this research study.

I, _____, voluntarily consent to participate.
(*Printed Name of Participant*)

_____

Signature of Participant Date

Appendix C. Task Selection

This document describes task-selection procedures associated with task-conformance testing based on NHTSA's Guidelines for Reducing Visual-Manual Driver Distraction During Interactions With Integrated, In-Vehicle, Electronic Devices, Version 1.01.

NHTSA envisions different situations in which task-conformance testing using procedures described in NHTSA's Driver Distraction Guidelines may be performed. Generally, two classes of situations are envisioned. The first involves tests directed at specific tasks; for example, manufacturers may want to determine whether specific tasks performed using a new interface design conform to the specifications presented in NHTSA's Driver Distraction Guidelines. In this situation, the manufacturer would likely have a preselected set of testable tasks. The second anticipated situation involves testing a vehicle's interface (the in-vehicle system) as part of an overall after-market assessment of a particular vehicle. NHTSA-funded conformance testing of new vehicles is an example of this latter situation. In this situation, the test organization may not have specific tasks provided beforehand. The following recommendations relate to the latter situation in which specific tasks have not been identified for testing and the objective is to provide an overall assessment of the in-vehicle system.

A. Task-Selection Recommendations

1. These task-selection recommendations apply to both Eye Glance Measurement Using Driving Simulator Testing and Occlusion Testing. Each test method requires data collection from a sample of 24 test participants.
2. Each task selected for testing should be consistent with the scope of tasks as defined in Section II of the Driver Distraction Guidelines.
    a. Generally, Driver Distraction Guidelines testing is not applicable to tasks performed by the driver as part of the primary task of safe operation and control of the vehicle, or those involving systems required by law. Non-applicable tasks include the use of controls for operating the vehicle, tasks relating to the proper use of a driver-safety warning system, using an electronic device that relates either to a Federal Motor Vehicle Safety Standard, another U.S. law or regulation, or a State or local law or regulation.
    b. The Driver Distraction Guidelines are applicable to other driving-related tasks referred to as secondary tasks because they are not related to the primary task of safe vehicle operation and control. These tasks may relate to driver comfort, convenience, communications, entertainment, information seeking or navigation.
    c. The Driver Distraction Guidelines are applicable to human-machine interfaces of original equipment electronic devices built into the vehicle at time of manufacture even when linked with aftermarket or portable devices. For example, if a vehicle has an interface designed to operate a phone or hand-held music device, the tasks involved in controlling these devices are applicable.

d. Tasks performed using interfaces of portable devices or tasks performed with auditory-vocal commands are not covered by the Driver Distraction Guidelines.

3. Each task selected for testing should be consistent with the definition of a testable task (See Section A.1). Each task must have a defined start and end to be considered testable.

B. Task-Related Explanatory Material (from Driver Distraction Guidelines Section IV.C)

1. Testable tasks should be completely defined prior to any testing to determine whether they are suitable to perform while driving under these Driver Distraction Guidelines. The task's goal, start state, end state, specific method to be used, and inputs should all be specified.
2. For testable tasks with a variety of possible inputs of different lengths (e.g., city names for navigation systems), a typical or average length input may be used. Precise mean values need not be used and there may be some variation in length from input-to-input. For example, for the input of city names into a navigation system, lengths of 9 to 12 letters might be used.
3. For testable tasks that involve reading, nearby text unrelated to the task being performed should not be considered part of the text that is to be read during the testable task.
4. For the purposes of acceptance testing, text unrelated to the task and the labels of buttons or controls need not be included as part of the text that is read during a testable task.

C. Task Selection Procedure

1. Identify all testable tasks.
   a. Start with definitions of tasks to which NHTSA Driver Distraction Guidelines apply and those that meet the definition of a testable task (Section A, above).
   b. Many contemporary in-vehicle systems offer different paths to specific task objectives. To identify testable tasks, all paths, defined here as sequences of steps, to accomplish each specific task objective should be delineated.
2. Count the number of discrete input steps associated with each testable task
   a. Discrete input steps include each time a specific input is required or each time task performance requires obtaining specific information from an in-vehicle system display.
3. Compute an estimate of total glance time for each testable task.
   a. Assign a value of the expected glance duration for each step for each testable task. This value should represent the best estimate of the amount of glance time away from the forward roadway associated with each individual step. Based on our simulator set up, it appears that a value of approximately 1second is a good estimate of individual glance duration.

b. Multiply the number of steps for each testable task by the expected glance duration associated with one step. The product represents an estimate of the expected total off-road glance time associated with a task. This estimate is for use in categorizing tasks, not for assessing task conformance.

c. Using the estimated total glance time, assign tasks to one of three categories:
   1. Tasks with less than 9 seconds of total glance time – these tasks are likely to conform to Driver Distraction Guidelines criteria.
   2. Tasks with more than 15 seconds of total glance time – these tasks are likely not to conform to Driver Distraction Guidelines criteria.
   3. Tasks with estimated total glance times from 9 to 15 seconds – these tasks are primary candidates for testing.

D. Perform Conformance Testing

1. Start with tasks identified as primary candidates
2. Test tasks in outer categories only as necessary to verify their category assignment.
3. If category-assignment errors are frequent, consider redefining category boundaries to include more task in the candidates selected for testing.

E. Evaluate Task-Selection Procedure

1. Task-conformance test results based on either simulator or occlusion testing can be used to assess the validity of the total glance time estimates used to classify tasks and identify primary candidates for testing (Section B.3.c., above).
   a. For one or more tested tasks, divide the total glance time (from simulator testing) or TSOT (from occlusion testing) by the number of task steps (Section B.2., above). This value is a more direct estimate of the glance time associated with each task step, using test conformance data.
   b. This value can be used to categorize tasks for subsequent testing in the specific test setup that was used to obtain the total glance time values.

TEST PROCEDURES – TASK ACCEPTANCE TESTING

Eye Glance Measurement Using Driving Simulator Testing

Test Procedures for Guidelines for Reducing Visual-Manual Driver Distraction During Interactions With Integrated, In-Vehicle, Electronic Devices, Version 1.01

This document presents the test procedure for NHTSA Driver Distraction Guidelines task acceptance conformance testing using the "Eye Glance Measurement Using Driving Simulator Testing" method. Driving simulator testing involves the use of a car-following task in a driving simulator, with a method for collecting participant eye-glance characteristics while driving, car following, and performing in-vehicle tasks. Task conformance testing may also be accomplished using the Occlusion Testing method, described in a companion test procedure document.

The test procedure presented in this document differs slightly from the test specifications described in the NHTSA Driver Distraction Guidelines. After consideration of comments written in response to the Driver Distraction Guidelines, NHTSA decided that using data from multiple instances of task performance for each participant on each testable task would provide more valid estimates of the test metrics than using data from a single task instance. Accordingly, the procedures presented herein have been written to facilitate collection of data from three error-free task instances for each participant for each testable task. In addition to providing better estimates of metric values, this modification makes this procedure more consistent with the Occlusion Testing method.

A. Definitions

1. Testable Task means a pre-defined sequence of interactions performed using a specific method leading to a goal toward which a driver will normally persist until the goal is reached. A testable task begins with the device at a previously defined start state and proceeds, if successfully completed, until the device attains a previously defined end state. It is called a testable task because it is a completely defined secondary task that can be tested for adherence with these Driver Distraction Guidelines.

B. Driving Simulator Recommendations

1. A driving simulator is used for the Eye Glance Measurement Using Driving Simulator Testing option to determine whether driver performance of a testable task using an electronic device while driving produces an acceptable level of distraction. The driving simulator used for NHTSA Driver Distraction Guidelines testing should meet or exceed the following recommended specifications.
2. The driving simulator should be capable of testing using a substantial portion (the entire area that can be reached by a driver) of a full-size vehicle cab. Open cabs, partial cabs, and/or non-production cabs are acceptable for this testing if the driving simulator has a

seating and dashboard arrangement like that of an actual production vehicle so that realistic eye-glance behavior and control movements will occur. Specifically, the size, design, and location of the in-vehicle system and any related components used to perform the testable tasks in relation to the driver seated position should be the same in the driving simulator as intended in the production vehicle.

3. For testing using production vehicles, the simulator should be capable of connecting with the production vehicle so that the original equipment manufacturer (OEM) vehicle controls are used to drive the simulator. Any instrumentation added or connections made to production vehicles for this purpose should not damage the production vehicle.
4. To set up this portion of a production-vehicle or production-vehicle-replica cab for testing, no modifications should be made to the dashboard or human-machine interface other than:
    a. The addition of sensors to determine steering wheel angle, brake pedal position, throttle pedal position, driver gaze location, and other data deemed necessary to perform the assessment as specified here.
    b. The addition of equipment to provide force feedback on the driving simulator's steering wheel, brake pedal, and throttle pedal. Linear feel steering and pedal feels are adequate.
    c. The addition of equipment to display the forward speed to the driver. This may be accomplished either through use of the vehicle's OEM speedometer or through a separate display. If forward speed is presented to the driver through a separate display, this display may be either displayed on the simulated roadway image in front of the simulated vehicle, or mounted on or above the dashboard as close as possible to the OEM speedometer.
    d. The addition of visual landmarks, as needed, for eye tracker use.
5. The driving simulator should use information collected by the steering wheel angle, brake pedal position, and throttle pedal position sensors, along with an appropriate vehicle-dynamics simulation, to predict vehicle orientation and position, angular and linear velocities, and angular and linear accelerations. A vehicle-dynamics model with three degrees of freedom (lateral velocity, longitudinal velocity, and yaw rate) may be used. If more complex and accurate vehicle dynamics are desired, this is fine but not necessary.
6. The driving simulator should allow determination of eye-glance locations in one of two ways:
    a. Using an eye tracker, or
    b. By manual reduction of full-motion video data of each test participant's face obtained during task performance. Additional details about eye-glance characterization are presented later in this document.
7. The driving simulator should generate and display full-color (16-bit minimum color depth), true-perspective, three-dimensional (as viewed by the driver) computer-generated imagery of the forward road scene free from distracting anomalies, such as abrupt changes in scene content, aliasing problems in image processing, and abrupt changes in illumination, color, or intensity (i.e., no flickering or flashing).
8. This computer-generated imagery should be displayed in front of the simulated vehicle. The minimum recommended field-of-view should be at least 30 degrees wide.
9. The recommended screen resolution should be no greater than 3 arc minutes per pixel.

10. The recommended driver eye point to screen distance should be at least 2.0 meters.
11. The computer-generated image should be updated at least 30 times per second.
12. The time lag to calculate the computer-generated imagery should not be more than 0.10 second. As a "best practice," lead compensation should be provided to bring the driving simulator display into phase with the driver's perception.
13. The driving simulator should simulate the driving scenario described below.

C. Recommended Driving Simulator Scenario

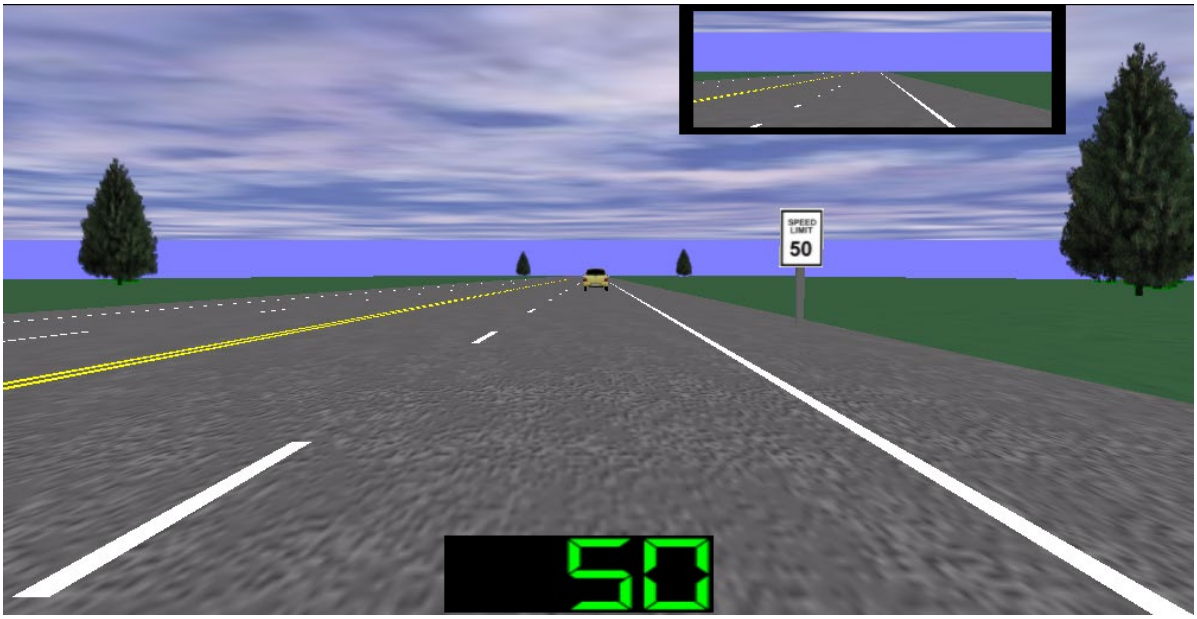
The driving simulator scenario described below is used for the Eye-Glance Measurement Using Driving Simulator Testing option (as per Driver Distraction Guidelines Section IV.D).

1. The road being simulated should:
    a. Traverse generally open, flat terrain with occasional trees or buildings;
    b. Be made of asphalt;
    c. Be light gray in color;
    d. Be undivided, four lanes wide, and have at least 1.0 meter (3.3 feet) of paved shoulders on each side of the traffic lanes;
    e. Have lanes that are 3.7 meters (12 feet) wide;
    f. Have a solid double-yellow line down the center of the road;
    g. Have solid white lines on the outside edges of the road;
    h. Have dashed white lines separating the two lanes that go in the same direction on each side of the road;
    i. Be flat (no grade or road crown); and
    j. Have a speed limit of 50 mph.
    k. Each of the above white and yellow lines on the road should be from approximately 100 mm to approximately 150 mm (4 to 6 inches) wide.
    l. For the solid double-yellow line, the spacing between the two yellow lines should be from approximately 50 mm to 100 mm (2 to 4 inches) wide.
    m. The dashed white lines should each consist of a white/asphalt pattern consisting of an approximately 3-meter (10-foot) white-line segment followed by an approximately 9-meter (30-foot) gap of asphalt before the beginning of the next white segment.
    n. All test data collection is performed on straight road segments. However, the road being simulated may, if desired, contain occasional curved segments in areas not used for data collection.
2. The lead vehicle should look like a typical, production, passenger vehicle (automobile or light truck) and be of a color that contrasts with the background.
3. The driving scenario should proceed as follows:
    a. The participant vehicle begins motionless in the right lane of the road.
    b. The test participant accelerates the vehicle up to approximately the speed limit.
    c. After approximately 360 meters (1,200 feet) of travel, the lead vehicle, which is initially traveling at the speed limit, suddenly appears in the travel lane in front of the participant vehicle about 70 meters (220 feet) ahead.
    d. The participant vehicle then follows the lead vehicle for the remainder of the test. This is referred to as the car-following portion of the test.
    e. During the car-following portion of the test, the participant should try to maintain a following distance of approximately 70 meters (220 feet).

4. All testing is performed while driving in the right lane of the simulated road.
5. A test participant should begin performing testable tasks as soon as feasible after the test participant has attained a constant speed at or near 50 mph and has adjusted to the prescribed following distance.
6. The speed of the lead vehicle should be a constant 50 mph throughout the car-following period of the test.

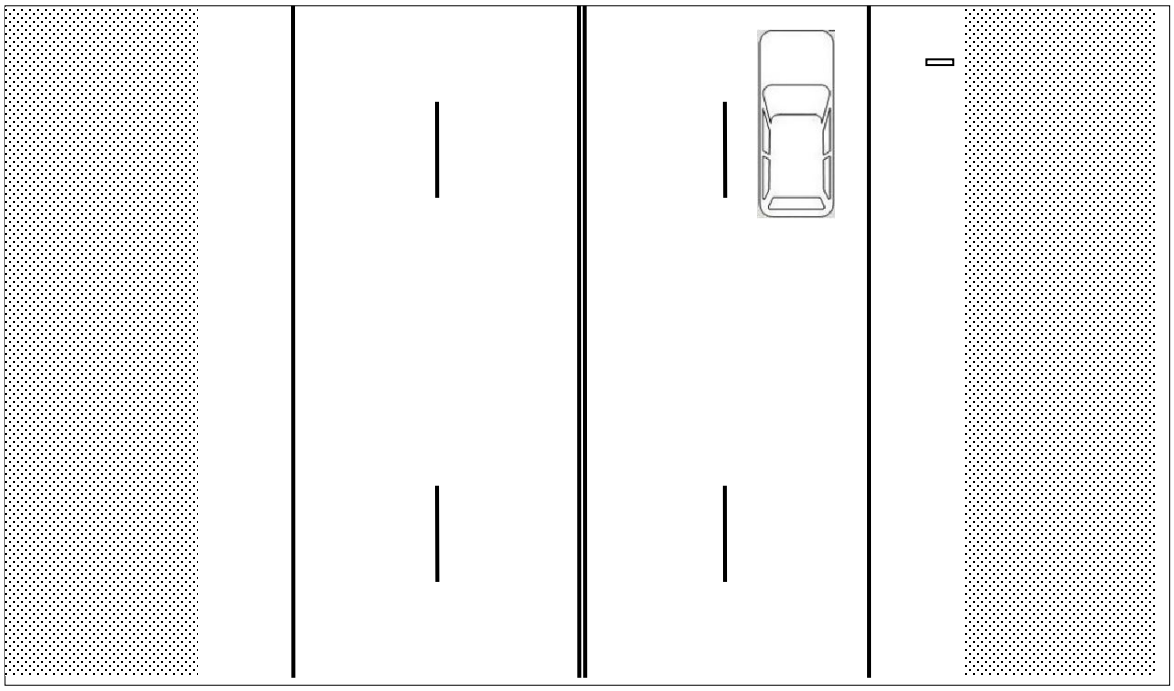
The following images depict examples of the recommended driving simulator scenario described in this section. The two images below show the participant's viewpoint when following the lead vehicle in the right lane of the four-lane undivided roadway (using different driving simulator programs). Note, the car-following distance in these images is not necessarily at the correct distance of 70 meters.

Examples of driving simulator scenario: road scene, lead vehicle, and speedometer:



The following image is an overhead view of a small section of the simulated roadway depicting the roadway dividing lines, the berm, a lead vehicle, and a speed-limit sign.

Overhead view of driving simulator scenario:



D. Eye Glance Characterization

While driving the simulator, and performing the testable task, the data necessary to determine the duration of each test participant's eye glances away from the forward roadway should be recorded.

1. The duration of an individual glance is defined as the time between successive eye glances to the forward roadway. Due to the driving scenario, eye glances to the side of the roadway or to the vehicle's mirrors are expected to be minimal. Furthermore, to minimize extraneous unrelated glances, all vehicle mirrors (interior and exterior) can be covered during testing, when a production vehicle or replica is used.
2. Eye-glance durations should be determined in one of two ways:
    a. Using data obtained by an eye tracker, or
    b. By manual reduction of video data of each test participant's face (see SAE J2396: Definitions and Experimental Measures Related to the Specifications of Driver Visual Behavior Using Video Based Techniques, revised 2017-05, for reference).
3. Ensuring Eye-Tracker Accuracy and Repeatability: If an eye tracker is used, the testing organization should have a procedure for ensuring the accuracy and repeatability of the method used to determine eye-glance timing from eye-tracker data. One approach would involve collecting full-motion video data preferably using a reference task (e.g., visual-manual radio tuning), which provides at least 10 glances away from the roadway during

a task-performance interval of approximately 30 seconds (providing at least 12 seconds of off-road glance time) and having two data reducers determine for each frame where the participant is looking. Once 95 percent frame-by-frame agreement between the two manual reductions is attained, the eye-position data from the reduced video will be compared with the data from the eye tracker for the same trial. Because frame-by-frame synchronization between face video and eye-tracker data may not be feasible, the goal is to establish 95 percent agreement in the total duration of glances away from the roadway during an interval that includes approximately 12 seconds of total off-road glance time. Due to individual differences associated with eye-trackers' accuracy, this comparison is recommended for all participants where feasible. The testing organization should also have a written procedure for setting up and calibrating the eye tracker.

4. Ensuring Full-Motion Video Reduction Accuracy and Repeatability: If full-motion video is used, the testing organization should have a procedure for ensuring the accuracy and repeatability of the method used to determine eye-glance durations. This will involve having multiple data reducers analyze the same, relatively short segment(s) of full-motion video data and checking that they obtained the same glance durations. A target criterion value of 95 percent frame-by- frame agreement for a one-minute interval is recommended. The testing organization should also have a written procedure for instructing and training data reducers as to how to determine eye-glance durations.
5. When manual reduction is employed, to the extent possible, data reducers should not have an interest as to whether a testable task or device being tested meets the acceptance criteria. Data reducers should not be closely involved with the development of a device.

E. In-Vehicle Interface, Testable Tasks, and Test Participants

1. Test Device: The electronic device under evaluation should be operational and fitted to a vehicle, driving simulator, or vehicle mock-up in a design that duplicates the intended size and location of the interface in the vehicle (i.e., the viewing angle and control placement relationships should be maintained).
2. Testable Tasks: A testable task is a pre-defined sequence of interactions performed using a specified method leading to a goal toward which a driver will normally persist until the goal is reached. Testable tasks should be defined prior to testing. Testable-task definitions should include the task goal, the start and end states of the in-vehicle system, and details of the specified sequence of inputs required to accomplish the task goal. Procedures for selecting tasks are presented in Appendix A.
3. Test Participants: Twenty-four test participants should be enrolled using the criteria described in the Driver Distraction Guidelines (6 participants balanced by gender from each of the following age groups: 18 to 24; 25 to 39; 40 to 54; and 55 and older; see Appendix D).

F. Test Participant Training Recommendations

Each test participant should be given training on how to operate the driving simulator, how to perform the simulator driving task, and how to perform each of the testable tasks using the electronic devices being evaluated.

1. General. Test instructions should be standardized and read to each participant. The displays and controls of the interface should be visible during instruction. An instruction may be repeated at the request of a test participant.
2. Simulator Orientation. Each test participant should have the driving simulator's controls and displays explained, and be shown how to adjust the seat. The seated position should allow the participant to comfortably reach the controls of the device interface associated with the testable tasks.
3. Simulator Operation. Each test participant should be given general driving instructions, which include the speed limit of 50 mph, the requirement to drive in the right lane, and that the participant's primary responsibility is the driving task.
4. Driving Scenario Instructions. The driving scenario should be described to each participant, including the car-following task. The participant should be told to drive at a speed of 50 mph prior to the beginning of car following. Each test participant should be told that, once in car-following mode, he or she should try to follow the lead vehicle at as close to the initial following distance (approximately 70 meters or 220 feet) as possible. The participant should be given practice driving the simulator alone and driving the simulator with a car-following task. The duration of driving practice trials should be approximately 3 to 4 minutes, which generally should allow sufficient time for multiple task instances separated by driving-only intervals of sufficient duration to allow the participant to re-establish successful car-following performance between successive testable-task instances. Practice can continue until the participant is comfortable with the driving task.
5. Testable Task Alone. Test participants should be given specific detailed instructions and practice on how to perform each testable task of interest on each device being studied. The experimenter should demonstrate the performance of each testable task to the participant. The participant should practice performing each testable task with no simulated driving task. This practice should continue until the participant becomes comfortable performing the task. This training and practice may also be performed in a separate parked vehicle with an identical interface configuration.
6. Testable Task With Driving Task. Each test participant should be given training and practice on how to perform each testable task on each device of interest while performing the simulator driving task. The participant should practice each testable task together with the simulator driving task as many times as needed until he or she becomes comfortable in performing the combination of tasks.

G. Recommendations for Testing

7. Following the completion of training, each test participant should drive the driving scenario while performing 3 to 5 instances of the testable task being studied (the Data Trial). The goal is to obtain data from three error-free task instances. Depending on the task and the duration of the driving scenario, one driving trial should be sufficient for allowing three successful task instances separated by driving-only intervals. Additional driving trials may be used if necessary to obtain data from three successful task instances either for long tasks or when errors occur. Testing should stop when data from three successful or five total task instances have been obtained. Eye-glance data should

be collected during these test trials. Data from the three testable-task instances is used to determine whether the task meets the acceptance criteria.

2. Stimuli. Different task stimuli (addresses, phone numbers, etc.) should be used for each instance of testable-task performance for a particular test participant. Task stimuli should be provided to a test participant immediately prior to the beginning of each instance of testable-task performance.

H. Example Test Materials and Training / Instruction Scripts

The Driving Simulator Protocol Reference Table presented below provides a time-ordered list of components that comprise the test protocol. Components are either Administrative, Instructional, Practice, or Testing. Document templates and instruction scripts are provided when available and are referenced in the first column of the table below. Instruction scripts are documents typically be read to the participant by an experimenter to explain a task or objective. Additional background information relating to each of the reference table items is located below.

Driving Simulator Protocol Reference Table:

Item #	Component Type	Description	Additional Descriptor
1	Admin	Experimenter Checklist	Time ordered list for experimenter to follow, that references other documents and instructional materials
2	Admin	Informed Consent Form	Initial document for participant to read/sign (Example in Appendix C)
3	Instruction	Simulator Overview	Simulator orientation script to read to participant
4	Instruction	Driving Task Training	Driving task instructions script to read to participant
5	Practice	Simulator Familiarization	Simulation familiarization drive description
	Practice	Driving Task Familiarization	Driving task familiarization drive description
6	Admin	Experimenter Sheet	Main trial data collection checklist tool
7	Instruction	Secondary Task Overview	Secondary task instruction script to read to participant (also referenced atop Experimenter Sheet)
8	Test	1st Main Task	Static training, practice while driving, main trial
	Test	2nd Main Task	Static training, practice while driving, main trial
	Test	Nth Main Task	Static training, practice while driving, main trial
9	Admin	Wrap Up	Payment materials, copy of Informed Consent Form for participant

Item 1: Experimenter Checklist, Driving Simulator Protocol

Tasks	Training Description	Complete
Informed Consent Form	*Make sure Participant Informed Consent Form (ICF) completed.*	
DS Overview	*Read Simulator Orientation.*	
Driving Task Training	*Read Driving Task Instructions.*	
Simulator Familiarization	*Read Simulator Familiarization Drive Instructions*.	
Driving Task Familiarization	*Read Driving Task Familiarization Instructions*. [Repeat practice drive as needed.]	
Feedback	Provide feedback on driving task, car-following performance.	
Break	Participant can take break if needed.	
Use Experimenter Sheet to determine Secondary Task Main Trial Order. Then start with correct secondary task instructions and practice session.		
Breaks	After block of main trials, when most appropriate, offer participant breaks if needed.	
Secondary Task Overview	***Read Secondary Task Instructions (Driving Simulator Protocol) as noted on top of Experimenter Sheet.***	
1st Main Task	*Follow Experimenter Sheet: static training, practice while driving, main trial.*	
2nd Main Task	*Follow Experimenter Sheet: static training, practice while driving, main trial.*	
Nth Main Task	*Follow Experimenter Sheet: static training, practice while driving, main trial.*	
Wrap Up	Provide copy of ICF to participant, review payment, and obtain signed receipt of payment.	

Item 2: Informed Consent Form, Driving Simulator Protocol

Informed consent is the process by which participants learn about the study to make an informed decision about whether to agree to participate. The Informed Consent Form (ICF) presents the essential details of the test protocol including the participant's rights and responsibilities, as well as the risks associated with participation. The ICF is presented to the participant to read and sign upon arriving at the test facility. An example of an ICF for a driving simulator protocol is presented in Appendix C.

Item 3: Driving Simulator Overview Script

SIMULATOR ORIENTATION

This vehicle is a _____, which has been modified to collect driving performance data. You will be sitting in this vehicle today to drive a driving simulator. Please get into the driver's seat and adjust the seat to your comfort. You should also make sure that you can reach the buttons on the center console and the task screen located to your right. The seat controls are under the front and on the lower left side of the seat. There is no need to adjust the mirrors as you will not be using them for this experiment. No shifting is required in this vehicle.

We have added sensors to the steering wheel, accelerator and brake pedals. These sensors allow us to run the driving simulator without having the vehicle turned on. Your control inputs are recorded by these sensors and input to the simulator to change the roadway image projected on the screen in front of you.

Item 4: Driving Task Training Script

DRIVING TASK INSTRUCTIONS

[Participant seated in simulator] *This is a fixed-base driving simulator, meaning that it has no motion. The simulated driving environment will be a 4-lane roadway with a lead vehicle traveling in front of you.*

When the roadway image first appears, your vehicle will be stopped. When instructed to begin driving, you should accelerate to 50 mph. After several seconds, a lead vehicle will appear ahead of you in your travel lane. We call this the "lead vehicle" because it is leading you in the car-following task. Your task is to follow this vehicle, adjusting your speed as necessary to maintain a constant following distance behind the lead vehicle. The initial distance at which the vehicle appears ahead of you is the desired following distance, 220 feet. Please be sure to note this distance when the lead vehicle first appears on the screen. You should try to maintain this following distance throughout the entire drive. The lead vehicle will drive at 50 mph regardless of your speed or following distance.

While driving in the simulator, you should also try to keep the vehicle centered in the right lane at all times because lane keeping performance is also important.

Remember, the driving task is the highest priority! Drive in the right lane and do your best to maintain a following distance of 220 feet behind the lead vehicle. If your following distance increases during a task, it is OK to drive faster than 50 mph to catch up to the lead vehicle. If your following distance decreases, it is okay to drive slower than 50 mph to return to the specified following distance.

For practice trials, we will end the drive at some point after you've performed several consecutive task instances and are comfortable performing that task while driving. For the

main trials, the goal is to obtain data from three successful task instances. We will run as many main trials as are necessary to obtain three successful task instances, given the fixed trial duration of 3 to 4 minutes. At the end of a drive, the lead vehicle disappears and the screen will go blank. Do you have any questions or need a repeat of any instructions about the driving simulator or car-following tasks before we practice?

Item 5: Simulator and Driving Task Familiarization Drives

Next, the participant will have the opportunity to practice driving the simulator freely and then will practice performing the car-following task with no secondary tasks. For any practice / training components, participants should be offered the opportunity to practice the given task as many times as needed, until they are comfortable performing the task. Participants should be encouraged to ask for repeats of any instructional or practice trials. See current Driver Distraction Guidelines for clarification of any specific practice and training requirements. The following contains a basic outline of the practice drives, which can be found in abbreviated form on the Experimenter Checklist (Item 1).

Simulator Familiarization Drive (lead vehicle is not present)

Encourage the participant to get a "feel" for the simulator during the first minute of the drive; encourage participant to try steering, brakes and accelerator (no speed or lane restrictions):

First, I'd like you to practice "just driving" to get a feel for the simulator. The phrase "just driving" will be used to refer to driving without performing any other task such as tuning the radio. Press the accelerator until the vehicle begins to move. Drive the vehicle and accelerate to a speed of 50 mph…try making a lane change, decelerating, braking.

After the first minute, instruct the participant to practice driving at a constant speed of 50 mph (speed limit) and to stay in the right lane. Participants can repeat this practice drive as needed.

Driving Task Familiarization Drive (lead vehicle will appear just like in the main drives)

Have the participant perform the car-following and lane-keeping tasks during this drive. After the drive, provide performance feedback (following distance and lane keeping performance). Repeat the driving task instructions as needed. Participants can repeat this practice drive as needed.

Item 6: Experimenter Sheet Template, Driving Simulator Protocol

Item 6 presents a template for an experimenter sheet. The experimenter sheet provides the experimenter with an outline of the training, practice, and main trials in the testing protocol. It can provide pertinent information such as simulator files and secondary task stimuli files to load for each trial, as well as, provide indicators for the training (T) and practice (P) material that need to be completed before running the main (M) trials. The experimenter sheet also provides fields for the experimenter to document participant performance and other observations about each trial.

STEP 1, before training on first secondary task: Read *Secondary Task Instructions Overview (Driving Simulator Protocol).*							
Trial Checks: Data acquisition system logging during trials? Refresh power to car regularly (car shuts off after x time). Other Preparations…							
Study Info Here							
First Name: **Date:** **Filename / Info:**							
Trial	**Simulator / Task File Setup Fields**		**Out File**	**Task**	**Task Input**	**Video File**	**Trial Notes: Driving, Car Following, Secondary Task, Other**
T1	Training						
P1	PracDrive	Prac					
M1	**StudyDrive**	**Main**					
T2	Training						
P2	PracDrive	Prac					
M2	**StudyDrive**	**Main**					
T*	Training						
P*	PracDrive	Prac					
M*	**StudyDrive**	**Main**					
Post-Brief Wrap Up: Pay participant (payment, receipt), make sure they have copy of Informed Consent Form.							

Item 7: Secondary Task Overview

Item 7 consists of a general secondary task training script that an experimenter reads to the participant to explain how the secondary task (a testable task) training and execution will work. The script contains examples of the interactions involved, such that once this training is complete, the participant is ready for practice on the first secondary task. This item contains a generic script for a basic radio-tuning task, to show the flow from a secondary task overview to a first secondary task. For each secondary task, the participant would first be trained on the task in a static setting (including practice), then practice the task while performing the driving task, and then perform the main trial of that task.

Tasks are first explained and then demonstrated by the experimenter. The experimenter sits next to the participant and offers assistance, showing the steps, and providing other task details. The experimenter moves to the next step only if the experimenter is sure the participant understands the task. Following the demonstration, the participant attempts the task while the experimenter gives detailed instructions and assistance if necessary. The participants can make as many attempts as necessary until comfortable performing the task. After the initial static training, the

participant should feel comfortable doing the tasks, but might not remember the exact sequence of the steps.

For any practice/training, participants are offered the opportunity to practice the given task as many times as needed until they have become comfortable in performing the task and driving. Participants can ask for repeats of both instructions and practice trials. See current Driver Distraction Guidelines for clarification of any specific practice and training requirements.

SECONDARY TASK INSTRUCTIONS OVERVIEW SCRIPT

While driving in the simulator, you will be asked to perform a series of tasks, which we call "Secondary Tasks." We refer to driving (car following and lane keeping) as the "Primary Task" because safe control of the vehicle is more important than performing the secondary tasks. Performing secondary tasks can interfere with car following, but it is important that you don't let primary task performance deteriorate too much while performing the secondary tasks.

Each drive will involve one secondary task. You will perform the specified secondary task when the lead vehicle is present. The specific secondary task details will be presented before each drive. At this time, I will explain the way in which the secondary task information is presented to you.

Let's take radio tuning as an example. In this task, you will be asked to tune the radio to different stations. We will tell you which stations to select; this information will be presented auditorily so that you do not have to look away from the driving task. It will also be displayed on the computer screen located to the right of the center console, in case you forget. We call this the Task Screen.

When you are driving, the first radio frequency will be presented shortly after the lead vehicle appears. This will be followed by the instruction to "BEGIN." [Play Example File] *When you hear the word "BEGIN," you should work quickly and accurately to complete the secondary task. When you have entered the first radio frequency, you should say "DONE" out loud.*

Next, you will be prompted to return the system to an initial condition (start state), after which a new radio frequency will be presented and followed by the instruction to "BEGIN." At this point, you would select this new frequency on the radio, and then say "DONE" out loud again. You will then be prompted to return the system to the start state. You should continue tuning the radio in this way until the driving trial ends.

I want to say a few words about errors. Mistakes are inevitable. If you make a mistake while performing a secondary task, please try to correct the error before moving on. We will provide specific information about how to recover from errors for each secondary task. It is important that you try to complete each task if possible.

Do you have any questions or need a repeat of any instructions before we move on to training for the first secondary task?

(VEHICLE SPECIFIC) RADIO TUNING EXAMPLE INSTRUCTIONS (DRIVING SIMULATOR PROTOCOL)

In this task, you will use the touch screen and tuning controls below the center console to tune the radio to a designated frequency. During the trial, you will select several different radio frequencies, one at a time. The bands (AM or FM) and frequencies will be presented auditorily and will be visible on the Task Screen.

At the beginning of each radio-tuning task, you will hear the band (AM or FM) and the frequency. This will be followed by the word "Begin." When you hear "Begin," you should work quickly and accurately to complete the task. If you forget the band or frequency, you can look at the Task Screen. The information will be displayed there.

To select the radio station, first, press the AM or FM button located to the left on the touch screen. The current band will be highlighted in red. If you select the wrong band, press the correct button for the appropriate band. The current frequency will be shown in large font on the console screen. Use the tuning controls located below the screen (Tune + and Tune -) to adjust the frequency. When you have reached the specified frequency, say "DONE" aloud to indicate that you have completed the radio tuning task.

If you select the wrong band or frequency, try to fix it before saying "DONE." If you notice an error but have already said "DONE," you do not need to try to fix it. The task is considered complete when you say "DONE." Do you have any questions or need a repeat of any instructions before we practice this task?

Item 8: Trial Data Collection, Main Tasks, and Testable Tasks

Once the training is complete and the experimenter has clearly demonstrated the task to the participant, the participant then practices the task several times until comfortable. For any practice / training, participants are offered the opportunity to practice the given task as many times as needed until they have become comfortable in performing the task and driving. Participants can ask for repeats of both instructions and practice trials. See current Driver Distraction Guidelines for clarification of any specific practice and training requirements. Once the training and practice is complete, the participant performs the main data collection trial of the testable task. Once the main trial is complete, training and practice can commence with the next testable task, if applicable. The process is repeated until all testable tasks have been completed. After the last testable task is complete, the participant: exits the simulator, completes a simulator-sickness questionnaire (Appendix D), is compensated for participation, is provided with a copy of the ICF, and is given the opportunity to ask questions before leaving the research facility.

I. Driving Simulator Test Trial Validation and Acceptance Criterion

1. Results from individual testable-task trials (single task instances) are removed from analysis only if:
   - A test participant refuses to complete a trial,
   - A test participant says he or she is done with a trial but is not,
   - The experimenter judges that the participant cannot successfully complete a trial,
   - The experimenter judges that the participant is not genuinely doing their best to perform the tasks as instructed, or
   - The participant fails to complete three error-free instances of each testable task. Errors are defined below, in Section I of this document.

   When one or more of these outcomes occurs, trials for a specific testable task for this participant are to be removed and replaced with data from an additional participant in the same age by gender category who does not have any of the problems listed above.
2. There should be a means of determining the exact time of the start and end of each testable task that is performed.
3. Multiple Testable Task Testing. To improve testing efficiency, multiple (different) testable tasks may be performed by the same test participant during the participant's test session. There is no limit to the number of testable tasks that may be evaluated by a test participant in one session; however, including multiple tasks in a single session may lead to performance degradation due to test participant fatigue or confusion. Accordingly, shorter test sessions are preferable and sessions should generally not last longer than 4 hours. Additionally, to ensure that the testing of each task reflects the demands of that task alone, all instructions, practice and testing for a single task should be completed before beginning a new task. Driving trials may allow multiple instances of a single testable task, but should not include instances of different testable tasks.
4. Eye glance Characterization. Eye glance data from each test participant's Data Trials, collected and validated in accordance with the requirements described in Section C of this document, shall be used to assess testable tasks using the analysis techniques described below.
5. Acceptance Criteria. A testable task should be locked out from performance by drivers while driving unless the following three criteria are all met:
   a. For at least 21 of the 24 test participants, no more than 15 percent (rounded up to the next whole number) of each participant's total number of eye glances away from the forward road scene have durations of greater than 2.0 seconds based on three error-free task instances.
   b. For at least 21 of the 24 test participants, the mean duration of all eye glances away from the forward road scene is less than or equal to 2.0 seconds based on three error-free task instances.
   c. For at least 21 of the 24 test participants, the mean sum of the durations of each individual participant's eye glances away from the forward road scene for each task instance is less than or equal to 12.0 seconds based on three error-free task instances.

Table 3: Maximum Allowable Number of Eye Glances Longer Than 2.0 Seconds

Number of Eye Glances Away From the Forward Road Scene Made by an Individual Test Participant in Performing a Task	15% of the Total Number of Eye Glances Away From the Forward Road Scene	Maximum Number of Allowable Off-Road Eye Glances Longer Than 2.0 Seconds
1	0.15	0*
2	0.30	1
3	0.45	1
4	0.60	1
5	0.75	1
6	0.90	1
7	1.05	2
8	1.20	2
9	1.35	2
10	1.50	2
11	1.65	2
12	1.80	2
13	1.95	2
14 through 20	>2.0	3

*Note: See Section VI.E.14.b. If a testable task takes a test participant exactly one glance to perform, that glance must be no longer than 2.0 seconds to have a mean duration that does not exceed 2.0 seconds for all eye glances.

J. Task-Performance Errors During Testing

1. Error-Free Performance During Testing. During testing, only data from error-free test trials (as defined in section IV.B.5 and IV.B.6 of the Driver Distraction Guidelines) performed by test participants should be used for determining whether a task is suitable for performance while driving.
2. An error means that a test participant has made an incorrect input when performing a requested task during a test trial. An error has occurred if the test participant must backtrack during performance of the task or delete already entered inputs. If the device can accommodate an incorrect entry without requiring backtracking and extra inputs beyond those necessary to reach the desired end state of the task, then no error is deemed to have occurred.
3. When errors are made that result in fewer than three successful task instances among the five total task instances for a participant, data from that participant should not be used to determine task acceptability for performance while driving. This data should be retained for determination as to whether a task was unreasonably difficult. When a participant's data is removed due to excessive errors, an additional test participant in the correct demographic group should be added. Testing should continue until 24 test participants have completed three error-free instances of the task or until four test participants do not meet the acceptance criteria.
4. Unreasonably Difficult Tasks. A record should be kept during testing as to whether one or more errors occurred during each test trial. If errors occur during

more than 50 percent of all test trials, using combined data from all participants, including those who were replaced, then that task is deemed an "unreasonably difficult task" for performance by a driver while driving. Unreasonably difficult tasks are not recommended for performance while driving and should be locked out.

K. Task Conformance Determination Method

Task conformance on each criterion shall be determined separately for each participant for each of the three Driver Distraction Guidelines test criteria. The determination shall be based on the data aggregated over three successful task instances for each testable task.

A. Proportion of Long Glances > 2.0 seconds

For each participant, the proportion of long glances shall be computed separately for each of three task instances and the mean of these proportions shall be used to assess task conformance. Specifically, for each selected task instance, the number of glances away from the forward roadway during the task-performance interval shall be counted. The duration of each glance shall be determined. The proportion of long glances, defined as the number of glances with duration greater than 2.0 seconds divided by the total number of glances away from the forward roadway, shall be computed for each task instance. The mean of these proportions shall be computed.

If this mean proportion is greater than 0.15, then the task shall be classified as non-conformance for this participant. This computation shall be made for each of the 24 participants. The results for each participant shall be used together with the Driver Distraction Guidelines specification, which indicates that a task should be locked out for performance by drivers while driving unless the mean proportion of long glances is no more than 0.15 for at least 21 of 24 test participants.

B. Mean Glance Duration ≤ 2.0 seconds

For each participant, the mean glance duration shall be computed separately for each of three task instances and the mean of these computed mean values shall be used to assess task conformance. Specifically, for each selected task instance, the duration of each glance away from the forward roadway during the task-performance interval shall be determined. The mean of these glance durations shall be computed for each task instance and the mean of these mean values shall be computed and referred to as the overall mean.

If the overall mean glance duration is greater than 2.0 seconds, then the task shall be classified as non-conformance for this participant. This computation shall be made for each of the 24 participants. The results for each participant shall be used together with the Driver Distraction Guidelines specification, which indicates that a task should be locked out for performance by drivers while driving unless the overall mean duration of glances away from the forward roadway is no more than 2.0 seconds for at least 21 of 24 test participants.

C. Total Glance Time ≤ 12.0 seconds

For each participant, the sum of glance durations (total glance time) shall be computed separately for each of three successful task instances and the mean of these three computed total glance times shall be used to assess task conformance. Specifically, for each selected task instance, the duration of each glance away from the forward roadway during the task-performance interval shall be determined. The total glance time shall be computed for each task instance and the mean of these total glance time values shall be computed and referred to as the overall mean.

If the overall mean total glance time is greater than 12.0 seconds, then the task shall be classified as non-conformance for this participant. This computation shall be made for each of the 24 participants. The results for each participant shall be used together with the Driver Distraction Guidelines specification, which indicates that a task should be locked out for performance by drivers while driving unless the overall mean total glance time for all glances away from the forward roadway is no more than 12.0 seconds for at least 21 of 24 test participants.

Appendix A. Test Participant Recruitment Procedures

Participant Recruitment Procedures for Driver Distraction Guidelines for Reducing Visual-Manual Driver Distraction During Interactions With Integrated, In-Vehicle, Electronic Devices, Version 1.01

This document describes test participant recruitment procedures associated with testing of secondary task conformance to NHTSA's Guidelines for Reducing Visual-Manual Driver Distraction During Interactions With Integrated, In-Vehicle, Electronic Devices, Version 1.01.

A. Test Participant Recommendations

1. These Test Participant recommendations apply to both Eye Glance Measurement Using Driving Simulator Testing and Occlusion Testing. Each test method requires data collection from a sample of 24 test participants.
2. General Criteria. Each test participant should meet the following general criteria:
   a. Be in good general health,
   b. Be an active driver with a valid driver's license,
   c. Drive a minimum of 3,000 miles per year,
   d. Have experience using a cell phone while driving,
   e. Be unfamiliar with the devices being tested.
3. Test Participant Impartiality. Test participants should be impartial regarding 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.
   a. NHTSA will not use any vehicle manufacturer employees in its Driver Distraction Guidelines monitoring testing.
   b. NHTSA considers it acceptable for vehicle manufacturers to test their own employees if the employees are unfamiliar with the product being tested.
4. Mix of Ages in Each Test Participant Sample. Out of each group of 24 test participants used for testing a particular in-vehicle device task, there should be:
   a. 6 test participants 18 to 24 years old,
   b. 6 test participants 25 to 39 years old,
   c. 6 test participants 40 to 54 years old, and
   d. 6 test participants 55 or older.
5. Even Mix of Genders in Each Test Participant Sample. Each sample of 24 test participants used for testing a particular in-vehicle device task, should contain:
   a. Twelve men and 12 women overall, and
   b. An equal balance of men and women in each of the age ranges 18 to 24, 25 to 39, 40 to 54, and 55 and older.

Eligibility criteria: To be eligible for participation in Driver Distraction Guidelines task-conformance testing, an individual must meet the criteria stated in points 2 to 5 above. First, there are general criteria to be met including impartiality. In addition, each group of 24 test participants must meet an even mix of age and gender as described above and shown in the following checklist.

Sample Recruitment Checklist to Balance Age & Gender, 24 Participants				
Age Groups	**18 to 24**	**25 to 39**	**40 to 54**	**55 & older**
24 Participants	6	6	6	6
12 Males	1	7	13	19
	2	8	14	20
	3	9	15	21
12 Females	4	10	16	22
	5	11	17	23
	6	12	18	24

In addition to these basic criteria, applicants should be screened for other test eligibility criteria using standardized recruitment materials and a standardized recruitment process.

Recruitment materials: Advertisements may be published in local newspapers, in online ads, and on posted flyers to recruit participants. These advertisements should include the basic eligibility criteria along with a brief description of the test protocol. Advertisements are the first step in the recruitment process; they are intended to attract interested candidates and direct them to a website or phone number for screening. An example advertisement is presented below.

Recruitment process: Following the prospective participant's response to advertising, the recruitment process consists of three steps, including: (1) initial screening questions to determine if the basic eligibility requirements described above have been met; (2) a follow-up set of eligibility questions covering the topics of health and availability for those who have met the basic eligibility criteria; and (3) a scheduling step to make arrangements with those who have met the criteria and have been selected for participation. Recruitment steps 1 and 2 are implemented by directing interested candidates either to complete an automated online survey or to complete the screening questions verbally via phone. Initial questions (Step/Part 1) cover basic eligibility criteria; follow-up questions (Step/Part 2) cover more detailed questions, including health-related topics related to the specific study requirements. They also determine specific availability in preparation for scheduling. An example list of test participant recruitment screening questions is presented below.

Introductory Study Description Used for Recruitment

Advertisement:

Receive $xx.xx per hour, plus mileage allowance, for approximately x hours of participation
We are seeking participants for a laboratory test study of driving performance
The study will be conducted by:
Insert Organization Name for *Insert Organization Name*
Insert Address Information
Weekday Sessions

MUST BE:
Licensed driver 18 to 70 years old
Good general health
3,000+ miles driven per year
Cell phone user while driving

PLEASE CALL: 7a.m. – 5 p.m. weekdays
[Contact name] *Insert Phone Number*
OR REPLY ONLINE: *Insert Website*
OR E-MAIL: *Insert E-mail Address*

Study Description (to appear on website):

The *Insert Organization Name* is conducting a research study for the *Insert Organization Name*. The study will assess the potential for distraction associated with specific tasks performed with the in-vehicle information system in a specified vehicle. The assessment will involve use of a task-conformance test protocol developed by the National Highway Traffic Safety Administration as part of its Driver Distraction Guidelines. Participation involves one session of approximately x hours. Participants will *drive a driving simulator or wear glasses that can be transparent or opaque* and perform in-vehicle tasks like tuning a radio. If selected, you will be required to come to a laboratory facility located *Insert Location*. Participants will receive $xx.xx per hour for participating in the study. Participants will receive a monetary travel allowance for mileage to and from our facility.

Example Participant Recruitment Screening Forms / Questions

Phone Screen or Internet Introduction Material	
Introduction	Thanks for expressing interest in participating in our study.
Research Study Purpose	The study is being conducted by *Insert Organization Name* to assess the potential for distraction associated with specific tasks performed with the in-vehicle information system in a specified vehicle. The assessment will involve use of a task-conformance test protocol developed by the National Highway Traffic Safety Administration as part of its Driver Distraction Guidelines.
Purpose of Screening	The objective is to *(by phone or internet)* describe the study and gather information that can be used by the principal investigator to determine if you qualify for participation. This *call or internet survey* will take about 10 minutes.
Participation Commitment	Participants will (*drive a driving simulator or wear occlusion goggles*) and perform in-vehicle tasks like tuning a radio. Participation involves one session of approximately *x* hours. If selected, you will be required to come to a laboratory facility located at *Organization Name, Address*.
Participation Compensation	If selected, you will receive $*xx.xx* per hour for participating in the study. You will also receive a travel allowance for mileage to and from your home to our facility.
Information Being Requested & Confidentiality	I would now like to ask you a series of questions to determine your eligibility. Questions will cover: (1) personal information, (2) driving experience, (3) wireless phone usage, and (4) medical history. Note that we will not release any personal identifying information that you provide. The information gathered will be kept confidential and be stored in a password protected database. Responses to health-related questions will be maintained separately from your personal information and will be deleted at the end of the study. You do not have to answer any question that you do not want to answer and you may end this survey at any time.

Part 1. Initial Screening Questions: Contact Information and Questions for Determining Initial Eligibility (Internet or Phone Interview)	
NAME (first, last)	
GENDER (M/F)	
AGE (office note: must be 18 to 70 years old to participate)	
Have you participated in a previous research study with us? If yes, what year?	
How did you hear about our study? Which newspaper or online ad?	
Do you have a valid U.S. driver's license? (Y/N)	
Are there any restrictions on that license? (Y/N)	
Are you able to drive without the use of assistive devices? (Y/N)	
How many miles do you drive per year?	
What kind of vehicle do you normally drive (year, make, and model)?	
PHONE – daytime:	
E-mail Address:	
Home Address: Street Address:	Apartment No:
City:	State:
ZIP Code:	
Screening process ends here if: (1) age outside range, (2) driver's license not valid, (3) license restrictions other than corrective eyewear, (4) miles driven per year less than 3,000 miles.	

Part 2. Secondary Questions for Determining Eligibility and Availability (Internet or Phone Interview)
Do you wear prescription eye glasses or contacts while driving? (Y/N)
Do you require reading glasses to use a cell phone while driving? (Y/N)
How comfortable (on a scale of 0 to 10, with 0 being least comfortable) are you at multi-tasking while driving (e.g., eating, drinking, changing radio stations, talking on a cell phone, talking with passengers)?
Do you use a cell phone while driving? (Y/N)
Do you regularly communicate using text messages (not during driving)? (Y/N)
Do you use a navigation system, computer, or any other similar devices in your car? (Y/N)
Do you have any health problems that affect driving? (Y/N) (If yes, please describe.)
Do you have high blood pressure that is not controlled by medicine? (Y/N)
Do you have a history of seizures or epilepsy? (Y/N)
Are you susceptible to motion sickness? (Y/N)
Do you have any difficulty hearing and understanding normal conversation? (Y/N)
Do you have any inner ear, dizziness, vertigo, or balance problems? (Y/N)
Do you have diabetes for which insulin is required? (Y/N)
Have you ever had a concussion, brain injury, or other injury resulting in decreased motor control or cognitive ability? (Y/N) (If yes, please describe.)
Are you taking any medications (over-the-counter or prescription) that may cause drowsiness or impact your driving ability? (Y/N)
Do you currently have any medical condition that might affect your ability to concentrate while driving, such as attention deficit hyperactivity disorder (ADHD), depression, anxiety, or claustrophobia? (Y/N) (If yes, please describe.)
Please indicate which days of the week you are available to participate in this study.
Are you available on short notice to participate in our study? Could we call you on the same day to schedule if necessary?
Can we use your e-mail address to help with scheduling? (Y/N)
Can we use text messaging to help with scheduling? (Y/N) If yes, obtain cell phone number: _____
How long would you like to be considered for this study?

Part 3. ***Phone Conversation for SCHEDULING PARTICIPANTS***
The principal investigator or a designated associate will determine which respondents are selected for participation.
Date Scheduled:
Hi, this is *Insert First Name* from *Insert Organization Name*. This is a call back to notify you that you have been selected to participate in our study. I have one additional question and then I would like to schedule a test session.
Since your initial screening, have you begun taking any over-the-counter medications or experienced any other issues that might affect driving? (Y/N)
I would like to schedule an appointment with you at this time. The first available openings are: _____ (calendar of events needed with date and time frame up to x hours - try to use previous call input for choices, before calling). Do any of those dates and times work for you? (If YES, schedule. If NO, then offer next available set of times, perhaps by week, until scheduled. If no good dates, find a time when best for them and say we will see what we can do and call back later.)
(Appointment Confirmation) Ok. I have you scheduled for *Insert Date & Time*. Please try to arrive promptly.
Please be sure to bring your valid, U.S. driver's license to the appointment for identification purposes. Dress comfortably for driving and weather conditions and wear comfortable driving shoes. Do not bring another guest with you unless prior arrangements have been made with us.
The session will last between *x* and *y* hours. You will have one or more short breaks, during which you can *purchase food and soft drinks from vending machines in our lunchroom*, if needed.
Note that your personal wireless devices must be turned off while you are participating in this study. Cameras, firearms, and alcoholic beverages are not permitted at the data collection facility.
If your hair hangs in your face, you will be asked to pull it back out of the way so that we can see where you are looking during the experiment.
Please refrain from drinking alcohol or taking non-prescription drugs for at least the 24 hours preceding the session.
Do you understand these requirements? (Record "Yes" or "No")
DIRECTIONS: We will send a map link to you using the email address you provided.
Do you have any questions at this time?
If you have any questions before your scheduled date, please feel free to call me at *Phone Number*. If you need to contact us on the day of your scheduled appointment, please call *xxx-xxx-xxxx*. Or you can send a text message to this number: *XXX-XXX-XXXX*.
If something comes up and you need to cancel or reschedule your appointment, please try to call at least 24 hours in advance. Otherwise, we look forward to seeing you on *Insert Date* at *Time*.

Appendix B. Example Driving Simulator Testing Informed Consent Form

OVERVIEW

You are being asked to participate in a research study. Your participation in this research is strictly voluntary, meaning that you may or may not choose to take part. To decide whether you want to be part of this research, the risks and possible benefits of this study are described in this form so that you can make an informed decision. This process is known as informed consent. This consent form describes the purpose, procedures, possible benefits and risks of the study. This form also explains how your information will be used and who may see it.

The study investigator or study staff will answer any questions you may have about this form or about the study. Please read this document carefully and do not hesitate to ask anything about this information. This form may contain words that you do not understand. Please ask the study investigator or study staff to explain the words or information that you do not understand. After reading the consent form, if you would like to participate, you will be asked to sign this form. You will be offered a copy of the form to take home and keep for your records.

PURPOSE

This research study is being conducted by the *Insert Name*. The purpose of this study is to assess the potential for distraction associated with specific tasks performed with the in-vehicle information system in a specified vehicle. The assessment will involve use of a task-conformance test protocol developed by the National Highway Traffic Safety Administration as part of its Driver Distraction Guidelines.

STUDY REQUIREMENTS

You are being asked to participate in this research study because:

- You are at least 18 years of age;
- You are in good general health;
- You are an active driver with a valid, unrestricted *Test Country (e.g., U.S.)* driver's license (except for restrictions concerning corrective eyeglasses and contact lenses);
- You drive at least 3,000 miles per year;
- You have experience using a wireless phone while driving; and
- You are unfamiliar with the devices being tested.

STUDY PROCEDURES

Before participating in this research study, you will be asked to read this Participant Informed Consent Form in its entirety. After all your questions have been answered, you will be asked to sign this form to show that you voluntarily consent to participate in this research study.

Your participation in this research study will consist of one session lasting approximately *x* hours. A member of the study staff will give you detailed instructions and will accompany you during your participation in this research study.

In-Vehicle Tasks:
During this session, you will be asked to perform in-vehicle tasks that involve actions like those required to operate in-vehicle systems. The in-vehicle tasks will consist of tasks using the *Insert Descriptions* interface in the study vehicle. You will be asked to perform the in-vehicle tasks while driving in a driving simulator.

Simulated Driving:
During your session, you will be asked to drive a fixed-base simulator. A fixed-based simulator is a machine that imitates the conditions of driving in real life but does not move. The simulator will be connected to an *Insert Test Vehicle Name*. While driving the simulator you will sit in the driver's seat of the study vehicle. You will control the simulator with the vehicle's steering wheel and gas and brake pedals. The engine will be turned off. Video cameras and sensors have been installed in the vehicle to collect eye glance and task performance information and to record your steering, braking, and gas pedal inputs. The cameras and sensors are located so that they will not affect your driving. The information is recorded so that it can be analyzed later. A large screen in front of the vehicle will display a computer-generated image of the virtual road on which you will be driving.

While operating the simulator, you will be asked to perform specific driving tasks. These tasks will involve activities such as following a car at a specified distance and keeping the vehicle in the designated travel lane.

Summary of Study Procedures:
The following procedures will take place at your session.

- After signing this consent form, you will be given instructions and training on driving the simulator and performing the in-vehicle tasks. You will also practice before performing test trials.
- You will then complete *x* sets of trials, including approximately *x* simulator driving trials each lasting *x* minutes.
- After completing the simulator driving trials, the session will end and your participation in this research study will be complete.

NEW INFORMATION

We do not anticipate that any changes to procedures will take place during this study. However, any new information developed during the research that may affect your willingness to participate will be given to you.

RISKS of STUDY PARTICIPATION

Most people enjoy driving in the simulator and do not experience any discomfort. However, a small number of participants experience symptoms of discomfort associated with simulator disorientation. Previous studies with similar driving intensities and simulator setups have produced mild to moderate disorientation effects such as slight uneasiness, warmth, or eyestrain for a small number of participants. These effects typically last for only a short time, usually 10 to15 minutes after leaving the simulator. If you ask to stop driving because of discomfort, you

will be allowed to stop at once. You will be asked to sit and rest before leaving, while consuming a beverage and a snack. There is no evidence that driving ability is hampered in any way; therefore, if you show minimal or no signs of discomfort, you should be able to drive home. If you experience anything other than slight effects, transportation will be arranged through other means. This outcome is considered unlikely since studies in similar devices have shown only mild effects in recent investigations and evidence shows that symptoms decrease rapidly after simulator exposure is complete.

There are no known physical or psychological risks associated with participation in this study beyond those described above.

BENEFITS OF STUDY PARTICIPATION

This research study will provide data on driver behavior and in-vehicle task performance that will be used by researchers to *Insert Purpose/Benefits*.

You are not expected to receive direct benefit from your participation in this research study.

ALTERNATIVES

This study is for research purposes only. Your alternative is to not participate.

CONDITIONS OF PARTICIPATION, WITHDRAWAL, AND TERMINATION

Participation in this research is voluntary. By agreeing to participate, you agree to operate the research vehicle in accordance with all instructions provided by the study staff. If you fail to follow instructions, or if you behave in a dangerous manner, you may be terminated from the study. You may withdraw your consent and discontinue participation in the study at any time without penalty.

COSTS TO YOU

Other that the time you contribute, there will be no costs to you.

COMPENSATION

You will receive $*xx.xx* per hour for the time you spend at the data collection facility.
If you voluntarily withdraw or are terminated from this study, you will be compensated for the number of hours that you participated in the study.

QUESTIONS

Any questions you have about the study can be answered by the principal investigator or the study staff by calling *xxx-xxx-xxxx*.

If you have any questions regarding your rights as a research participant, or if you have questions, concerns, complaints about the research, would like information, or would like to offer input, you may contact: *Insert Information*.

INFORMED CONSENT

By signing the informed consent statement contained in this document, you agree that your participation is voluntary and that the terms of this agreement have been explained to you. Also, by signing the informed consent statement, you agree to operate the study vehicle in accordance with all instructions provided by the study staff. You may withdraw your consent and discontinue participation in the study at any time without penalty.

Insert Organization Name will retain a signed copy of this Informed Consent Form. A copy of this form will also be offered to you.

INFORMED CONSENT STATEMENT

I certify that:

- I have a valid, *Insert State or Country of Origin* driver's license.
- All personal and vehicle information, as well as information regarding my normal daily driving habits provided by me to *Insert Organization Name* employees associated with this study during the pre-participation screening and the introductory briefing was true and accurate to the best of my knowledge.
- I have been informed about the study in which I am about to participate.
- I have been told how much time and compensation are involved.
- I have been told that the purpose of this study is to *Insert Purpose*.
- I agree to operate the research vehicle in accordance with all instructions provided to me by the study staff.

I have been told that:

- The study will be conducted in a fixed-base driving simulator and that the risk of discomfort associated with simulator disorientation is minimal.
- My participation is voluntary and I may refuse to participate or withdraw my consent and stop taking part at any time without penalty or loss of benefits to which I may be entitled.
- I have the right to ask questions at any time and that I may contact the study investigator or the study staff at *xxx-xxx-xxxx* for information about the study and my rights.

I have been given adequate time to read this informed consent form. I hereby consent to take part in this research study.

I, _____, voluntarily consent to participate.
(*Printed Name of Participant*)

_____

Signature of Participant Date

Appendix C. Example Simulator Sickness Questionnaire

Directions: Circle one option for each symptom to indicate whether that symptom applies to you right now.

1. General discomfort ..... None ..... Slight ..... Moderate ..... Severe
2. Fatigue ..... None ..... Slight ..... Moderate ..... Severe
3. Headache ..... None ..... Slight ..... Moderate ..... Severe
4. Eye strain ..... None ..... Slight ..... Moderate ..... Severe
5. Difficulty focusing ..... None ..... Slight ..... Moderate ..... Severe
6. Salivation increased ..... None ..... Slight ..... Moderate ..... Severe
7. Sweating ..... None ..... Slight ..... Moderate ..... Severe
8. Nausea ..... None ..... Slight ..... Moderate ..... Severe
9. Difficulty concentrating ..... None ..... Slight ..... Moderate ..... Severe
10. "Fullness of the head" ..... None ..... Slight ..... Moderate ..... Severe
11. Blurred vision ..... None ..... Slight ..... Moderate ..... Severe
12. Dizziness with Eyes Open ..... None ..... Slight ..... Moderate ..... Severe
13. Dizziness with Eyes Closed ..... None ..... Slight ..... Moderate ..... Severe
14. *Vertigo ..... None ..... Slight ..... Moderate ..... Severe
15. **Stomach awareness ..... None ..... Slight ..... Moderate ..... Severe
16. Burping ..... No ..... Yes ..... If yes, no. of times _____
17. Vomiting ..... No ..... Yes ..... If yes, no. of times _____
18. Other _____

* Vertigo is a sensation of motion in which the individual or the individual's surroundings seem to whirl dizzily. (https://www.merriam-webster.com/dictionary/vertigo)

** "Stomach awareness" is usually used to indicate a feeling of discomfort just short of nausea.

Appendix D. Task Selection

This document describes task-selection procedures associated with task-conformance testing based on NHTSA's Guidelines for Reducing Visual-Manual Driver Distraction During Interactions With Integrated, In-Vehicle, Electronic Devices, Version 1.01.

NHTSA envisions different situations in which task-conformance testing using procedures described in NHTSA's Driver Distraction Guidelines may be performed. Generally, two classes of situations are envisioned. The first involves tests directed at specific tasks; for example, manufacturers may want to determine whether specific tasks performed using a new interface design conform to the specifications presented in NHTSA's Driver Distraction Guidelines. In this situation, the manufacturer would likely have a preselected set of testable tasks. The second anticipated situation involves testing a vehicle's interface (the in-vehicle system) as part of an overall after-market assessment of a particular vehicle. NHTSA-funded conformance testing of new vehicles is an example of this latter situation. In this situation, the test organization may not have specific tasks provided beforehand. The following recommendations relate to the latter situation in which specific tasks have not been identified for testing and the objective is to provide an overall assessment of the in-vehicle system.

A. Task-Selection Recommendations

1. These Task-Selection recommendations apply to both Eye Glance Measurement Using Driving Simulator Testing and Occlusion Testing. Each test method requires data collection from a sample of 24 test participants.
2. Each task selected for testing should be consistent with the scope of tasks as defined in Section II of the Driver Distraction Guidelines.
    a. Generally, Driver Distraction Guidelines testing is not applicable to tasks performed by the driver as part of the primary task of safe operation and control of the vehicle, or those involving systems required by law. Non-applicable tasks include the use of controls for operating the vehicle, tasks relating to the proper use of a driver-safety warning system, using an electronic device that relates either to a Federal Motor Vehicle Safety Standard, another U.S. law or regulation, or a State or local law or regulation.
    b. The Driver Distraction Guidelines are applicable to other driving-related tasks referred to as secondary tasks because they are not related to the primary task of safe vehicle operation and control. These tasks may relate to driver comfort, convenience, communications, entertainment, information seeking or navigation.
    c. The Driver Distraction Guidelines are applicable to human-machine interfaces of original equipment electronic devices built into the vehicle at time of manufacture even when linked with aftermarket or portable devices. For example, if a vehicle has an interface designed to operate a phone or hand-held music device, the tasks involved in controlling these devices are applicable.
    d. Tasks performed using interfaces of portable devices or tasks performed with auditory-vocal commands are not covered by the Driver Distraction Guidelines.

3. Each task selected for testing should be consistent with the definition of a testable task (See Section A.1). Each task must have a defined start and end to be considered testable.

B. Task-Related Explanatory Material (from Driver Distraction Guidelines Section IV.C)

1. Testable tasks should be completely defined prior to any testing to determine whether they are suitable to perform while driving under these Driver Distraction Guidelines. The task's goal, start state, end state, specific method to be used, and inputs should all be specified.
2. For testable tasks with a variety of possible inputs of different lengths (e.g., city names for navigation systems), a typical or average length input may be used. Precise mean values need not be used and there may be some variation in length from input-to-input. For example, for the input of city names into a navigation system, lengths of 9 through 12 letters might be used.
3. For testable tasks that involve reading, nearby text unrelated to the task being performed should not be considered part of the text that is to be read during the testable task.
4. For the purposes of acceptance testing, text unrelated to the task and the labels of buttons or controls need not be included as part of the text that is read during a testable task.

C. Task Selection Procedure

1. Identify all testable tasks.
   a. Start with definitions of tasks to which NHTSA Driver Distraction Guidelines apply and those that meet the definition of a testable task (Section A, above).
   b. Many contemporary in-vehicle systems offer different paths to specific task objectives. To identify testable tasks, all paths, defined here as sequences of steps, to accomplish each specific task objective should be delineated.
2. Count the number of discrete input steps associated with each testable task
   a. Discrete input steps include each time a specific input is required or each time task performance requires obtaining specific information from an in-vehicle system display.
3. Compute an estimate of total glance time for each testable task.
   a. Assign a value of the expected glance duration for each step for each testable task. This value should represent the best estimate of the amount of glance time away from the forward roadway associated with each individual step. Based on our simulator set up, it appears that a value of approximately 1 second is a good estimate of individual glance duration.
   b. Multiply the number of steps for each testable task by the expected glance duration associated with one step. The product represents an estimate of the expected total off-road glance time associated with a task. This

estimate is for use in categorizing tasks, not for assessing task conformance.

c. Using the estimated total glance time, assign tasks to one of three categories:
   1. Tasks with less than 9 seconds of total glance time – these tasks are likely to conform to Driver Distraction Guidelines criteria.
   2. Tasks with more than 15 seconds of total glance time – these tasks are likely not to conform to Driver Distraction Guidelines criteria.
   3. Tasks with estimated total glance times between 9 and 15 seconds – these tasks are primary candidates for testing.

D. Perform Conformance Testing

1. Start with tasks identified as primary candidates
2. Test tasks in outer categories only as necessary to verify their category assignment.
3. If category-assignment errors are frequent, consider redefining category boundaries to include more task in the candidates selected for testing.

E. Evaluate Task-Selection Procedure

1. Task-conformance test results based either on simulator or occlusion testing can be used to assess the validity of the total glance time estimates used to classify tasks and identify primary candidates for testing (Section B.3.c., above).
   a. For one or more tested tasks, divide the total glance time (from simulator testing) or TSOT (from occlusion testing) by the number of task steps (Section B.2., above). This value is a more direct estimate of the glance time associated with each task step, using test conformance data.
   b. This value can be used to categorize tasks for subsequent testing in the specific test setup that was used to obtain the total glance time values.

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