OMB Control No.: 2126-0083
Expiration Date: 06/30/2027

ATTACHMENT G: DATA COLLECTION DOCUMENTS

OMB Control No.: 2126-0083
Expiration Date: 06/30/2027

Questionnaire #1 – Pre-Study Demographic/Previous Experiences

Public Burden Statement

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control number. The OMB Control number for this information collection is 2126-0083. Public reporting for this collection of information is estimated to be approximately 4.5 minutes per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are voluntary. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to brian.routhier@dot.gov.

Please respond to the following questions by either placing an "X" in the appropriate box or writing a clear answer in the space provided. There are no "correct" responses, please just be honest. All responses will only be used for research purposes and will not be used for regulatory purposes.

Demographics

1. What is your age? _____ (yrs)

2. What is your sex?
   - ❑ Female
   - ❑ Male

3. What is the highest academic degree you have earned (please check one)?
   - ❑ Less than high school
   - ❑ Some high school
   - ❑ High school graduate or equivalence (for example, a GED)
   - ❑ Some college, but degree not received or is in progress
   - ❑ Associate's Degree (for example a AA or AS)
   - ❑ Bachelor's Degree (for example a BA, BS, or AB)
   - ❑ Master's Degree
   - ❑ Doctorate
   - ❑ Professional degree (for example a MD, DDS, DVM, LLB, JD)
   - ❑ None of the above

4. Is English your primary language (please check)? ___ Yes ___ No

   If **no**, please indicate your primary language here _____

5. What is your ***height*** in feet _____(ft) and inches _____ (in)?

6. What is your ***weight*** in pounds _____ (lbs.)?

7. What is your race?
   - ❑ American Indian or Alaska Native
   - ❑ White
   - ❑ Black or African American
   - ❑ Asian
   - ❑ Native Hawaiian or Other Pacific Islander
   - ❑ Hispanic or Latino
   - ❑ Other _____

Driving Experience

8. How long have you been driving commercial vehicles?
   _____years _____ months

9. Are you currently employed as a commercial motor vehicle driver?
   ____ Yes ___ No

10. What class commercial driver's license do you currently hold? _____

11. Select the type of endorsements you hold (please check all that apply)
    - ❑ Hazardous Materials
    - ❑ Tanker Vehicle
    - ❑ Bus passenger
    - ❑ School Bus
    - ❑ Double/Triple Trailers
    - ❑ Combination HazMat/Trailer
    - ❑ Other _____

12. Are you an owner operator? (please check) _____ Yes _____No

13. Approximately how many hours do you drive a commercial motor vehicle per week? _____ hours

14. Approximately how many miles do you drive a commercial motor vehicle per week? _____ miles

15. What is your typical daily schedule?
    Start time _____
    End time _____
    Hours driving _____

16. Over the past **three years**, have you had any crashes in a commercial vehicle?

    _____ Yes _____ No (If **no,** please skip to question 9)

    If **yes**, state the number of crashes in each category over the past three years:

    _____ Total crashes

    _____ Preventable Crashes

    _____ Injury Crashes

    _____ Fatal Crashes

17. Over the past **three years**, have you had any moving violations in your commercial vehicle? (please check)

    _____ Yes _____ No (If **no**, skip to question 10)

    If **yes**, state the violation type for each crash over the past three years. Each row is a different violation: thus, if you had two violations you would complete two rows, one for each violation.

Violation Number	Violation Type (e.g., speeding, tailgating, signal violation, etc.)
1	
2	
3	
4	
5	
6	
7	

18. How many nights per week do you typically return home after a route?

    _____ nights per week

19. What are the typical routes you drive your commercial vehicle? (please check one)
    - ❑ Local/ Delivery (less than 50 miles per trip)
    - ❑ Short-haul/ Regional (50 – 499 miles per trip)
    - ❑ Long-haul/ National (500 + miles per trip)
    - ❑ Other _____

Daily Routines

20. Do you typically consume caffeine? If yes, indicate the average amount consumed below.

    o No
    o Yes (If yes, for all categories that apply, indicate amount consumed in a typical day.)

Coffees	_____ cups per day
Cola drinks	_____ drinks per day
Energy drinks	_____ drinks per day
Caffeine pills	_____ pills per day
Caffeine gum	_____ sticks/pieces per day
Tea (not herbal)	_____ cups per day

21. If **yes,** please state how many hours ago you consumed your last caffeinated substance. ____ hours ago

Sleep Schedule

22. Approximately, how many hours did you sleep in the last day? ____ hours

23. Approximately, how many hours did you sleep two days ago? ____hours

24. Approximately, how many hours did you sleep three days ago? ____hours

25. On average, how many hours do you sleep each day? ____hours

Driver Health

26. Has a physician informed you that you have any of the following conditions? (Mark all that apply to you.)
    o Sleep apnea
    o Diabetes
    o High blood pressure
    o Insomnia

27. Do you use any of the following? (Mark all that apply to you)
    o CPAP for sleep apnea
    o Medication for diabetes
    o Medication for high blood pressure
    o Medication for insomnia

28. How often do you experience pain of any kind during a typical daily work shift? (Check only 1 box)
    o 0-5% of shift
    o 5-25% of shift
    o 25-50% of shift
    o 50-75% of shift
    o 75% or more of shift

Karolinska Sleepiness Scale

29. Please indicate your *current* sleepiness level on the following scale (please check one):

- ❑ Extremely Alert.....1
- ❑ Very Alert..... 2
- ❑ Alert.....3
- ❑ Rather Alert.....4
- ❑ Neither alert nor sleepy.....5
- ❑ Some signs of sleepiness.....6
- ❑ Sleepy, but no effort to keep awake.....7
- ❑ Sleepy, but some effort to keep awake..... 8
- ❑ Very sleepy, great effort to keep awake, fighting sleep.....9
- ❑ Extremely sleepy, can't keep awake.....10

OMB Control No.: 2126-0083
Expiration Date: 06/30/2027

Questionnaire #2 – Perceptions of Technology and Vehicle Safety Technologies

Public Burden Statement

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control number. The OMB Control number for this information collection is 2126-00*XX*. Public reporting for this collection of information is estimated to be approximately 6.25 minutes per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are voluntary. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to brian.routhier@dot.gov.

General Use of Technology

1. Please choose any or all that apply to you. A computer is defined as a laptop or desktop computer and excludes tablets and smartphones.
    a. _____ I own a computer
    b. _____ My family owns a computer
    c. _____ I had access to computers in high school
    d. _____ I am taking (or have taken) one or more classes in a computer classroom
    e. _____ I use the internet regularly
    f. _____ I know how to create a web page

2. Please select any or all the following technologies that you own
    a. _____ Smart watch
    b. _____ Laptop
    c. _____ Smart Phone
    d. _____ Virtual reality headset
    e. _____ Video game console
    f. _____ Bluetooth headphones/Speaker
    g. _____ Smart TV (Roku, Samsung smart TV, etc.)
    h. _____ Amazon Alexa (Echo)/ Google home/ Google Nest
    i. _____ E-reader (Ex: Amazon Kindle)
    j. _____ Tablet

Please answer the following questions (select one per question):

3. I use the internet
    ☐ Regularly
    ☐ Infrequently
    ☐ Never

4. I enjoy using technology
   - ☐ Disagree totally
   - ☐ Disagree
   - ☐ Not strong opinion
   - ☐ Agree
   - ☐ Agree Strongly

5. I avoid using technology
   - ☐ Disagree totally
   - ☐ Disagree
   - ☐ Not strong opinion
   - ☐ Agree
   - ☐ Agree Strongly

6. I struggle to learn new technology
   - ☐ Disagree totally
   - ☐ Disagree
   - ☐ Not strong opinion
   - ☐ Agree
   - ☐ Agree Strongly

7. Technology breaks down too often to be of very much use
   - ☐ Disagree totally
   - ☐ Disagree
   - ☐ Not strong opinion
   - ☐ Agree
   - ☐ Agree Strongly

8. I am very confident when it comes to working with technology at home/at work
   - ☐ Disagree totally
   - ☐ Disagree
   - ☐ Not strong opinion
   - ☐ Agree
   - ☐ Agree Strongly

9. When I have a problem with technology, I usually know how to fix it by myself
   - ☐ Disagree totally
   - ☐ Disagree
   - ☐ Not strong opinion
   - ☐ Agree
   - ☐ Agree Strongly

10. I like buying the newest and latest technologies on the market
    - ☐ Disagree totally
    - ☐ Disagree
    - ☐ Not strong opinion
    - ☐ Agree
    - ☐ Agree Strongly

11. Technology makes my life easier
    - ☐ Disagree totally
    - ☐ Disagree
    - ☐ Not strong opinion
    - ☐ Agree
    - ☐ Agree Strongly

12. Using new technology is very difficult for me
    - ☐ Disagree totally
    - ☐ Disagree
    - ☐ Not strong opinion
    - ☐ Agree
    - ☐ Agree Strongly

Experience with Safety Technologies

Advanced vehicle safety systems assist the driver by providing stationary object alerts, steering control, lane departure warnings, automatic braking, and/or a variety of other methods. Some common examples include automatic emergency braking (AEB), forward collision warning (FCW), lane departure warning (LDW), adaptive cruise control (ACC), and blind spot warning (BSW). Please answer the following questions **based on your opinions and any past experiences with advanced vehicle safety systems.** To answer, **check only one box** for each statement that best expresses your answer (unless indicated otherwise).

13. Indicate which of the following safety technologies you have **heard of** (select all that apply)
    - ❑ Automated parking
    - ❑ Remote-control drive or remote-control parking
    - ❑ Traffic jam assist
    - ❑ Adaptive cruise control
    - ❑ Forward collision warning system
    - ❑ Automatic emergency braking
    - ❑ Blind spot warning
    - ❑ Camera-mirror system
    - ❑ Lane-keep assist
    - ❑ Lane centering assist
    - ❑ Lane departure warning
    - ❑ Traffic sign recognition system
    - ❑ Pedestrian detection
    - ❑ Rear backing camera

14. Indicate which of the following safety technologies you have **used in your personal or commercial vehicle.** Please check all that apply.
    - ❑ Automated parking
    - ❑ Remote-control drive or remote-control parking
    - ❑ Traffic jam assist
    - ❑ Adaptive cruise control
    - ❑ Forward collision warning system
    - ❑ Automatic emergency braking
    - ❑ Blind spot warning
    - ❑ Camera-mirror system
    - ❑ Lane-keep assist
    - ❑ Lane centering assist
    - ❑ Lane departure warning
    - ❑ Traffic sign recognition system
    - ❑ Pedestrian detection
    - ❑ Rear backing camera

15. For each of the safety technologies **you indicated using above,** indicate whether you have experienced a situation in which this safety technology worked to **prevent a crash**.

Automated parking	o Yes	o No
Remote-control drive or remote-control parking	o Yes	o No
Traffic jam assist	o Yes	o No
Adaptive cruise control	o Yes	o No
Forward collision warning system	o Yes	o No
Automatic emergency braking	o Yes	o No
Blind spot warning	o Yes	o No
Camera-mirror system	o Yes	o No
Lane-keep assist	o Yes	o No
Lane centering assist	o Yes	o No
Lane departure warning	o Yes	o No
Traffic sign recognition system	o Yes	o No
Pedestrian detection	o Yes	o No
Rear backing camera	o Yes	o No

16. Have you ever been trained in the use of advanced safety technologies? This includes informal training such as a friend or relative teaching you how to use the advanced safety technologies in their vehicle.

    _____ Yes _____No (If **no**, skip to the next section)

17. If **yes,** how long was the training you received? Please indicate length in hours, days, or weeks, whatever is appropriate.

    Length of training: _____ (#) _____ (hours, days, weeks, etc.)

    If **yes**, please describe the type of training you received:

    _____

    _____

    _____

Acceptance of Advanced Vehicle Safety Technologies, Before

Please circle how much you agree or disagree with each of the following statements.

18. I am interested in using advanced safety technologies in my commercial vehicle.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

19. I think advanced safety technologies help people drive more safely.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

20. I am comfortable with the idea of my vehicle driving without me controlling steering or braking.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

21. I would recommend advanced safety technologies to drivers at other companies.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

22. I think warnings sounds in vehicles annoy drivers.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

23. I feel advanced safety technologies cause drivers to pay less attention to the road.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

24. I think advanced safety technologies work well in all driving conditions.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

25. I think advanced safety technologies help drivers avoid a crash.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

26. I think advanced safety technologies threaten the jobs of professional drivers.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

27. I rely on (or would rely on) advanced safety technology to alert me to potential accidents.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

OMB Control No.: 2126-0083
Expiration Date: 06/30/2027

Questionnaire #3 – PVT

Public Burden Statement

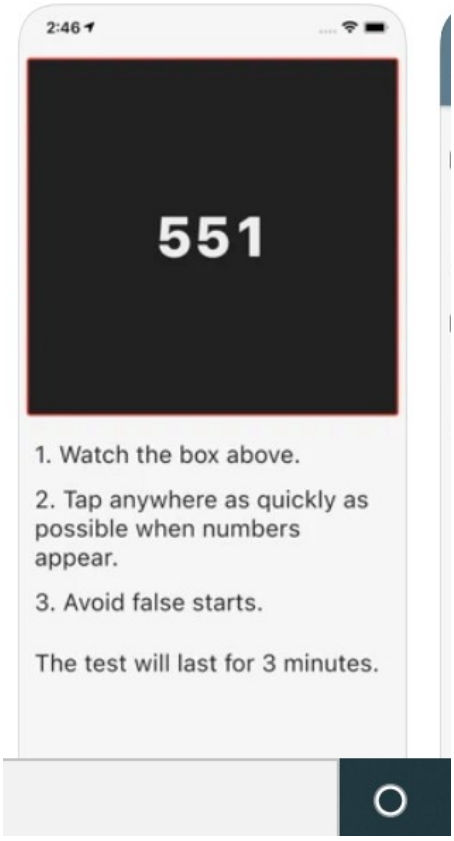
A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control number. The OMB Control number for this information collection is 2126-00*XX*. Public reporting for this collection of information is estimated to be approximately 3 minutes per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are voluntary. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to brian.routhier@dot.gov.

Psychomotor Vigilance Test (PVT)

The original 10-minute PVT was invented by Dr. David F. Dinges, through support from the U.S. Office of Naval Research. It has been validated to detect slowing of psychomotor speed and lapses of attention, as well as vigilance decrements and instability in behavioral alertness, which are common adverse effects of fatigue on performance due to inadequate sleep, wakefulness at night, and prolonged time-on-task. The original 10-minute PVT has been validated to be sensitive to fatigue in more than 100 published scientific studies that include a range of experimental, simulated, and some occupational (real-world) evaluations (e.g., transportation operators, health care professionals, and first responders).

Through research supported by the National Space Biomedical Research Institute (NSBRI) via a National Aeronautics and Space Administration (NASA) cooperative agreement, Dr. Dinges and colleagues empirically developed an algorithm for PVT stimulus delivery rate and response quantification that resulted in the briefer 3-minute PVT-B. Using experiments supported by the National Institutes of Health, NSBRI/NASA, and the Department of Homeland Security on the performance effects of total and chronic partial sleep loss in healthy adults, they demonstrated that performance on the 3-minute PVT-B tracked performance on the 10-minute PVT throughout total and partial sleep loss. Thus, this study will incorporate the PVT-B.

OMB Control No.: 2126-0083
Expiration Date: 06/30/2027



OMB Control No.: 2126-0083
Expiration Date: 06/30/2027

Questionnaire #4 – Driver Behavior Questionnaire

Public Burden Statement

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control number. The OMB Control number for this information collection is 2126-00*XX*. Public reporting for this collection of information is estimated to be approximately 3.6 minutes per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are voluntary. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to brian.routhier@dot.gov.

Driving Behavior Questionnaire

Below are 38 questions about your driving. Please note the rating scale has changed from the previous section. Read each item and choose your response by marking or circling your response. There are no "correct" responses. Please answer honestly. All responses will only be used for research purposes and will not be used for regulatory purposes.

1. I drive when I am angry or upset.

   Never Rarely Sometimes Often Always

2. I lose my temper when driving.

   Never Rarely Sometimes Often Always

3. I consider the actions of other drivers to be inappropriate or "stupid."

   Never Rarely Sometimes Often Always

4. I flash my headlights when I am annoyed by another driver.

   Never Rarely Sometimes Often Always

5. I make rude gestures (for example, giving the "finger" or yelling curse words) toward drivers who annoy me.

   Never Rarely Sometimes Often Always

6. I feel resentful when I do not get my own way.

   Never Rarely Sometimes Often Always

7. I verbally insult drivers who annoy me.

Never Rarely Sometimes Often Always

8. I deliberately use my car/truck to block drivers who tailgate me.

Never Rarely Sometimes Often Always

9. If another driver seriously threatens my safety, I will defend myself.

Never Rarely Sometimes Often Always

10. I would tailgate a driver who annoys me.

Never Rarely Sometimes Often Always

11. I try to get even rather than forgive and forget.

Never Rarely Sometimes Often Always

12. I “drag race” other drivers at stop lights to get out front.

Never Rarely Sometimes Often Always

13. I will illegally pass a car/truck that is going too slowly.

Never Rarely Sometimes Often Always

14. I am willing to admit when I’ve made a mistake.

Never Rarely Sometimes Often Always

15. I feel it is my right to strike back in some way, if I feel another driver has been aggressive toward me.

Never Rarely Sometimes Often Always

16. When I get stuck in a traffic jam, I get very irritated.

Never Rarely Sometimes Often Always

17. I will race a slow-moving train to a railroad crossing.

Never Rarely Sometimes Often Always

18. I have taken unfair advantage of another person.

Never Rarely Sometimes Often Always

19. I will weave in and out of slower traffic.

Never Rarely Sometimes Often Always

20. I will drive if I am only mildly intoxicated or buzzed.

Never Rarely Sometimes Often Always

21. I am courteous, even to people who are disagreeable.

Never Rarely Sometimes Often Always

22. When someone cuts me off, I feel I should punish him/her.

Never Rarely Sometimes Often Always

23. I am a good listener, no matter who I'm talking to.

Never Rarely Sometimes Often Always

24. I get impatient and/or upset when I fall behind schedule when I am driving.

Never Rarely Sometimes Often Always

25. Passengers in my car/truck tell me to calm down.

Never Rarely Sometimes Often Always

26. I get irritated when a car/truck in front of me slows down for no reason.

Never Rarely Sometimes Often Always

27. I will cross double yellow lines to see if I can pass a slow-moving car/truck.

Never Rarely Sometimes Often Always

28. I feel it is my right to get where I need to go as quickly as possible.

Never Rarely Sometimes Often Always

29. I am an aggressive driver.

Never Rarely Sometimes Often Always

30. I feel that passive drivers should learn how to drive or stay home.

Never Rarely Sometimes Often Always

31. There have been occasions when I have taken advantage of someone.

Never Rarely Sometimes Often Always

32. I keep some type of weapon in my car/truck.

Never Rarely Sometimes Often Always

33. I will drive in the shoulder lane or median to get around a traffic jam.

Never Rarely Sometimes Often Always

34. When passing a car/truck on a 2-lane road, I will barely miss on-coming cars.

Never Rarely Sometimes Often Always

35. I will drive when I am drunk.

Never Rarely Sometimes Often Always

36. I feel that I may lose my temper if I have to confront another driver.

Never Rarely Sometimes Often Always

37. I consider myself to be a risk-taker.

Never Rarely Sometimes Often Always

38. I feel that most traffic “laws” could be considered as suggestions.

Never Rarely Sometimes Often Always

OMB Control No.: 2126-0083
Expiration Date: 06/30/2027

Questionnaire #5 - Simulator Sickness Questionnaire

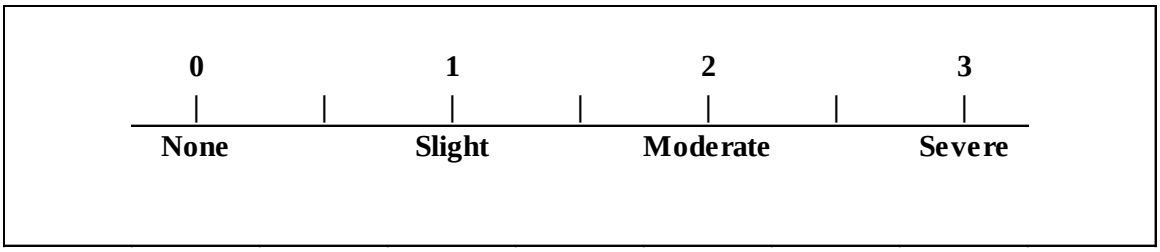
Public Burden Statement

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control number. The OMB Control number for this information collection is 2126-00*XX*. Public reporting for this collection of information is estimated to be approximately 0.5 minutes per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are voluntary. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to brian.routhier@dot.gov.

Initial: Administered after initial 5-minute test drive.

Date: _____ Driver ID #_____

Please answer each of the statements in the table using the scale below. Circle whole numbers only.



SYMPTOM	RATING
General Discomfort	
Fatigue	
Headache	
Eye Strain	
Difficulty Focusing	
Increased Salivation	
Dry Mouth	
Sweating	
Nausea	
Difficulty Concentrating	
Fullness of Head	
Blurred Vision	

Dizzy (eyes open)	
Dizzy (eyes closed)	
Vertigo	
Stomach Awareness	
Burping	

Simulator Sickness Score: _____

Intermittent Simulator Health Checks

These questions will be asked periodically throughout the study while participants take short breaks. These help identify if the participant does not feel the negative effects of simulator sickness.

Verbally ask the participant:

Are you feeling any of the following symptoms?
Nausea
General Discomfort
Stomach Awareness
Increased Salivation
Sweating
Difficulty Concentrating
Dizziness
Eyestrain

If yes to one or more: Ask the participant if they would like to take a short break (10-15 minutes), or if they need to leave. If possible, have the participant look at something far in the distance, at least 20 feet away.

If not: Ask them if they are ready to continue.

OMB Control No.: 2126-0083
Expiration Date: 06/30/2027

Questionnaire #6 – Post Study Experiences/Perceptions

Public Burden Statement

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control number. The OMB Control number for this information collection is 2126-00*XX*. Public reporting for this collection of information is estimated to be approximately 6.1 minutes per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are voluntary. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to brian.routhier@dot.gov.

Acceptance of Advanced Vehicle Safety Technologies, After

Please select how much you agree or disagree with each of the following statements.

1. I am interested in using advanced safety technologies in my commercial vehicle.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

2. I think advanced safety technologies help people drive more safely.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

3. I am comfortable with the idea of my vehicle driving without me controlling steering or braking.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

4. I would recommend advanced safety technologies to drivers at other companies.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

5. I think warning sounds in vehicles annoy drivers.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

6. I feel advanced safety technologies cause drivers to pay less attention to the road.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

7. I think advanced safety technologies work well in all driving conditions.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

8. I think advanced safety technologies help drivers avoid a crash.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

9. I think advanced safety technologies threaten the jobs of professional drivers.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

10. I rely on advanced safety technology to alert me to potential accidents.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Future Use of Full Automation Safety Technologies

11. Would you feel less fatigued over the course of a driving day if your truck had technology that helped to keep you in your lane, maintain a safe speed, and keep a safe following distance?
    a. Yes
    b. No
    c. Please explain why:

    _____

    _____

12. If allowed by the hours-of-service (HOS) regulations, would you feel safe being on duty or driving beyond the current HOS limits if your truck had technology that helped to keep you in your lane, maintain a safe speed, and keep a safe following distance?
    a. Yes
    b. No
    c. Please explain why:

    _____
    _____

13. If allowed, would you feel safe being off duty in the sleeper berth if your truck had technology that was capable of operating safely at highway speeds for long periods between highway exits or *parking itself on a shoulder/ramp*?
    a. Yes
    b. No
    c. Please explain why:

    _____
    _____

14. If allowed, would you feel safe being off duty in the sleeper berth if your truck had technology that was capable of operating safely at highway speeds *while platooning with another truck operated by a human* for long periods between highway exits?
    a. Yes
    b. No
    c. Please explain why:

    _____
    _____

15. If allowed, would you feel safe being off duty in the sleeper berth if your truck had technology that was capable of operating safely at highway speeds for long periods between highway exits *while a remote assistant monitored your truck and traffic*?
    a. Yes
    b. No
    c. Please explain why:

    _____
    _____

16. Would you feel safe driving your typical truck around other trucks that are *remotely driven by humans (not onboard the truck) at low speeds AND by full automation at high speeds* for long periods between highway exits?
    a. Yes
    b. No
    c. Please explain why:

    _____
    _____

17. Please describe any situations where you think a truck with full automation safety technology would be beneficial, if ever. Consider all locations a combination truck-tractor trailer needs to operate at varying speeds and environments, for example yards, ports, city roads with high traffic, highways with low traffic, highways with high traffic, etc.

    _____
    _____
    _____

Overall Likes and Dislikes

18. What are two things you **liked** about the automated system, and why?

    I._____

    _____

    II._____

    _____

19. What are two things you **disliked** about the automated system, and why?

    I._____

    _____

    II._____

    _____

OMB Control No.: 2126-0083
Expiration Date: 06/30/2027

Virginia Tech Transportation Institute
HUMAN-ADS TEAM

Additional Information about the Commercial Training & Prototyping Simulator (CTAPS) and VTTI DAS Used to Collect Data

The CTAPS (Figure 1; FAAC model TT-2000-V7) is a full-mission driver- and/or hardware-in-the-loop simulation tool. CTAPS allows VTTI to simulate multiple commercial vehicle types, including dump trucks and tractor-trailers with various trailer types, lengths, and load configurations. VTTI can produce interactive and programmable traffic and roadway environments (e.g., snow, rain, construction zones, and different levels of traffic densities), trigger vehicle malfunctions (e.g., front tire blowout and air pressure loss), and develop custom SCEs. CTAPS provides a 225-degree forward field of view along with two rear video channels that can be viewed through real west coast mirrors installed on the truck cab. CTAPS can also display an overhead (birds-eye) view of the training or scenario. All simulator hardware has been updated to current high-performance standards as of early 2021.

Figure 1. VTTI's CTAPS

Planned upgrades for the CTAPS include full ADS capabilities and remote operator control. The ADS capabilities will function to simulate real CMV ADS operations, including a button on the instrument panel to initiate ADS takeover from the driver and to disengage the ADS and return manual control to the driver. An instrument panel indicator light will alert the driver to ADS activation and any potential malfunctions. Remote operator control will include a separate PC station with steering wheel and accelerator/brake pedals for the remote operator to control the simulator. The remote operator control station will include the forward view of the roadway and mirror views along with indicators of remote operations and any failures. Data captured from the CTAPS will include the following metrics: steering input, brake input, acceleration/deceleration, speed, stop sign/traffic light violations, major and minor crashes, curb strikes, near crashes, and lane excursions.

VTTI's DAS will allow for the collection of high-quality behavioral data throughout the ADS-driver/remote operator scenarios. In this study, VTTI will equip the CTAPS with VTTI's FlexDAS (Figure 2). VTTI's hardware and equipment team, which specializes in developing, manufacturing, and implementing innovative systems in transportation research, will install the data collection equipment in the CTAPS.

Figure 2. VTTI's FlexDAS

The FlexDAS can collect, encode, and encrypt eight 1080p high-definition video streams (see Figure 3 for example photos of demonstrating the FlexDAS' video quality). For this study, the FlexDAS will be integrated to collect data from the forward roadway simulation, the left- and right-side simulations, a driver facing camera, an over-the-shoulder camera, a remote operator facing camera (when appropriate), and a remote operator over-the-shoulder camera (when appropriate). The encrypted data are stored on a removable solid-state drive within the FlexDAS.

Figure 3. Example of High-quality Video from FlexDAS

Smart Eye's eye-tracking solution will be used in all simulation testing. Smart Eye uses artificial intelligence to observe driver attention and alertness reliably, unobtrusively, and in real time. Smart Eye will allow the VTTI team to collect high-quality, detailed data on participant engagement in the driving/monitoring tasks, distraction from vehicle monitoring, and fatigue. At a minimum, dependent variables captured by the eye-tracking system include driver attention and duration, gaze direction, and drowsiness.