Participant ID_____

This collection of information is voluntary and will be used for formative purposes only so that we may develop vehicle safety programs designed to reduce the number of traffic-related injuries and deaths. 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 2127-0741. Public reporting for this collection of information is estimated to be approximately 25 minutes per response, including the time for reviewing instructions, 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: Information Collection Clearance Officer, National Highway Traffic Safety Administration, 1200 New Jersey Ave, S.E., Washington, DC, 20590.

For questions about this study, please contact Andrew Krum at 540-231-0353 or akrum@vtti.vt.edu

For questions about the approval of this research, please contact the Virginia Tech IRB at 540-231-3732 or irb@vt.edu.

INITIAL CAS TECHNOLOGY QUESTIONNAIRE

Questionnaire

Collision Mitigation Technologies are safety systems that alert drivers to unfolding conflicts and automatically take action if the driver does not respond to unfolding conflicts. Please answer the following questions **based your opinions and any past experiences with CAS technology.** To answer, **check only one box** for each statement that best expresses your answer (unless indicated otherwise). The questionnaire will take about 25 minutes to complete.

General Use of the Collision Mitigation Technology

1. Based on your opinions and experiences, please indicate how much you agree with the following statements

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
a) Collision mitigation technology makes drivers safer	□	□	□	□	□	□	□
b) Collision mitigation technology makes driving easier	□	□	□	□	□	□	□
c) I'm less distracted and make fewer errors while using collision mitigation technology	□	□	□	□	□	□	□
d) I rely on collision mitigation technology to alert me to potential accidents	□	□	□	□	□	□	□
e) False alerts negatively affect my performance	□	□	□	□	□	□	□
f) I find the technology easy to understand	□	□	□	□	□	□	□
g) Collision mitigation technology is more useful in bad weather or traffic	□	□	□	□	□	□	□
h) Collision mitigation technology works properly in bad weather or traffic	□	□	□	□	□	□	□
i) Collision mitigation technology should be installed as standard equipment in commercial vehicles	□	□	□	□	□	□	□
j) Collision mitigation technology gives alerts too early	□	□	□	□	□	□	□
k) I would recommend collision mitigation technology to drivers at other companies	□	□	□	□	□	□	□

Following Distance Alert

The collision mitigation technology has a following distance alert that beeps when the distance between the truck and the vehicle ahead is closing. The alert beeps faster as the distance closes. The following questions ask about this alert.

2. Based on your opinions and experiences, the **following distance** alert…

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
a) …is easy to hear in all situations	☐	☐	☐	☐	☐	☐	☐
b) …is good at getting a drivers' attention back to driving	☐	☐	☐	☐	☐	☐	☐
c) …helps drivers avoid a crash	☐	☐	☐	☐	☐	☐	☐
d) …distracts or annoys drivers	☐	☐	☐	☐	☐	☐	☐
e) …works properly in all weather conditions	☐	☐	☐	☐	☐	☐	☐
f) …works properly in all traffic conditions	☐	☐	☐	☐	☐	☐	☐
g) …encourages drivers to pass slow lead vehicles	☐	☐	☐	☐	☐	☐	☐
h) …works well on curved roads	☐	☐	☐	☐	☐	☐	☐
i) …causes drivers to pay less attention to the road	☐	☐	☐	☐	☐	☐	☐

3. What percentage of following distance alerts do you think will be false alerts (that is, alerts in response to objects that are not in the path of the vehicle)?
   _____%

4. What percentage of following distance alerts do you think will be safety-critical (that is, alert drivers to a potential collision)?
   _____%

5. What are the top three things you think you will like about the following distance alert?

   1. _____
   2. _____
   3. _____

6. What are the top three things you think you will dislike about the following distance alert?

   1. _____
   2. _____
   3. _____

Stationary Object Alert

The collision mitigation technology has a stationary object alert that beeps when a stationary object on the road is detected. The following questions ask about this alert.

7. Based on your opinions and experiences, the **stationary object alert**…

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
a) …is easy to hear in all situations	☐	☐	☐	☐	☐	☐	☐
b) …is good at getting drivers' attention back to driving	☐	☐	☐	☐	☐	☐	☐
c) …helps drivers avoid a crash	☐	☐	☐	☐	☐	☐	☐
d) …distracts or annoys drivers	☐	☐	☐	☐	☐	☐	☐
e) …works properly in all weather conditions	☐	☐	☐	☐	☐	☐	☐
f) …works properly in all traffic conditions	☐	☐	☐	☐	☐	☐	☐
g) …works well on curved roads	☐	☐	☐	☐	☐	☐	☐
h) …causes drivers to pay less attention to the road	☐	☐	☐	☐	☐	☐	☐

8. What percentage of stationary object alerts do you think will be false alerts (that is, alerts that activate in response to objects that are not valid threats, such as overpasses and guard rails)?
   _____%

9. What percentage of stationary object alerts do you think will be safety-critical (that is, alert drivers to a potential collision)?
   _____%

10. What are the top three things you think you will like about the stationary object alert?

    1. _____
    2. _____
    3. _____

11. What are the top three things you think you will dislike about the stationary object alert?

    1. _____
    2. _____
    3. _____

Impact Alert

The collision mitigation technology has an impact alert that presents lights on the dash, rapidly beeps to alert you to an imminent collision. The following questions ask about this alert.

12. Based on your opinions and experiences, the **impact alert** …

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
a) …is easy to hear in all situations	☐	☐	☐	☐	☐	☐	☐
b) …is good at getting drivers' attention back to driving	☐	☐	☐	☐	☐	☐	☐
c) …helps drivers avoid a crash	☐	☐	☐	☐	☐	☐	☐
d) …distracts or annoys drivers	☐	☐	☐	☐	☐	☐	☐
e) …works well in all weather conditions	☐	☐	☐	☐	☐	☐	☐
f) …works well in all traffic conditions	☐	☐	☐	☐	☐	☐	☐
g) …works well on curved roads	☐	☐	☐	☐	☐	☐	☐
h) …causes drivers to pay less attention to the road	☐	☐	☐	☐	☐	☐	☐

13. What percentage of impact alerts do you think will be false alerts (that is, alerts that activate in response to objects that are not valid threats, such as vehicles in a different lane)?
    _____%

14. What percentage of impact alerts do you think will be safety-critical (that is, alert drivers to a potential collision)?
    _____%

15. What are the top three things you think you will like about the impact alert?

    1. _____
    2. _____
    3. _____

16. What are the top three things you think you will dislike about the impact alert?

    1. _____
    2. _____
    3. _____

Automatic Emergency Braking

The collision mitigation technology can apply the truck's brakes to help you avoid an imminent collision. The following questions ask about this activation.

17. Based on your opinions and experiences, the **automatic emergency braking** applied at the last moment…

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
a) …is beneficial	□	□	□	□	□	□	□
b) …is the most appropriate action for the vehicle to take	□	□	□	□	□	□	□
c) …works well in all weather conditions	□	□	□	□	□	□	□
d) …works well in all traffic conditions	□	□	□	□	□	□	□
e) …is good at getting drivers' attention back to driving	□	□	□	□	□	□	□
f) …helps drivers avoid a crash	□	□	□	□	□	□	□
g) …distracts or annoys drivers	□	□	□	□	□	□	□
h) …works well on curved roads	□	□	□	□	□	□	□
i) …causes drivers to pay less attention to the road	□	□	□	□	□	□	□

18. What percentage of AEB activations do you think will be false alerts (that is, alerts that activate in response to objects that are not valid threats, such as vehicles in a different lane)?
    _____%

19. What percentage of AEB activations do you think will be safety-critical (that is, activations in response to a potential collision)?
    _____%

20. What are the top three things you think you will like about the automatic braking?

    1. _____
    2. _____
    3. _____

21. What are the top three things you think you will dislike about the automatic braking?

    1. _____
    2. _____
    3. _____

Adaptive Cruise Control (ACC)

When engaged, the adaptive cruise control maintains a constant headway to a slowing lead vehicle by reducing throttle, applying the engine retarder, and applying the truck's brakes when needed. The following questions ask about this feature.

22. Based on your opinions and experiences, please rate the statements about **adaptive cruise control** below.

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
a) It is clear when ACC has detected a lead vehicle	□	□	□	□	□	□	□
b) ACC's de-throttling is helpful in keeping a safe distance	□	□	□	□	□	□	□
c) ACC's engaging the engine retarder is helpful in keeping a safe distance	□	□	□	□	□	□	□
d) ACC's braking helps keep a safe distance	□	□	□	□	□	□	□
e) ACC automatically slowing the truck when lead traffic slows is annoying to drivers	□	□	□	□	□	□	□
f) ACC works properly in all weather conditions	□	□	□	□	□	□	□
g) The ACC works properly in all traffic conditions	□	□	□	□	□	□	□
h) ACC applies a sufficient amount of braking	□	□	□	□	□	□	□
i) ACC works on curved roads	□	□	□	□	□	□	□
j) Drivers know when they need to start braking because ACC isn't sufficient	□	□	□	□	□	□	□
k) Drivers pay less attention to the road when using ACC	□	□	□	□	□	□	□

23. What percentage of the times ACC slowing the vehicle do you think will be false alerts (for example, slowing in response to objects that are not valid threats, such as bridges and trees)?
    _____%

24. What percentage of the times ACC slowed the vehicle do you think were safety-critical (that is, slowing in response to a potential collision)?
    _____%

25. What are the top three things you think you will like about the ACC feature?

    1. _____
    2. _____
    3. _____

26. What are the top three things you think you will dislike about the ACC feature?

    1. _____
    2. _____
    3. _____

Lane Departure Alert

The collision mitigation technology has a lane departure alert that beeps when the truck crosses a lane marking when the turn signal is not activated. The following questions ask about this alert.

27. Based on your opinions and experiences, the **lane departure alert**…

	Strongly Agree	Agree	Slightly Agree	Neutral	Slightly Disagree	Disagree	Strongly Disagree
a) …is easy to hear in all situations	□	□	□	□	□	□	□
b) …is good at getting drivers' attention back to driving	□	□	□	□	□	□	□
c) …helps drivers avoid a crash	□	□	□	□	□	□	□
d) …distracts or annoys drivers	□	□	□	□	□	□	□
e) …works well, assuming lane markings are clear	□	□	□	□	□	□	□
f) …works properly in all weather conditions	□	□	□	□	□	□	□
g) …works properly in all traffic conditions	□	□	□	□	□	□	□
h) …works properly in all lighting conditions	□	□	□	□	□	□	□
i) …works well on curved roads	□	□	□	□	□	□	□
j) …causes drivers to pay less attention to the road	□	□	□	□	□	□	□

28. What percentage of lane departure alerts do you think will be false alerts (for example, alerts that activate in response to faded lane markings in construction zones)?
    _____%

29. What percentage of lane departure alerts do you think will be safety-critical (that is, helps correct an unintentional lane drift)?
    _____%

30. What are the top three things you think you will like about the lane departure warning?

    1. _____
    2. _____
    3. _____

31. What are the top three things you think you will dislike about the lane departure warning?

    1. _____
    2. _____
    3. _____

32. Please rank which technologies you think will work best for you from 1 (Best) to 6 (Worst).

____ Following Distance Alert
____ Stationary Vehicle Alert
____ Impact Alert
____ Adaptive Cruise Control
____ Lane Departure Warning
____ Automatic Emergency Braking

33. Which kinds of alerts do you prefer? (Please check all that apply)

____ Audio alerts
____ Visual alerts
____ Vibration or haptic alerts

34. Do you think there will be any issues with maintenance or calibration of the technology? For example, dirt, bugs, rain, ice, sunlight glare, bumps, or vibration?

_____

_____

_____

35. Do you think there will be any unintended consequences from using collision mitigation technology?

_____

_____

_____

36. Please provide any additional thoughts you might have regarding collision mitigation technology.

_____

_____

_____

Thank you for participating in this questionnaire.