

NHTSA AUTONOMOUS VEHICLES Discussion Guide

NOTE TO MODERATOR: When group is fully assembled, read:

This focus group is being conducted to collect information that will help us better understand your opinions about an important highway safety issue.

This collection of information is voluntary and will be used for formative purposes only so that we may develop communications 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 2127-0682. Your participation today in this collection of information is estimated to average 90 minutes, including the time for reviewing instructions. All responses to this collection of information are voluntary.

- | | | |
|-------------|--|--------------------------------------|
| I. | Welcome | [5 minutes/5 minutes total] |
| II. | Introduction | [5 minutes/10 minutes total] |
| | a. What are your biggest safety concerns while driving? | |
| | b. How might technology be able to address these concerns? | |
| III. | Autonomous Driving Top-of-Mind | [10 minutes/20 minutes total] |

Our discussion this evening is going to focus on automated vehicle safety technology.

- a. When you hear the phrase automated vehicle safety technology, what comes to mind?
What do you think about?
 - i. Is that positive or negative
 - ii. Positive – why?
 - iii. Negative – why?

- b. What would you call these types of technologies? If you had to group them all under one phrase what would that be?

- c. When it comes to overall vehicle safety and technology, people can have different perspectives. I'm going to read you two perspectives and after I do I'd like you to tell me, which one comes closer to your own.

DESCRIPTION #1 IN WORKBOOK

- i. **[HUMANS ARE SAFER]** Some people say that it's safer when they (the driver) are in complete control of all the vehicle functions. They trust themselves more than technology, and say that technology software could be hacked, or that they can't fully relax in a vehicle where driving is controlled by a computer.
- ii. **[TECHNOLOGY IS SAFER]** Others say that vehicles in which driving is controlled by a computer are safer, because the technology is proven, there is new and better technology on the horizon and technology can react more quickly and reliably than people can.

[DEBRIEF]

- Place a check mark next to the one you most agree with
 - Show of hands around the table
 - Why do you feel that way?
- d. Next, I'd like to show you a description of the type of automated vehicle safety technology we'll be discussing:

DESCRIPTION #2 IN WORKBOOK

Automated vehicle safety technology covers a range of technologies from existing features like adaptive cruise control that adjusts your speed based on the distance to the vehicle in front of you, blind spot detection, collision warnings like lane departure, and automatic emergency braking, and all the way to emerging technologies where the vehicle performs all the driving functions, removing the need for manual operation of the steering wheel or gas and brake pedals entirely.

[CAPTURE ON EASEL]

- i. Based on this description, what do you see as the benefits to increasing the amount of vehicles on the road with these types of technologies?
- ii. And what are your biggest concerns about increasing the number of vehicles on the road with these types of technologies? Why is that a concern for you?
- iii. How could that concern be overcome? What would you need to read, see or hear to make that issue less of a concern for you?

IV. Technology Progression

[25 minutes/45 minutes total]

- a. As I mentioned earlier, there are a variety of different levels of technology that can be incorporated into vehicles to assist drivers and help vehicles operate more safely. Let's think of these across six different levels.

[DESCRIPTION #3 IN WORKBOOK / MODERATOR READS WITH PARTICIPANTS]

Level 0 — The driver (human) controls everything: steering, brakes, throttle, power.

Level 1 — Most functions are still controlled by the driver, but some (like braking) can be done automatically by the car.

Level 2 — At least 2 functions are automated (like adaptive cruise control and lane-centering), but the driver must be ready to take control of the vehicle.

Level 3 — Drivers are still necessary but are not required to monitor the situation as with previous levels.

Level 4 — Vehicles perform all safety-critical driving functions and monitor roadway conditions for an entire trip, with option for human driving.

Level 5 — No option for human driving – no steering wheel or controls.

Progression from Level 0 – 1

- i. Thinking of these first two levels, Level 0 and Level 1, what are some of the benefits that you might see in a Level 1 vehicle that could make it appealing to drivers?

[CAPTURE ON EASEL]

- ii. Let's think about the other side as well. What are some of the concerns that you might see in a Level 1 vehicle that could make it unappealing to drivers?

[CAPTURE ON EASEL]

WORKBOOK ACTIVITY #1

- iii. Now that you have weighed some of the benefits and concerns of a Level 1 vehicle, how comfortable would you be moving from driving a Level 0 vehicle to Level 1 vehicle? Please record your response in your workbook.

SCALE: 0 – Not at all comfortable to 10 – Extremely comfortable

Progression from Level 1 – 2

- iv. Thinking of these next two levels, Level 1 and Level 2, what are some of the benefits that you might see in a Level 2 vehicle that could make it appealing to drivers?
- v. Let's think about the other side as well. What are some of the concerns that you might see in a Level 2 vehicle that could make it unappealing to drivers?

WORKBOOK ACTIVITY #1 (continued)

- vi. Now that you have weighed some of the benefits and concerns of a Level 2 vehicle, how comfortable would you be moving from driving a Level 1 vehicle to Level 2 vehicle? Please record your response in your workbook.

SCALE: 0 – Not at all comfortable to 10 – Extremely comfortable

Progression from Level 2 – 3

- vii. Thinking of these next two levels, Level 2 and Level 3, what are some of the benefits that you might see in a Level 3 vehicle that could make it appealing to drivers?
- viii. Let's think about the other side as well. What are some of the concerns that you might see in a Level 3 vehicle that could make it unappealing to drivers?

WORKBOOK ACTIVITY #1 (continued)

- ix. Now that you have weighed some of the benefits and concerns of a Level 3 vehicle, how comfortable would you be moving from driving a Level 2 vehicle to Level 3 vehicle? Please record your response in your workbook.

SCALE: 0 – Not at all comfortable to 10 – Extremely comfortable

Progression from Level 3 – 4

- x. Thinking of these next two levels, Level 3 and Level 4, what are some of the benefits that you might see in a Level 4 vehicle that could make it appealing to drivers?
- xi. Let's think about the other side as well. What are some of the concerns that you might see in a Level 4 vehicle that could make it unappealing to drivers?

WORKBOOK ACTIVITY #1 (continued)

- xii. Now that you have weighed some of the benefits and concerns of a Level 4 vehicle, how comfortable would you be moving from driving a Level 3 vehicle to Level 4 vehicle? Please record your response in your workbook.

SCALE: 0 – Not at all comfortable to 10 – Extremely comfortable

Progression from Level 4 – 5

- xiii. Thinking of these last two levels, Level 4 and Level 5, what are some of the benefits that you might see in a Level 5 vehicle that could make it appealing to drivers?
- xiv. Let's think about the other side as well. What are some of the concerns that you might see in a Level 5 vehicle that could make it unappealing to drivers?

WORKBOOK ACTIVITY #1 (continued)

- xv. Now that you have weighed some of the benefits and concerns of a Level 5 vehicle, how comfortable would you be moving from driving a Level 4 vehicle to Level 5 vehicle? Please record your response in your workbook.

SCALE: 0 – Not at all comfortable to 10 – Extremely comfortable

V. Image Collateral Review [15 minutes/60 minutes total]

- a. Next, we are going to look at some different ways that this type of information about driver assistance technologies could be communicated to people like yourself graphically.

[DISTRIBUTE IMAGE #1]

Take a moment to look through all the information on this image. As you do, please **carefully** CIRCLE any words, phrases or images that you find particularly compelling and positive in helping you to feel better informed about these technologies.

At the same time, please ~~STRIKE THROUGH~~ any words, phrases or images that you find hard to understand or are not appealing to you.

- b. [DEBRIEF IMAGE #1 Exercise]
 - What do you think works well in this image?
 - What could be improved?

- c. Great, let's take a look at another image:

[DISTRIBUTE IMAGE #2]

Again, take a moment to look through all the information on this image. As you do, please **carefully** CIRCLE any words, or phrases or images that you find particularly compelling and positive in helping you to feel better informed about these technologies.

At the same time, please ~~STRIKE THROUGH~~ any words, phrases or images that you find hard to understand or are not appealing to you.

- d. [DEBRIEF IMAGE #2 Exercise]
 - What do you think works well in this image?
 - What could be improved?

- e. Now, let's take a look at one last image.

[DISTRIBUTE IMAGE #3]

Again, look through all the information on this image. As you do, please **carefully** CIRCLE any words, phrases or images that you find particularly compelling and positive in helping you to feel better informed about these technologies.

At the same time, please **STRIKE THROUGH** any words, phrases or images that you find hard to understand or are not appealing to you.

- f. [DEBRIEF IMAGE #3 Exercise]
- What do you think works well in this image?
 - What could be improved?

VI. Technology Nomenclature

[10 minutes/70 minutes total]

- a. Let's think about different levels of automation that could be included in the type of technology we've been talking about. Which of the following names do you think is the best fit for some of these different possible levels?

WORKBOOK ACTIVITY #2

- i. The driver (human) controls everything: steering, brakes, throttle, power.
 1. Human Only
 2. No Automation
 3. Other [SPECIFY]
- ii. Most functions are still controlled by the driver, but some (like braking) can be done automatically by the car.
 1. Modern Vehicle
 2. Driver Assistance
 3. Other [SPECIFY]
- iii. At least 2 functions are automated (like adaptive cruise control and lane-centering), but the driver must be ready to take control of the vehicle.
 1. Modern Plus
 2. Partial Automation
 3. Other [SPECIFY]
- iv. Drivers are still necessary but are not required to monitor the situation as with previous levels.
 1. Partial Autonomy
 2. Conditional Automation
 3. Other [SPECIFY]

- v. Vehicles perform all safety-critical driving functions and monitor roadway conditions for an entire trip, with option for human driving.
 - 1. Full Autonomy (+ Human)
 - 2. High Automation
 - 3. Other [SPECIFY]

- vi. No option for human driving – no steering wheel or controls.
 - 1. Full Autonomy (No Human)
 - 2. Full Automation
 - 3. Other [SPECIFY]

[DEBRIEF]

- Show of hands around the table
- Why did you select that name?
- Did anyone come up with any other names? What was it? Why did you select that?

- b. Thinking about these advanced vehicle technologies that are available CURRENTLY. What would you call these types of technologies?

[OPEN END]

WORKBOOK ACTIVITY #3

Below are some names that others have suggested for these types of technologies that are widely available now. Which of the following is the best name to refer to this type of vehicle technology that is currently available?

- i. Self-driving vehicles
- ii. Driverless vehicles
- iii. Autonomous vehicles
- iv. Driver assistance vehicles
- v. Safe-drive technologies
- vi. Automated vehicle technology
- vii. Other [SPECIFY]

[DEBRIEF]

- Show of hands around the table
- Why did you select that name as the most appealing to refer to this type of technology?

- c. Thinking about these advanced vehicle technologies that are going to be available IN THE FUTURE (like vehicles that are capable of driving without ANY input from a human/driver). What would you call these types of technologies?

[OPEN END]

WORKBOOK ACTIVITY #3 (continued)

Below are some names that others have suggested for these types of technologies that are going to be available in the future. Which of the following is the best name to refer to this type of vehicle technology that is coming?

- i. Self-driving vehicles
- ii. Driverless vehicles
- iii. Autonomous vehicles
- iv. Driver assistance vehicles
- v. Safe-drive technologies
- vi. Automated vehicle technology
- vii. Other [SPECIFY]

[DEBRIEF]

- Show of hands around the table
- Why did you select that name as the most appealing to refer to this type of technology?

VII. Message Testing

[15 minutes/85 minutes total]

Now we are going to look at some statements about the driving assistance technology we've been discussing. For each of the statements, please indicate how much you agree with each of the following:

[WORKBOOK WITH STATEMENTS. Based on time, review three to four of the following statements, mixing the statements for each group. Review one statement, followed by series of questions, and then move on to the next statement.]

FG: Message Rotation Grid	Messages
Younger Group (Paramus, NJ)	A, B, C
Younger Group (Kansas City, MO)	D, E, F
Younger Group (Sacramento, CA)	C, D, E
Older Group (Paramus, NJ)	B, C, D
Older Group (Kansas City, MO)	E, F, A
Older Group (Sacramento, CA)	F, A, B

WORKBOOK ACTIVITY #4

- A. The faster the shift to self-driving cars happens safely on our roads, the faster thousands of lives can be saved.

- B. An estimated 94% of vehicle crashes involve human error. Driver assistance technologies – like adaptive cruise control, which helps you maintain space between your car and others, and lane keeping support, which helps you stay in your lane – are already available in many vehicles. These technologies reduce human error by alerting the driver or reacting more quickly than the driver could to avoid crashes and help save thousands of lives.
- C. Whether it's Tesla's autopilot, Uber's driverless ridesharing, or Google's self-driving cars, automated vehicles are here and improving every day. These technologies will significantly reduce the estimated 94% of crashes caused by driver error, helping to save thousands of lives.
- D. An estimated 94% of vehicle crashes involve human error. Fully autonomous vehicle systems, which control the vehicle for the driver, hold the promise of eliminating human error related crashes entirely, helping to save tens of thousands of lives.
- E. You're a good driver. But with so many people driving recklessly, drunk, or while on their phone, having safe-driving technology in your vehicle will keep you safe from them.
- F. Drivers who have used driver assistance technologies and driverless cars see their potential to save lives. Try it. You'll see it too.

[DEDICATED DISCUSSION FOR EACH QUESTION]

Considering the statement, for each of the following questions, do you:

- Completely agree
- Somewhat agree
- Do not agree at all

This statement:

- i. Tells me something I didn't know before.
 - ii. Makes me more supportive of having more vehicles with these types of driver assistance technology on the road.
 - iii. Is credible.
 - iv. Helps me understand the benefits of these vehicle technologies.
 - v. Shows how my quality of life can be improved through these vehicle technologies.
 - vi. Demonstrates to me that these vehicle technologies can help to save lives on America's roads.
- b. Is there anything about this statement that is confusing or difficult to understand? If, so, what, and how could that be improved?

[REPEAT FOR AS MANY MESSAGES AS TIME ALLOWS]

VIII. Wrap-up

[5 minutes/90minutes total]

- a. As we wrap up tonight, I want to go back to one of the questions I asked you early on in our discussion. We started off by asking where you came down on two different perspectives about driver assistance technologies. Thinking back about everything we discussed this evening, please turn to the last page in your workbook and indicate which of these two perspectives is closest to your own:

WORBOOK ACTIVITY #5

- i. **[HUMANS ARE SAFER]** Some people say that it's safer when they (the driver) is in complete control of all the vehicle functions. They trust themselves more than technology, and say that technology software could be hacked, or that they can't fully relax in a vehicle where driving is controlled by a computer.
- ii. **[TECHNOLOGY IS SAFER]** Others say that vehicles in which driving is controlled by a computer are safer, because the technology is proven, there is new and better technology on the horizon and technology can react more quickly and reliably than people can.

Which of these statements comes closer to your own?

1. DEFINITELY FEEL HUMANS ARE SAFER
 2. SOMEWHAT FEEL HUMANS ARE SAFER
 3. SOMEWHAT FEEL TECHNOLOGY IS SAFER
 4. DEFINITELY FEEL TECHNOLOGY IS SAFER
- b. Did anyone's answer change from the first time you answered? How? What did you read or hear tonight that helped to you change your response?
- b. FOR THOSE SAYING HUMANS ARE SAFER: What information would you need to know to get you to believe that driving assistance safety technology is safer and better for you than individual drivers?
- c. FOR THOSE SAYING TECHNOLOGY IS SAFER: What is the most important factor that makes you feel that technology is more reliable than individuals when it comes to safety on America's roads?

On behalf of the Department of Transportation, we thank you for being so generous with your time and honest in your feedback throughout the course of this session.