United States Senate
WASHINGTON, DC 20510

May 25, 2018

Dara Khosrowshahi
Uber Technologies, Inc.
1455 Market Street,
Suite 400
San Francisco, California 94103

Dear Mr. Khosrowshahi:

We write to inquire about your company's safety protocol and practices while testing autonomous vehicles (AVs) on public roads.

In March, a pedestrian in Tempe, Arizona was tragically struck and killed by a vehicle operating under autonomous technology — at least the third known fatality involving an autonomous vehicle. Yesterday, the National Transportation Safety Board (NTSB) released the initial findings from its investigation of the accident.[1] The NTSB found that an Uber Technologies, Inc. test vehicle equipped with a developmental self-driving system was traveling at 39 miles per hour on a public road when it struck the pedestrian. Although the vehicle was factory equipped with several advanced driver assistance functions, including collision avoidance with automatic emergency braking, those safety measures were disabled because the vehicle was in "computer control" mode under the Uber self-driving system. The collision occurred despite a human operator at the wheel of the vehicle. Further, the vehicle showed no sign of braking until after striking the pedestrian.

This latest fatality has raised many questions about the processes companies have in place to guard public safety when testing this type of technology on public roads. A recent *New York Times* report alleges that, although most AV companies require two employees in every vehicle during tests on public roads, Uber recently modified its safety protocols to require just one employee in the vehicle.[2] The report also alleges that Uber proceeded with this change despite Uber employees' expressing safety concerns about the looser safety protocols. According to another *New York Times* report, Uber was exploring moving the only employee in the vehicle to the back seat.[3]

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[1] Preliminary Report, Highway, HWY18MH010, National Transportation Safety Board (May 24, 2018), https://www.ntsb.gov/investigations/AccidentReports/Reports/HWY18MH010-prelim.pdf.
[2] Daisuke Wakabayashi, *Uber's Self-Driving Cars Were Struggling Before Arizona Crash*, N.Y. TIMES (Mar. 23, 2018), https://www.nytimes.com/2018/03/23/technology/uber-self-driving-cars-arizona.html.
[3] Cecilia Kang, *Where Self-Driving Cars Go to Learn*, N.Y. TIMES (Nov. 11, 2017), https://www.nytimes.com/2017/11/11/technology/arizona-tech-industry-favorite-self-driving-

Although we understand that Uber and several other AV companies have temporarily halted vehicle testing, we would like to know more about your company's protocols for test-driving AVs on public roads and how they will be adjusted in light of the recent tragedy. Accordingly, we respectfully request that you respond to following the questions about your company's safety protocols by June 8, 2018:

1. Does your company test AVs on public roads? If no, why not? If yes:

    a. Where is your company testing AVs? Please list the cities and states. Why has your company chosen to test there?

    b. How did your company determine your AV technology was safe enough to operate on public roads? Please detail the criteria used to make those determinations as well as any limitations on conditions for the vehicles to operate safely (*e.g.*, speed, weather, or road conditions).

    c. Does your company test AVs with members of the public as passengers? What type of notice is given to those passengers that they are riding in an AV? Does your company plan on doing this in the future?

    d. Does your AVs' control system rely on external inputs communicated wirelessly (such as GPS or internet connection) or does it depend only on tools such as built-in sensors? If the control system relies on external inputs, how do you assess and assure adequate quality of service, including cybersecurity, for continued safe operation? How do you ensure built-in sensors are working optimally?

2. How many employees are required to be in your AVs during testing? Will this number change in light of the recent fatality? What safety and operational functions are the employees expected to perform while in the vehicle during testing?

3. How have your protocols regarding the number of drivers and other personnel in the vehicle changed over time? Please provide the justification and evidence on which your company based this decision. How did those changes affect job requirements or responsibilities for the employees in the vehicle?

4. Since 2017, how many times have drivers had to unexpectedly regain control of an AV while the vehicle was in autonomous mode?

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a. How often have these incidents been related to pedestrians or safety concerns?

b. Are these incidents more common at certain times of day or in certain types of weather?

c. Have any of your drivers ever averted a tragedy like the Arizona fatality by taking over control of the vehicle? If yes, please provide details.

d. What protocols are in place to ensure drivers regain control of an AV while in autonomous mode? What metrics are being tracked to assess adequacy and improvement in driver-intervention responsiveness?

5. Please document any concerns raised by employees about your company's safety protocols. How does your company address concerns that employees raise about your AV safety protocols?

6. How does your company select drivers for its AVs? What minimum requirements are needed to become a driver?

7. Do you limit the amount of time that a driver monitors the AV? If yes, what is the maximum duration of one shift and how did your company determine that period of time is optimal? Are drivers permitted to work multiple shifts per day? If yes, how many shifts are permitted? Do you track or limit total weekly behind-the-wheel time for individual drivers? If no, why not?

8. Do you plan to change your safety protocol for testing AVs on public roads in light of the Arizona fatality? Will your training of drivers change? If so, please send updated protocols and when they are expected to be implemented.

9. Did your company halt testing of AVs on public roads in light of the Arizona fatality? What changes in vehicle technology and safety does your company have to see before you begin testing AVs on public roads again? How do you incorporate external expert review into your determination of operational safety?

10. What data on safety performance does your company record from your AVs? Are these data available to federal and state safety authorities in a form that is readily accessible and useful for crash reconstruction and analysis? Do you share safety performance and other AV performance data with other AV manufacturers and suppliers?

Thank you in advance for your attention to these requests. If you have any questions about them, please contact Daniel Greene (202-224-2742) in Senator Markey's office and Anna Yu (202) 224-2823) in Senator Blumenthal's office.

Sincerely,

Edward J. Markey
United States Senator

Richard Blumenthal
United States Senator