

31 March 2021

James C. Owens

Deputy Administrator, National Highway Traffic Safety Administration

M-30, U.S. Department of Transportation, West Building

Ground Floor, Room W12-140

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To Deputy Director Owens,

I am Austin Wu, a Master of Public Health student at the University of Iowa. For years, safer streets and reduced injury and death from road traffic has been identified as a crucial public health issue in improving the health and well-being of Americans, particularly in regards to the disproportionate burden of traffic-related injury and death faced by lower-income and minority populations. Autonomous vehicles have the potential to reduce the impact of human error towards automobile-related injury and death, but their introduction to wider society must be done in a way which recognizes an equal right to the street among drivers, pedestrians, cyclists, and users of public transit alike. The haphazard introduction of cars to American streets over a century ago quickly resulted in their dominance over the landscape at the expense of pedestrians and users of public transit; a failure to adopt a new perspective with the development of ADS could all too easily result in the repetition of the same mistakes and a squandering of the potential promises of autonomous vehicles.

This comment responds to questions 1, 2, 6, and 14 in NHTSA's proposed Framework for Automated Driving System Safety (ADS). Further described below is the necessity of considering

pedestrian and bicyclist safety in addition to drivers, a call for NHTSA to look for best practices internationally in incorporating pedestrian safety into vehicle testing and design, and for NHTSA to take a holistic, multimodal approach when defining the notions of “sensing, perception, planning, and control”.

A. Questions about a Safety Framework

- 1. Describe your conception of a Federal safety framework for ADS that encompasses the process and engineering measures described in this document and explain your rationale for its design.*

My conception of a Federal safety framework for ADS is one that accounts for the safety of all road users, including pedestrians and bicyclists, just as much as the occupants of a vehicle. In 2019, pedestrian fatalities in the US reached their highest rate in 30 years – an increase by more than 50% from the previous decade, compared to just 2% of all other traffic deaths¹. However, the failure to account for pedestrian safety in current standards has not affected all demographics equally. There is clear evidence, including from the NHTSA, that pedestrian fatalities from vehicle collisions disproportionately affect already-disadvantaged groups in society, including children, the elderly, ethnic and racial minorities, as well as the poor.

Data from the CDC shows that from a similar period of time, 2009 to 2018, not only did pedestrian fatalities occur at higher rates for Black and Hispanic populations in 2009, but also that

¹ Feese, Joe. “New Projection: 2019 Pedestrian Fatalities Highest Since 1988.” Governors Highway Safety Administration, February 27, 2020. <https://www.ghsa.org/resources/news-releases/pedestrians20>.

the increase in 2018 was more extreme compared to White non-Hispanics². Data from the NHTSA shows that 19% of child traffic deaths and 17% of elderly traffic deaths were pedestrians in 2017, both higher than the general average of 16%³. Furthermore, there is evidence to suggest that regardless of age, education, or population density, that poor neighborhoods are disproportionately likely to suffer from pedestrian crashes⁴. A robust Federal safety framework must be designed to actively combat these disparities, and ensure that the introduction of ADS does not perpetuate these inequities.

Compared to the often-haphazard ways in which automobiles were introduced *en masse* to American streets a century ago, the proactive approach with which NHTSA is viewing safety standards for ADS is appreciated. Even as ADS are today often hailed as a solution to the perennial issues of traffic safety and congestion⁵, a failure to recognize the errors of the past could result in ADS failing to significantly affect either issue, and quite possibly even amplify them.

The American experience with cars has been one of the concession of public street space to the car. Whereas at the turn of the 20th century an American could reasonably expect to share

² “Age-Adjusted Pedestrian Death Rates, by Race/Ethnicity — National Vital Statistics System, United States, 2009 and 2018.” *Morbidity and Mortality Weekly Report*, QuickStats, 69, no. 39 (October 2, 2020): 1434.

³ “Traffic Safety Facts: Pedestrians.” Washington, DC: National Highway Transportation Safety Administration, March 2019.
<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812681>.

⁴ Chakravarthy, Bharath, Craig L Anderson, John Ludlow, Shahram Lotfipour, and Federico E Vaca. “The Relationship of Pedestrian Injuries to Socioeconomic Characteristics in a Large Southern California County.” *Traffic Injury Prevention* 11, no. 5 (October 2010): 508–13.

⁵ Brown, Dalvin. “How Self-Driving Car or Adaptive Cruise Control Could Ease Traffic Jams.” *USA Today*, July 4, 2018, sec. Money.
<https://www.usatoday.com/story/money/2018/07/03/self-driving-reduces-traffic-jams-study-says/741985002/>.

the street with bicycles, other pedestrians, playing children, streetcars, horses and carriages, and the occasional car, by the beginning of the 21st century, the vast majority of road infrastructure and planning was dedicated to the convenience of automobile traffic, at the expense of public transportation and pedestrians⁶. This has made a lot of people very angry and has been widely regarded as a bad move. From the perspective of safety, the dependence on cars upon which American transportation infrastructure is predicated upon is a key contributor to the relatively high traffic fatality rate the United States has among developed countries, even with improvements in recent years.

Current Secretary of the Department of Transportation Pete Buttigieg has openly signaled his support for Compete Streets and has criticized autocentric approaches to development which fails to consider the needs of bicyclists, pedestrians, and transit users⁷. Humans are mortal and fallible, and the power granted by operating a car amplifies that immensely. With proper regulation, ADS can become part of a safer, more equitable future for transportation in the United States, but a failure to take the initiative could result in the loss of a rare opportunity for change. We are already seeing examples of private-sector ADS solutions which continue down the old path of prioritizing automotive traffic above all other factors. Notions such as having pedestrians wear radar-reflecting wristbands to identify themselves to autonomous vehicles⁸ or automatic gates at

⁶ McShane, Clay. *Down the Asphalt Path: The Automobile and the American City*. New York City: Columbia University Press, 1994.

⁷ Fortunati, Jenna. "Everything We Liked (and Didn't like) at Buttigieg's Transportation Secretary Confirmation Hearing." *T4America Blog* (blog), January 25, 2021. <https://t4america.org/2021/01/25/everything-we-liked-and-didnt-like-at-buttigiegs-transportation-secretary-confirmation-hearing/>.

⁸ BBC Newsround. "Driverless Cars: Special Wristbands to Help Spot People." News, March 10, 2014. <https://www.bbc.co.uk/newsround/56322871>.

pedestrian crossings to keep the streets clear for cars⁹ only serve to place the burden of traffic safety on the most vulnerable users of roads, deflect blame away from cars for traffic fatalities, and negate the vision of safe, multimodal streets as advanced by the current DOT secretary.

A proper Federal safety framework for ADS must be designed to effectively test the ability of autonomous vehicles to safely interact with the environments associated with complete streets, which includes pedestrians, bicyclists, public transit, and transit riders. Furthermore, a proper framework must also be designed with the lens of equity in mind, and include processes which are inclusive of people of various ethnic and racial communities, people with disabilities, children, and the elderly.

2. *In consideration of optimum use of NHTSA's resources, on which aspects of a manufacturer's comprehensive demonstration of the safety of its ADS should the Agency place a priority and focus its monitoring and safety oversight efforts and why?*
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There is an imperative for NHTSA to prioritize the ability of autonomous vehicles to consistently and safely interact in real-world environments with changing conditions and various modes of transportation, including pedestrians, bicyclists, and debris, all in a variety of weather and lighting conditions. Manufacturers must be able to prove to NHTSA that autonomous vehicles are able to safely adapt to the world around them, rather than asking the world to adapt to them.

The consequences of setting testing standards without considering the safety of pedestrians can already be seen in NHTSA's ambivalence towards including pedestrian safety tests in its New

⁹ Taub, Eric. "How Jaywalking Could Jam Up the Era of Self-Driving Cars." *The New York Times*. August 2, 2019, New York edition, sec. B.

Car Assessment Program. Per the Government Accountability Office (GAO)¹⁰, recent increases in American pedestrian fatalities are related to the lack of pedestrian-specific safety standards in its New Car Assessment Program (NCAP). This includes new driver assistance technology such as pedestrian automatic emergency braking (PAEB), which itself is considered by NHTSA to be a precursor to fully autonomous driving¹¹. In order for a future ADS framework to be fully developed, NHTSA must also align its standards for vehicles already on the market to encompass safety for pedestrians and cyclists, especially as the gradual process of improving driver assistance and automation technology progresses.

Tragic examples such as the 2018 death of an Arizona pedestrian walking her bicycle by an Uber self-driving car, where a fully-functional ADS detected a pedestrian with a bicycle nevertheless failed to brake in time¹², demonstrate a need for manufacturers to value human life inside or outside of their vehicles over speed or convenience, and ADS are able to do all driving on all circumstances, mechanisms with which to ward off against automation complacency in human drivers.

Finally, NHTSA should place a focus on monitoring the ways in which inaccurate manufacturer advertising of ADS capabilities can endanger people inside and outside of autonomous vehicles alike. Of particular note is Tesla's use of words and phrases such as

¹⁰ "PEDESTRIAN SAFETY: NHTSA Needs to Decide Whether to Include Pedestrian Safety Tests in Its New Car Assessment Program." Washington, DC: United States Government Accountability Office, April 2020. <https://www.gao.gov/assets/gao-20-419.pdf>.

¹¹ National Highway Traffic Safety Administration. "Automated Vehicles for Safety." Government. Accessed March 14, 2021. <https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety>.

¹² Walker, Alissa. "Are Self-Driving Cars Safe for Our Cities?" Curbed, January 8, 2020. <https://archive.curbed.com/2016/9/21/12991696/driverless-cars-safety-pros-cons>.

“Autopilot” and “Full Self Driving” in its contemporary driver assist systems, even though Tesla itself admits that both modes require active supervision by the driver. Use of Tesla’s Autopilot mode more in line with the function’s name rather than the fine print of its actual capabilities has already resulted in avoidable collisions and death¹³, and could continue to do so as long as Tesla and its owner and CEO, Elon Musk, continue to promote autonomous functions in their vehicles in a disingenuous manner. The National Transportation Safety Board (NTSB) has already called upon NHTSA to adopt stricter actions and oversight in regards to Tesla’s lack of safeguards towards beta testing its “Autopilot” and “Full Self Driving” technology in its own comments on this proposed rulemaking¹⁴; I would concur with the recommendations of the NTSB.

6. *Do you agree or disagree with the core elements (i.e., “sensing,” “perception,” “planning” and “control”) described in this document? Please explain why.*

I largely agree with the core elements of sensing, perception, planning, and control as described in the proposed rule. However, I reiterate the need for an ADS safety framework to take apply these four core functions in the context of safety for pedestrians and bicyclists in various climate and weather conditions in addition to the occupants of autonomous vehicles or other cars on the road.

For example, the definition of “sensing” in the context of pedestrian safety could be viewed as the ability to correctly identify humans of various sizes, heights, and skin colors, not only on

¹³ BBC News. “Tesla Autopilot Crash Driver ‘Was Playing Video Game,’” February 26, 2020. <https://www.bbc.com/news/technology-51645566>.

¹⁴ Sumwalt, Robert. “Comment from Robert L. Sumwalt, III,” January 31, 2021. <https://www.regulations.gov/comment/NHTSA-2020-0106-0617>.

their own, but also with items such as bicycles, strollers, and carts, in various lighting and weather conditions. Perception could be seen as the ability to differentiate the movement patterns of various people of different demographics and activities, such as children playing in a street, an adult, bicycling, or a couple alighting from a bus stop. Planning could entail the recognition of pedestrian-heavy residential streets or bicycle boulevards even when clear markings are lacking, and having the ADS-equipped vehicle take action accordingly. Of particular note here is how navigation apps such as Waze can increase congestion on side streets¹⁵, and the ways in which uncoordinated ADS could magnify such concerns to the detriment of pedestrians. Finally, control in this context could be defined as creating a framework where ADS control is defined in a manner which not only protects drivers and passengers, but also protects pedestrians, bicyclists, and other more vulnerable users of the road. Above all else, the safety of people should be prioritized ADS control over vehicle occupant convenience or speed.

B. Question about NHTSA Research

14. What additional research would best support the creation of a safety framework? In what sequence should the additional research be conducted and why? What tools are necessary to perform such research?

NHSTA should support additional resources into existing “best practices” from other traffic safety bureaus around the world as they relate to pedestrian protection, advanced driver-assistance systems (ADAS), and full ADS, especially given the United States’ current lack of strict

¹⁵ Raphelson, Samantha. “New Jersey Town Restricts Streets From Commuters To Stop Waze Traffic Nightmare.” News. NPR, May 8, 2018.

<https://www.npr.org/2018/05/08/609437180/new-jersey-town-restricts-streets-from-commuters-to-stop-waze-traffic-nightmare>.

pedestrian safety testing in its own NCAP program. Of particular note here is the European New Car Assessment Programme's (Euro NCAP) vulnerable road user (VRU) protocols, which currently tests automatic braking systems (AEBs) for pedestrians and cyclists¹⁶. Such additions should be made to American NCAP testing standards, and could form the basis for the creation of standards for testing more capable ADS, or more equitable standards, such as testing with dummies of various skin tones (Euro NCAP currently appears to only test pedestrian and cyclist AEBs with light-skinned dummies).

Additionally, I would support the requests made by the League of American Bicyclists regarding research for an ADS safety framework¹⁷, which include research on the interactions between bicycle/pedestrian infrastructure and ADS as well as research on building pedestrian and bicyclist confidence around interacting with autonomous vehicles. Research in both areas would not only bolster pedestrian and bicyclist safety, but would also work to make American streets more inclusive for all road users.

Thank you for this opportunity to comment. I can be contacted for further information at austin-wu@uiowa.edu.

Sincerely,

Austin Wu

¹⁶ Euro NCAP. "Vulnerable Road User (VRU) Protection." Accessed March 13, 2021. <https://www.euroncap.com/en/vehicle-safety/the-ratings-explained/vulnerable-road-user-vru-protection/>.

¹⁷ "Comment on Framework for Automated Driving System Safety." The League of American Bicyclists, January 19, 2021. <https://www.euroncap.com/en/vehicle-safety/the-ratings-explained/vulnerable-road-user-vru-protection/>.