



Comments on Removing Regulatory Barriers for Vehicles with Automated Driving Systems

Docket No. NHTSA-2018-0009

March 20, 2018

NHTSA's Mission

On March 18, 2018, a pedestrian crossing the road in Tempe, Arizona was killed by a robot car being tested by Uber. While this death may be a surprise to an unsuspecting public saturated in autonomous vehicle manufacturer media campaigns promising unparalleled safety in robot cars, the tragedy reflects corporate greed and ambition in the race to develop the technology. An email exchange between former Uber CEO Travis Kalanick and then lead robot car developer Anthony Levandowski, revealed in the recent Waymo-Uber lawsuit, makes clear the corporation's lack of concern for public safety. "I just see this as a race and we need to win, second place is first loser" read one text from Levandowski in March 2016. "We do need to think through the strategy to take all the shortcuts we can find," said another from the engineer on the same day.¹ However, the tragic death should be no surprise to anyone who read the data released recently by the California Department of Motor Vehicles foretelling of the fatal risks posed by robot cars.

The data in these reports proves that this is the first of many human fatalities if corporations continue to have the privilege to drive their underdeveloped and unregulated robot cars on public roads. The reports, which were released by twenty companies to the California DMV and are the only publicly available data about the state of robot car technology show that so-called self-driving cars cannot go more than 5,596 miles in the best-case scenario without a human driver taking over the wheel.² In most cases, the vehicles cannot travel more than a few hundred miles without needing human intervention. The recent fatal incident on March 18, 2018 that took the life of an innocent pedestrian confirms the information revealed in this data.

Despite the alarming information in these reports, starting April 2018, the California DMV gave the green light to robot car manufacturers to test their vehicles on public roads without requiring a human driver ready to take control of the vehicle, thus moving towards the de-regulatory stance most other states, like Arizona, the state where the pedestrian was killed, have. These fatal hazards will only be exacerbated if NHTSA continues with its plans to adopt a de-regulatory position towards autonomous vehicles, as indicated in the call for comments on "Removing Regulatory Barriers for Vehicles and Automated Driving Systems."

The National Highway Traffic Safety Administration (NHTSA) is a "public health authority" insofar as its mission is "to prevent and reduce deaths, injuries and economic losses resulting from automotive travel on our nation's roadways."³ The agency's statutory authority is defined and limited towards achieving this aim. Accordingly, NHTSA has authority to "engage in research on all phases of highway safety and traffic conditions" (23 U.S.C. § 403(a)(1)), "undertake collaborative research and development projects with non-Federal entities for the purposes of crash data collection and analysis" (23 U.S.C. § 403(f)(1)), and "conduct research and collect information to

¹ <https://www.nbcnews.com/tech/tech-news/former-uber-ceo-steals-show-court-trade-secrets-bro-cabulary-n845541>

² Consumer Watchdog's Letter to the Senate, 02/09/2018, <http://www.consumerwatchdog.org/sites/default/files/2018-02/LtrSenate020918.pdf>

³ NHTSA's letter to administrators of hospitals and health organizations, March 27, 2003, <https://nemsis.org/media/referenceMaterials/documents/HIPAA-LETTER.pdf>

determine the relationship between motor vehicles and accidents, and personal injury or deaths resulting from such accidents” (49 U.S.C. § 30168(a)(1)).

NHTSA’s request for comment, “Removing Regulatory Barriers for Vehicles and Automated Driving Systems,” makes abundantly clear that the mission explicitly laid out in these statutes is not the current NHTSA leadership’s primary goal. The title makes clear the agency’s intention to deregulate the technologies it is in fact supposed to regulate.

As clearly set out in the statutory limitations cited above, the intention inherent in all research projects NHTSA undertakes must be *to protect the public from the health and economic safety risks automotive vehicles pose*. Yet, in the first sentence of the request for comments, NHTSA specifies its aim “to identify any regulatory barriers in the existing Federal Motor Vehicle Safety Standards (FMVSS) to the testing, compliance certification and compliance verification of motor vehicles with Automated Driving Systems (ADSs) and certain unconventional designs.”⁴ Here, NHTSA makes clear that it conceives the agency’s work as a “barrier” to private interests when NHTSA’s job is to anticipate ways that corporate interests pose a hazardous, and often lethal, “barrier” to public safety. NHTSA’s pursuit of this line of inquiry indicates a shift in the agency’s priorities from its historical and legal obligation to protect public interest to advocating for private corporate interests.

Public safety is NHTSA’s *raison d’etre*, but NHTSA now treats public safety as a mere afterthought. It states: “NHTSA also seeks comments on the research that would be needed to determine how to amend the FMVSS in order to remove such barriers, while retaining those existing safety requirements that will be needed and appropriate for those vehicles.” Rather than working to amend the FMVSS so as to add regulations specific to the kind of safety risks autonomous vehicles pose, NHTSA’s only plan is to “undertake more comprehensive and strategic efforts *to remove barriers*.”^{5 6}

NHTSA needs to remove the *right* barriers and thoroughly understand what these vehicles *are* and what it is that they can *do* before they are let loose on the highways. Only then can it create performance standards and a testing or certification process for autonomous vehicles.

NHTSA should first conduct comprehensive research about the capabilities of these vehicles, the risks and hazards they may pose, and the kinds of safety regulations needed to mitigate those potential risks and hazards. It is only after we establish these performance standards that we can consider what kind of testing and certification process we should establish (Question 1). Only after we have completed all of these steps, will it be possible to address the matter of how FMVSS should be amended based on the research and data collected during a pilot-testing phase.

Moreover, in its request for comments, NHTSA mentions no plans to add regulations that are specific to these new vehicles. Rather, NHTSA is only invested in “retaining those existing safety requirements that will be needed and appropriate for those vehicles.”⁷ The agency’s goal is only to remove barriers and retain only those that are minimally “needed,” without considering what regulations may need to be *added* to ensure optimal public safety.

⁴ NHTSA’s “Removing Regulatory Barriers for Vehicles with Automated Driving Systems,” pg. 1, <https://www.federalregister.gov/documents/2018/01/18/2018-00671/removing-regulatory-barriers-for-vehicles-with-automated-driving-systems>

⁵ Emphasis added

⁶ NHTSA’s “Removing Regulatory Barriers for Vehicles with Automated Driving Systems,” pg. 3

⁷ NHTSA’s “Removing Regulatory Barriers for Vehicles with Automated Driving Systems,” pg. 2

When “setting research priorities,”⁸ the primary goal for the agency should not be “to lay a path for innovative vehicle designs and technologies that feature ADSs,”⁹ but should first and foremost be to *ensure public safety in the face of the development of new technologies*. The agency’s job is to anticipate the potentially hazardous, and even lethal, effects of new technologies. Paving the path for innovation can be a factor on the agency’s mind, but it should not be the primary concern for an agency that was established to fulfill an entirely different purpose – protecting public safety on our highways.

A Proposed Action Plan for NHTSA

Consumer Watchdog, a non-partisan, nonprofit public interest group, is deeply concerned about NHTSA’s agenda in light of what we read in these request for comments. We see the request for comments as evidence of a departure from NHTSA’s historical role in regulating corporate practices at odds with the public good. Our comments provide a framework for NHTSA to regulate the imminent autonomous vehicle future and to best realize NHTSA’s safety mission.

NHTSA’s job, as made clear in the statutes mentioned above, is to conduct research on the ways in which autonomous vehicles may pose safety and economic risks to the public, *not* to conduct research on how NHTSA’s work might negatively impact corporate interests. NHTSA is funded by the public, not by private companies. The agency should, therefore, remain steadfast and exclusive in its commitment to the public interest.

In recognizing that the current FMVSS are not applicable to robot cars, NHTSA acknowledges the significant difference in these new autonomous technologies from already existing automotive vehicles. The distinctions these technologies have from existing ones must be carefully considered when formulating policy. As of now, there are no federal regulations in place that cover the potential consequences of allowing autonomous vehicles to drive on public roads. NHTSA’s inquiry should focus on what it needs to do to *apply* the statute to this new form of vehicle. In the past, the statute has been correctly applied to accommodate new kinds of technologies. For example, the agency mandated seat belts, an innovation that was not required in automotive vehicles until NHTSA stepped in. The agency should continue to identify specific regulations that apply to these new technologies in order to ensure public safety.

To fulfill NHTSA’s role, as dictated by law, and root inquiries in the agency’s statutory mission, the request for comment should have asked (Question 20):

- What does the testing process reveal about these vehicles?
- Are these vehicles safe and ready to be deployed for the public?
- What data has been collected or needs to be collected about the potential risks and hazards these vehicles might pose to the public?
- What kind of data needs to be available to the public to ensure transparency and accountability?
- What further research needs to be conducted about the health and financial safety risks these vehicles may pose to the public?
- How specifically do these vehicles differ from existing vehicles?
- Who will be held accountable in the event of a crash?

⁸ NHTSA’s “Removing Regulatory Barriers for Vehicles with Automated Driving Systems,” pg. 2

⁹ NHTSA’s “Removing Regulatory Barriers for Vehicles with Automated Driving Systems,” pg. 2

- Who and what are autonomous vehicles programmed to protect in the event of an emergency?
- How might the safety standards for these vehicles differ from existing vehicles?
- What safety and financial issues might the co-existence of the new and old forms of vehicles pose for the public?
- What vehicle safety technologies already exist that can remedy the deficiencies in these vehicles and thus should be mandatory in all vehicles?
- What vehicle safety technologies need to be developed in order to remedy deficiencies for which autonomous vehicle manufacturers have not yet accounted?
- What kinds of standards must these vehicles meet in order to be identified as sufficiently more “advanced” than existing vehicles?
- What qualifies a vehicle as “advanced” other than self-identification?
- In addition to FMVSS that apply to all automotive vehicles, what specific FMVSS do we need that uniquely apply to certain qualifying vehicles with ADSs?
- What sort of certification process is needed to standardize advanced forms of vehicles?
- What criteria do these vehicles need to meet to ensure optimal public safety?
- How do we prepare the public for the health, financial, social, economic, cultural, and political risks these vehicles will pose?

We Need More Data

Many of the responses to the questions posed above are contingent upon the data collected through research. NHTSA recognizes the significance of data, and thus has plans to reform the existing FMVSS “in those areas for which existing data and knowledge are sufficient to support decision-making.”

While this plan is sound in theory, it presupposes that there *are* areas where sufficient data exists to warrant amending the existing FMVSS. While this may be a possibility in the future, NHTSA is jumping ahead of itself by focusing its attention on the matter of amending FMVSS *rather than* collecting more data so as to inform future decision-making.

At present, the only publicly available data about the performance of autonomous vehicle technology is the 2017 disengagement reports made by autonomous vehicle manufacturers to the California Department of Vehicles. California is the only state that requires autonomous vehicle manufacturers testing robot cars on public roads to release data concerning how these cars performed. However, there are no plans to ensure that autonomous vehicle manufacturers will be required to release such data to the California DMV once vehicles are deployed for public use. That is, once the testing phase is over, AV manufacturers will no longer be required by the CA DMV to report data regarding disengagements and car crashes.¹⁰ The scant data we have is hardly enough to reasonably establish the path we must take forward.

Thus, it’s unclear how NHTSA plans to reform FMVSS if (a) the only data available comes from one specific geographic region and thus may not even be representative of the performance of autonomous vehicles undergoing

¹⁰ Consumer Watchdog’s “Speed Not Safety California Senate’s Concern in Robot Car Hearing.”
<http://www.consumerwatchdog.org/privacy-technology/speed-not-safety-california-senates-concern-robot-car-hearing>

testing in other states¹¹, and (b) there are currently no plans for legislation requiring future data collection, neither in California nor in other states.

The situation appears to be even more bleak when one examines the information in the disengagement reports, which hardly conforms to the rosy picture NHTSA envisions for the robot car future. As mentioned above, in the best-case scenario, self-driving cars cannot travel more than 5,596 miles without requiring a human test driver to take over the wheel. In most cases, the vehicles cannot travel more than a few hundred miles without needing human intervention.

Consumer Watchdog conducted an analysis of these reports to better understand the specific reasons for the deficiencies in performance. The data revealed that robot cars tested could not cope when faced with the task of making some decisions humans make every day when they drive. Even California's reports do not include the hard data – such as the LIDAR, video and radar records of what happened preceding a disengagement – needed to inform new rules of the road for robot cars. Nevertheless, even the limited data in the disengagement reports is illuminating. Among the failures that required the human test driver to take control are: GPS signal failure; shorter-than-average yellow lights; rapid fluctuations in street traffic; sudden lane blockages; cars parked incorrectly nearby; hardware failure, and software failure.

When humans encounter the situations listed above, they are able to make a decision about what to do despite the unpredictability of the situation. If my GPS were to fail, I could still use my sense of direction to figure out how to proceed or make a phone call to a friend to ask how to get to where I needed to go. I could also visibly see and respond to rapid fluctuations in street traffic. Moreover, humans do not experience “hardware or software failure,” but common sense tells us that the human analog, a heart attack or a similar debilitating injury, likely occurs at a frequency less than 1 out of 5,596 miles while driving.

The point is that autonomous vehicles introduce a whole host of issues, many of which are endogenous to the technology itself, that we, *humans*, have not encountered before. Many of the deficiencies in autonomous vehicles are typically not due to extraneous conditions, such as extreme weather conditions, as one might commonly imagine if one assumes the technology to be 100% capable and safe. On the contrary, the data reveals that the problems are due to the fact that robot technologies are not sophisticated enough to deal with many of the problems humans encounter while driving every day.

This is only the tip of the iceberg. The data we have is scant, at best, and does not sufficiently tell us about the specific nature of the issues these new kinds of vehicles possess, nor the frequency with which they are likely to occur. It remains unclear whether autonomous vehicles have the same vision as humans, given that these reports reveal their inability to *see* objects humans can see: changes in street lights, lane blockages, lane markings, street traffic, or how cars are parked.

We may not know much about autonomous vehicle technology, but this much is certain: we need to collect more data about this technology to ensure our future safety. We need to know what these cars can see and can't see and also what they can do and cannot do. Once we collect enough data about the potential deficiencies in vision and

¹¹ It may also be possible that the California data is skewed, as autonomous vehicle manufacturing companies could very well choose to test only their best-available products in California and test the remaining vehicles in states where no laws require them to report disengagement data.

capability, then we can use this information to establish a testing and certification process as well as identify specific vehicle safety technologies that can accommodate these deficiencies (Question 1a and b). But before we can do any of that, we simply need more data. These vehicles will not be fit for public use until we can complete these goals.

We Need Federally Mandated Public Transparency

Although NHTSA allows robot car manufacturers to test their technologies on public roads throughout the nation, the agency does not require these corporations to report these activities. Effectively, NHTSA has given numerous corporations license to use public roads as their private laboratories without mandating that they inform the public what exactly these vehicles are even doing. Meanwhile, private companies are using public facilities to collect an extraordinary amount of data that the companies can then use towards their own private corporate interests.

California is currently the *only* state that requires robot car manufacturers testing on public roads to release disengagement reports, as mandated by the California Department of Motor Vehicles. Many corporations take advantage of the de-regulatory stance of both the federal government and the other states, and as such, prefer to test their technologies in states, such as Arizona, that require neither permits nor reporting.¹²

Bryan Salesky, the Chief Executive Officer of Argo AI, a company partnering with Ford on the development of AV technology, said, “We’re still very much in the early days of making self-driving cars a reality. Those who think fully self-driving vehicles will be ubiquitous on city streets months from now or even in a few years are not well connected to the state of the art or committed to the safe deployment of the technology. For those of us who have been working on the technology for a long time, we’re going to tell you the issue is still really hard, as the systems are as complex as ever.”¹³

The above remarks make clear that autonomous vehicle technology is not performing as well as clever marketing would have us believe. Fallacies about the potential safety of these new technologies are ubiquitous among the public, as demonstrated even in NHTSA’s own work. However, we can only know the truth about the “state of the art” if we obtain objective information about its performance.

California’s requirement to report disengagement data was a step in the right direction, but a federal mandate for disengagement data in addition to other relevant data that can be used to craft policy will provide a more comprehensive outlook of the autonomous vehicle landscape. Well aware of California’s disengagement reporting policy, autonomous vehicle manufacturers may only be testing their best vehicles in California but could be testing other similar, more deficient technologies in other states where reporting requirements are not as stringent. Many autonomous vehicle manufacturers likely do not even test in California and instead may opt to only test in other states. A federal mandate to release data in all states could fill in missing knowledge gaps from the limited publicly available data and thus provide us with a more accurate picture of the state of technology.

¹² Wired, “To Let Self-Driving Cars Go Anywhere, Train Them Everywhere,” Aarian Marshall, <https://www.wired.com/story/waymo-self-driving-michigan-testing/>

¹³ Advocates for Highway and Auto Safety, “Letter to Senate Committee on Commerce, Science, and Transportation on Autonomous Vehicles,” <http://saferoads.org/2018/01/23/letter-to-senate-committee-on-commerce-science-and-transportation-on-autonomous-vehicles/>

Moreover, NHTSA should require companies testing their technology on public roads to report additional data beyond the disengagement frequencies. There are several questions the data reported to the CA DMV leaves unanswered. For example, the disengagement reports require manufacturers to cite a “reason for disengagement.” Many of the reasons AV manufacturers have cited as the reasons for disengagement are vague and will require further explanation to inform any policy decisions. Some companies, such as Waymo, cited a “recklessly behaving road user” as a reason their autonomous vehicles disengaged.¹⁴ Are “reckless road users” simply drivers who spontaneously decide to switch lanes on a highway, a common occurrence human drivers deal with everyday?

There are other reasons cited, such as perception discrepancies, hardware and software discrepancies, and “incorrect prediction of other traffic participants,” that are sufficient to inform us that the technology is not as sophisticated as manufacturers claim, but are not enough to lead us towards policy initiatives to address the safety concerns. The CA DMV disengagement reports were enough to reveal to the public that the technology still has serious deficiencies, but it is now up to NHTSA to dig deeper and decipher the specifics of these deficiencies so that they can be regulated accordingly.

Public transparency is crucial at this stage of technological development. A comprehensive public data collection process has the potential to elucidate gaps in the business’ thought and design process, dispel myths about the technologies, establish expected standards of performance shared by competitors, and lead to a more participatory process in crafting policies that will ensure this technology is released to the public in a safe and optimally beneficial fashion.

We Need to Address Ethical Dilemmas

Another important question NHTSA’s data collection needs to address is: what are these vehicles programmed to do when faced with difficult, complex, or ethically ambiguous choices? For example, in a life-or-death situation, if the vehicle were faced with the option to save a pedestrian’s life or the passengers, who would the car choose?

At the moment, corporations, not the public, hold the authority to make these kinds of decisions. Take Mercedes-Benz, for example: they planned to program their autonomous vehicles to always save the people inside the car.¹⁵ Christoph von Hugo, the manager of driver assistance systems and active safety at Mercedes-Benz stated, “If you know you can save at least one person, at least save that one. Save the one in the car.”

Although Mercedes-Benz retracted these statements due to public protest,¹⁶ corporations continue to retain authority to make these life-or-death decisions because no regulations are in place to dictate otherwise.

Many autonomous vehicle manufacturers have yet to even consider the matter of what their software will do when faced with one of these ethical dilemmas. GM states in its 2018 Self-Driving Safety Report: “Our integrated design process also enables the vehicle to fully utilize its control system to respond to an event. For example, if another vehicle or person suddenly enters the lane in front of our vehicle, the vehicle can apply the full braking capability of

¹⁴ Waymo’s 2017 Autonomous Vehicle Disengagement Report, pg 2, <https://www.dmv.ca.gov/portal/wcm/connect/42aff875-7ab1-4115-a72a-97f6f24b23cc/Waymofull.pdf?MOD=AJPERES>

¹⁵ <https://blog.caranddriver.com/self-driving-mercedes-will-prioritize-occupant-safety-over-pedestrians/>

¹⁶ Consumer Watchdog’s “Self-Driving Vehicles: The Threat to Consumers,” Harvey Rosenfield, http://www.consumerwatchdog.org/sites/default/files/2017-10/self_driving_consumer_threat_report.pdf “The legal requirement that manufacturers be held strictly liable for defective products, a mainstay of America’s consumer protection regime, will remain essential” (7).

the vehicle brake system to quickly stop the vehicle”¹⁷ Yet, GM fails to further explain what would happen if the sudden braking also had the potential to cause a car crash that would kill many people, including the passengers in the vehicle, instead of the pedestrian on the road.

It remains unclear what the values and reasons are that guide the decisions these robots make. Whereas Mercedes-Benz planned to protect those who purchased their products, one can fathom other possible options corporations may consider instead: pricing vehicles with the self-preservation function at exorbitant prices; writing algorithms to avoid harm to high net worth individuals; or choosing to minimize their liability by making choices that will harm the least amount of people. Regardless of what corporations choose, one thing is for certain: their priority will always be their own interests, not the public’s interests, so long as they have authority to make these decisions.

NHTSA needs to collect data about the actions these vehicles take when faced with these ethical dilemmas. What intentions guide their actions, and who will be held accountable for their actions? These are questions NHTSA needs to answer in its research and accordingly inform the public.

Furthermore, NHTSA needs to reclaim the authority to make these decisions through the regulatory process. Based on informed research, NHTSA, not corporations, need to solve these ethical dilemmas for the benefit of *public*, not corporate, interest.

We Need to Extend the Testing Phase

NHTSA claims to be invested in the rapid deployment of vehicles with ADS, in part, because of the increased safety robot car media campaigns have promised. In “Removing Regulatory Barriers for Vehicles with Automated Driving Systems,” for example, NHTSA contends that even “in the best of circumstances, human drivers make errors in judgment or action.”¹⁸ In fact, the agency attributes 94% of crashes to human error or choice.¹⁹ Thus, NHTSA assumes that “the introduction of vehicles with ADSs into the fleet has the potential to reduce injuries, the loss of life, and property damage, reduce congestion, enhance mobility, and improve productivity” (5).²⁰

But this conclusion is based on the presumption that the future roads of the U.S.A. will *only* have robot cars and nothing more. Unless the federal government plans to nationalize robot cars, give one to every person in the U.S., illegalize older forms of vehicles, and ban pedestrians and cyclists from public roads, robot cars will necessarily co-exist on the roads with humans driving cars, walking, cycling, walking their dogs, and carrying their children. The future is not a vacuum free of human “judgment or action,” (6), but a future where fallible robots and fallible humans will have to contend with one another.

This specific issue of *co-existence* of humans and robot cars, however, is one of the primary safety hazards rapid robot car deployment poses.²¹ GM Cruise’s disengagement report confirms that 40% of all disengagements were

¹⁷ GM, 2018 Self-Driving Safety Report, pg. 21, https://www.gm.com/content/dam/gm/en_us/english/selfdriving/gmsafetyreport.pdf

¹⁸ NHTSA’s “Removing Regulatory Barriers for Vehicles with Automated Driving Systems,” pg. 6

¹⁹ NHTSA’s Traffic Safety Facts, Crash Stats, <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115>

²⁰ NHTSA’s “Automated Driving Systems: A Vision for Safety 2.0”, https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf

²¹ Consumer Watchdog’s Letter to Senator, February 9, 2018, “New Data Shows Self-Driving Cars Cannot Drive Themselves – Halt S. 1885”, <http://www.consumerwatchdog.org/sites/default/files/2018-02/LtrSenate020918.pdf>

due to the robot car's inability to predict the behavior of other drivers on the road.²² Waymo similarly confirmed that the unpredictability of "other road users" was one of the primary reasons why Waymo's robot cars required humans to take control of the wheel post-disengagement.²³

In sum, the problem is simple: robots cannot correctly predict the behavior of humans. Human beings are capable of spontaneous action and are thus unpredictable. Even if the technology were perfect (which it is nowhere near, as the information from the DMV disengagement reports mentioned above reveal), "human error and unsafe choices"²⁴ will continue to pose the problems it always has but now with the added risks and hazards posed by human encounters with deficient technologies.

As Consumer Watchdog's Founder Harvey Rosenfield puts it, "even if we assume that someday fully autonomous vehicles will be safe enough to deploy, *and* that all Americans will be ready and able to surrender the steering wheel, for the *foreseeable future* traditional vehicles driven by humans will share a "hybrid highway" filled with cars and trucks of widely varying degrees of automation and autonomy. Relatively few of them will be truly self-driving."²⁵ We need to prepare for this "hybrid highway" future, but we are not in a position to make decisions when we do not know enough about the specific nature of the risks and hazards this unprecedented situation will create. NHTSA must evaluate the safety risks these new technologies pose *before* beginning the process of amending FMVSS.

To prepare for the eventual deployment of autonomous vehicles, we need to extend the testing phase. Amending FMVSS immediately would prematurely sanction the mass deployment of unregulated autonomous vehicles to the public. Extending the testing phase instead, however, would ensure the time to comprehensively collect data to inform the regulatory process autonomous vehicles must undergo before they are deployed.

Although autonomous vehicle manufacturers are authorized to test their own vehicles, NHTSA should also pursue its own independent research and test the vehicles in academic facilities and testing grounds. Universities and established research centers can function as "incubators for this uncharted technology,"²⁶ and provide an objective perspective with regards to data collection, evaluation, policy research, and technological development (Question 19).

Recent poll data shows that 64% of respondents express concern about sharing the road with driverless cars. The level of apprehension was the same across the nation, regardless of the respondent's region of residence or political affiliation.²⁷ Given the lack of trust among the public, we cannot trust private corporations to objectively test the

²² GM Cruise's CA DMV 2017 Disengagement Report,

https://www.dmv.ca.gov/portal/wcm/connect/d94d9334-9955-4f97-aae1-5a2c9f10673b/GM_Cruise.pdf?MOD=AJPERES

²³ Waymo 2017 CA DMV Disengagement Report, pg. 2, <https://www.dmv.ca.gov/portal/wcm/connect/42aff875-7ab1-4115-a72a-97f6f24b23cc/Waymofull.pdf?MOD=AJPERES>

²⁴ NHTSA's "Removing Regulatory Barriers for Vehicles with Automated Driving Systems," pg. 7

²⁵ Consumer Watchdog's "Self-Driving Vehicles: The Threat to Consumers," Harvey Rosenfield,

http://www.consumerwatchdog.org/sites/default/files/2017-10/self_driving_consumer_threat_report.pdf, page 5

²⁶ Advocates for Highway and Auto Safety, "Letter to Senate Committee on Commerce, Science, and Transportation on Autonomous Vehicles," January 23, 2018, <http://saferoads.org/2018/01/23/letter-to-senate-committee-on-commerce-science-and-transportation-on-autonomous-vehicles/>

²⁷ Caravan Public Opinion Poll: Driverless Cars (January 12, 2018), Advocates for Highway and Auto Safety, <http://saferoads.org/wp-content/uploads/2018/01/AV-Poll-Report-January-2018-FINAL.pdf>

vehicles they hope to mass-market one day, or to disclose any unsatisfactory test results to regulators and the public. The government needs to test the technologies independently and assess them in a controlled environment.

If NHTSA were to instead allow widespread public sale and distribution despite our current lack of knowledge²⁸, rather than undergoing a more rigorous testing phase, the public will face unintended consequences and potentially cost lives. By taking a more measured and safe approach to the deployment of this technology, and continuing to test the technology until we have gathered more data to design good policies, NHTSA can ensure the public good.

We Need a Separate Set of FMVSS Specific to Robot Cars

Currently, the FMVSS regulations are based on the following four assumptions: (1) The driver is human (2) The driver will sit in the vehicle's left front seat to drive (3) The driver will need certain controls to be accessible and telltales and other displays to be viewable in order to do the driving (4) there will be at least one occupant in the vehicle.²⁹

In "Removing Regulatory Barriers...", NHTSA claims that "many FMVSS contain test procedures that are based on the assumed presence of a human driver and will therefore likely need to be amended to accommodate vehicles that cannot be driven by humans."

NHTSA cannot amend FMVSS prematurely without collecting more data about the ramifications of changing any of these assumptions. The data from the California DMV disengagement reports demonstrates that the robot technology is not safe yet to operate without a human driver ready to take control of the wheel. Thus, we must continue to demand the presence of a human driver, given that the technology has not proven able to function safely without a human driver as yet.

The various deficiencies in autonomous vehicle technologies listed in the above sections of our comments, in addition to the new kinds of issues these vehicles pose when contending with vehicles driven by human drivers, means that "amending" the current safety standards is not an appropriate regulation strategy. These vehicles pose a categorically different set of challenges than the automobiles on the road today. To simply transpose the current FMVSS to these new vehicles without considering the possibility of adding an additional set of regulations pertaining to these new kinds of vehicles would be akin to "attempting to apply rules of safe horsemanship to the Ford Model T."³⁰ The framework explicated in the request for comments should instead be re-formulated to ensure that NHTSA considers the specific ways in which these new kinds of vehicles might need a set of additional FMVSS that address the safety challenges uniquely created by these vehicles.

NHTSA seeks to revise the existing FMVSS to make it possible for self-driving car manufacturers to design cars without steering wheels, brakes, or accelerators.³¹ Following requests from autonomous vehicle manufacturers, NHTSA seeks comments to decipher how to best accommodate the innovation of unconventional interiors (or

²⁸ Advocates for Highway and Auto Safety, "Letter to Senate Committee on Commerce, Science, and Transportation on Autonomous Vehicles," January 23, 2018, <http://saferoads.org/2018/01/23/letter-to-senate-committee-on-commerce-science-and-transportation-on-autonomous-vehicles/>

²⁹ NHTSA's "Removing Regulatory Barriers for Vehicles with Automated Driving Systems," pg. 8

³⁰ Rand Corporation, "Autonomous Vehicles and Federal Safety Standards: An Exemption to the Rule?," https://www.rand.org/content/dam/rand/pubs/perspectives/PE200/PE258/RAND_PE258.pdf

³¹ NHTSA's "Removing Regulatory Barriers for Vehicles with Automated Driving Systems," pg. 2

exteriors) and thus wants to establish an FMVSS that is equally “effective” for both unconventional and conventionally-designed vehicles.

Consumer Watchdog rejects the presumption that the only regulatory problem vehicles with ADS pose is merely one of design. As NHTSA seems to see it, autonomous vehicles are already the same with respect to functionality; the only difference is what these cars look like. A detailed analysis of reports from companies manufacturing vehicles with ADSs, however, shows that these vehicles drastically differ in terms of *capability* and not just in terms of *design*.

The information already presented in these comments has shown how these new technologies pose a unique set of challenges that NHTSA needs to address. Given this, NHTSA is asking the wrong questions. Rather than seeking to identify ways in which the existing FMVSS impede the development of these technologies, NHTSA needs to conduct research on how (a) the autonomous vehicles may not meet the safety standards already established in the existing FMVSS and (b) how the existing FMVSS are not enough to account for the safety risks and hazards autonomous vehicles pose. NHTSA needs to better understand autonomous vehicles through research, data collection, and testing in order to address these questions first so that ultimately the agency can develop a special set of FMVSS that specifically address the safety risks autonomous vehicles uniquely pose.³²

Preliminary Research Possibilities to Explore Regarding Additional FMVSS

While autonomous vehicle technology is still in early development, there are three clear safety risks evident NHTSA has the potential to mitigate using FMVSS. More research should be conducted to better understand the specific nature of these potential issues, how they can best be regulated, and to further anticipate other issues autonomous vehicle technologies may pose in the future.

Vision

The data in the California disengagement reports reveals that “perception discrepancies” is one of the primary causes of disengagement for the major autonomous vehicle manufacturers.³³ Yet, we have very limited data about what specifically autonomous vehicles can and cannot see.

Moreover, different companies said that their cars were able to see objects that other companies’ vehicles could not see. For example, Waymo states that their vehicles can adequately respond to road construction, but GM Cruise’s vehicles required human intervention when they encountered road construction.³⁴

Creating a “vision test” for autonomous vehicles would be useful to solving both of these problems. It can make it possible to gather data about what autonomous vehicles can and cannot see, and it can also lead to standardization of the technologies. In the example of the road construction, for example, FMVSS could mandate that autonomous

³² The Rand Corporation is in agreement with Consumer Watchdog on this matter as well: “An alternative regulatory set of evolving standards specifically engineered around AVs, with introduction to the vehicle fleet organized around a graduated approach based on the measured impact on public safety, may be far more promising.”

https://www.rand.org/content/dam/rand/pubs/perspectives/PE200/PE258/RAND_PE258.pdf

³³ Waymo, GM Cruise, Drive.AI, and Baidu (USA) all cited “perception discrepancies” as one of the main causes of disengagement. https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/disengagement_report_2017

³⁴ Waymo and GM Cruise’s California DMV 2017 Disengagement Reports, see link above

vehicles be able to see road construction. Thus, it would make it the case that all autonomous vehicle manufacturers would need to meet this requirement in order for their vehicles to be certified.

Cyber Security

Autonomous vehicle technologies are highly susceptible to criminal and terrorist hijacking.³⁵ In March 2016, the F.B.I. issued a warning to vehicle manufacturers stating: “it is important that consumers and manufacturers are aware of the possible threats and how an attacker may seek to remotely exploit vulnerabilities in the future.”³⁶ NHTSA must account for the possible dangerous, life-threatening scenarios that could take place on the intelligent highway system and place according safety regulations that minimize the possibility of such hijacking taking place.

Safety for Whom?

In March 2016, NHTSA entered into an unprecedented “voluntary agreement” with twenty auto manufacturers to allow the industry to self-regulate the sale of three safety technologies, known as Automatic Emergency Braking (AEB), that assist cars in braking to avoid or limit the damage from collisions. NHTSA has acknowledged that AEB would prevent tens of thousands of deaths and serious injuries annually, yet NHTSA rejected a petition by Consumer Watchdog and other consumer advocates that manufacturers be required to install safety technologies such as AEB as standard equipment in light vehicles.³⁷

When manufacturers have the leeway to “self-regulate” safety technologies, these technologies become more expensive to make and thus are typically only available in more expensive vehicles.

This means that only those who can afford a more expensive car have access to life-saving technologies. As Harvey Rosenfield, the Founder of Consumer Watchdog, points out, “Mandatory federal safety standards create manufacturing economies of scale from mass production that dramatically reduce the price of the technology. Automakers resist industry-wide safety standards because they can treat expensive safety innovations as options to be introduced in their most expensive vehicles, for which such options are priced at a premium. It is not until the features become mandated through the FMVSS process that they are rolled out in all vehicles fleet-wide.”³⁸

Life-saving technologies should be available to *all*, and NHTSA needs to do its job to advocate for the public interest to identify which technologies autonomous vehicles require and mandate them in all vehicles.

This also brings up the relevant question of whether the robot cars being designed will have different tiers of performance. That is, will all robot cars of the future be standardized, or will some perform better than others? Will the rich have access to safer vehicles, or will all vehicles be guaranteed the same performance standards?

³⁵ Consumer Watchdog’s “Self-Driving Vehicles: The Threat to Consumers,” Harvey Rosenfield, http://www.consumerwatchdog.org/sites/default/files/2017-10/self_driving_consumer_threat_report.pdf, pg. 11

³⁶ Consumer Watchdog’s “Self-Driving Vehicles: The Threat to Consumers,” Harvey Rosenfield, http://www.consumerwatchdog.org/sites/default/files/2017-10/self_driving_consumer_threat_report.pdf, pg. 11

³⁷ Consumer Watchdog’s “Self-Driving Vehicles: The Threat to Consumers,” Harvey Rosenfield, http://www.consumerwatchdog.org/sites/default/files/2017-10/self_driving_consumer_threat_report.pdf, pg. 12

³⁸ Consumer Watchdog’s “Self-Driving Vehicles: The Threat to Consumers,” Harvey Rosenfield, http://www.consumerwatchdog.org/sites/default/files/2017-10/self_driving_consumer_threat_report.pdf, pg. 15

These are questions that NHTSA, not private corporations, needs to answer. Only once NHTSA has answers to such questions can the agency amend regulations to ensure a robot car future best for the public good, one that secures health and financial safety for *all*.

We Need to Establish a Certification Process

In addition to identifying the specific performance standards a vehicle with ADS technology needs to meet, policy must define the requirements a vehicle must meet to be categorized as one that needs to follow the new regulations as opposed to the old. As NHTSA sees it, the existing FMVSS only poses problems if car manufacturing companies intend to alter the design of vehicles with ADS. The regulations in place are sufficient, according to NHTSA, and any vehicle with an ADS is compliant with the current policy so long as car manufacturers do not design a vehicle “without a steering wheel, brake pedal and accelerator pedal or with novel configurations or orientations for certain vehicle systems” (pg. 11, “Removing Regulatory Barriers”).

Consumer Watchdog is deeply concerned about NHTSA’s stance on the current FMVSS and the new policy hurdles robot car technologies pose. The distinction between the vehicles on the market and those with ADS technologies is not exclusively a matter of difference in design. The information in reports released by self-driving car manufacturing companies themselves³⁹ shows that cars with ADS (Level 4 and Level 5 cars) pose a different set of threats to public safety than the cars currently on the road (Levels 0, 1, and 2). FMVSS need to account for these specific dangers, and the distinction must be understood not as one of *design* but rather one of *capability*. Rather than asking, *how is the design of vehicles with more advanced technologies distinct from most vehicle models?*, we should instead ask the question, *how are the capabilities of vehicles with more advanced technologies distinct from most vehicle models?* By framing the question in this way, we can more specifically define the capabilities a vehicle needs to have in order to fit the description to which the updated FMVSS will apply and identify the metrics by which a car can be uniformly constituted as “advanced.”

We cannot simply assume that any vehicle manufacturing company claiming to design vehicles with ADSs should abide by an updated version of FMVSS rather than the existing one. In other words, a car manufacturing company may attempt to design a vehicle with “Level 4” or “Level 5” capabilities but may not actually succeed in this endeavor.

Consider the case of Nvidia. In its disengagement report to the CA DMV, self-driving car manufacturer Nvidia reported that its vehicles disengaged 105 times in 505 miles.⁴⁰ In other words, the supposedly “self-driving” car could not drive 5 miles without needing a human to take control of the wheel. Under NHTSA’s proposed framework, could Nvidia claim its cars are Level 4 and avoid existing FMVSS? Even companies such as Waymo, the leading manufacturer of self-driving cars, reported that their vehicles required human intervention at least once every 5,596 miles.

The numerous companies that provided disengagement reports also varied in terms of the reasons for their disengagements. Whereas some companies, such as Waymo, reported that their cars were fully capable of detecting

³⁹ CA DMV, Autonomous Vehicle Disengagement Reports 2017, https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/disengagement_report_2017

⁴⁰ CA DMV, Autonomous Vehicle Disengagement Reports 2017, Nvidia, <https://www.dmv.ca.gov/portal/wcm/connect/4b11c4fd-781e-4d56-89b2-3ed63f42c88/NVIDIA.pdf?MOD=AJPERES>

road construction, other comparably successful companies, such as GM's Cruise, reported that their vehicles disengaged when they encountered road construction or blocked lanes.

These statistics reveal that vehicles with ADS technologies vary significantly in terms of performance and capability. Various manufacturers have produced vehicles that fail at different frequencies and for different reasons. To standardize the vast distinctions among the vehicles being developed, NHTSA must establish a certification process that serves to verify that the vehicles can actually do what they purport to do.

The Life-Saving Power of Regulation

Existing FMVSS⁴¹ are in place to ensure the safety of drivers and passengers in automobiles. To list a few examples, FMVSS 208 mandates airbags, FMVSS 209 and 210 mandate seat belts and specific requirements about the performance of those seat belts, FMVSS 101 requires certain controls and displays to be immediately available to the driver, FMVSS 105 regulates hydraulic and electric brake systems, and FMVSS 111 requires rearview mirrors. More generally, "the FMVSS specify minimum performance requirements and test procedures for brakes, accelerator controls, electronic stability control, seat belts, airbags, exterior lighting and interior warning telltales that illuminate to alert the driver when there is a vehicle malfunction, and for other equipment."⁴²

Vehicle safety technologies are ubiquitous today not because of car manufacturing companies but *in spite of them*. Automobile companies historically lobbied against the safety regulations (e.g. air bags) NHTSA created.⁴³ Cars are safer today because of NHTSA's strong history of holding automobile manufacturers accountable for public safety through comprehensive safety regulations.

NHTSA must remember that safety is not a primary concern for private corporations. A business' ultimate goal is to maximize profit; minimizing cost is an inherent part of achieving this aim. At the present moment, autonomous vehicle manufacturers are disincentivized from thinking about safety on multiple fronts. Numerous companies⁴⁴ are in an arms race to create the first self-driving car and release it to the public. To make matters worse, regulators and policymakers are being called upon by corporations to meet their demands, making it so that *de-regulation* is the favored outcome, a trend exhibited in NHTSA's request for comment. But we only have to look to twentieth-century history to understand what a grave mistake this would be.

The imminent historical moment is not unlike the time when the automobile was first introduced to the American public. Like self-driving car manufacturers plan to do, automobile manufacturers released their product to a public uneducated about the potential hazards these new technologies were about to pose. Without governmental regulations in place, these technologies were free to roam public roads despite the significant public safety hazard they posed.

⁴¹ NHTSA Regulations, <https://www.nhtsa.gov/laws-regulations/fmvss>

⁴² NHTSA's "Removing Regulatory Barriers for Vehicles with Automated Driving Systems," pg. 6

⁴³ Center for Effective Government, "Airbags Have Saved Tens of Thousands of Americans...and Industry Obstruction Costs Three Times As Many," Ronald White, <https://www.foreffectivegov.org/blog/airbags-have-saved-tens-thousands-americans%E2%80%A6-and-industry-obstruction-cost-three-times-many>

⁴⁴ CA DMV, Autonomous Vehicle Disengagement Reports 2017, https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/disengagement_report_2017

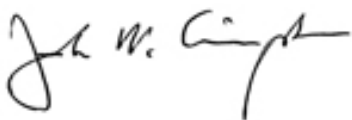
In 1908, Henry Ford released the Model T. At the time, fast automobiles were a new invention and thus the safety regulations we developed over the last century were not in place. Given this, it's no surprise that by 1925, auto accidents accounted for two-thirds of the entire death toll in cities with populations over 25,000.⁴⁵ If safety regulations had been a concern *prior to* the public release of automobiles, then many innocent lives could have been saved.

NHTSA was established, in part, to correct the wrongs of releasing a dangerous, unregulated technology to an unsuspecting public. History shows us that private corporations cannot be trusted to care about the public good, and agencies such as NHTSA were established to close this gap. For almost fifty years, NHTSA has created various FMVSS to continuously work on making automobiles more safe for the American public. Many of the existing FMVSS were hard-fought victories for regulators, policymakers, and advocates battling against the private interests of the automotive industry. Seat belts, for example, were not required in automotive vehicles until 1968 and airbags were not required until 1991 (and only first effective in 1998).

Another good example is the introduction of the Electronic Stability Control (ESC). Even though this technology has been commercially available since 1995, it was standard equipment in only 29% of all vehicles ten years later. It was only after Congress mandated the technology in automobiles that most manufacturers adopted ESC.⁴⁶

These various examples show that whether or not autonomous vehicles ever achieve the life-saving potential car manufacturers misleadingly tout, NHTSA has an equally life-saving power in its own hands, namely the power of *regulation*. According to NHTSA's estimate, "our nation's commitment to vehicle safety technologies has saved over 600,000 lives since 1960."⁴⁷ NHTSA can continue to exercise this power by using its resources to understand how new forms of vehicles require new kinds of safety features. Developing and mandating new vehicle safety technologies specific to addressing issues with autonomous vehicle technologies will be key for NHTSA to sustain its life-saving track record well into the twenty-first century.

Respectfully submitted,



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⁴⁵ Smithsonian Magazine, "When Pedestrians Ruled the Streets," December 2014, <https://www.smithsonianmag.com/innovation/when-pedestrians-ruled-streets-180953396/#biT0dtFvkPOPJ4mo.99>

⁴⁶ Consumer Watchdog's "Self-Driving Vehicles: The Threat to Consumers," Harvey Rosenfield, http://www.consumerwatchdog.org/sites/default/files/2017-10/self_driving_consumer_threat_report.pdf

⁴⁷ "Lives Saved by Vehicle Safety Technologies and Associated Federal Motor Vehicle Safety Standards, 1960 to 2012," NHTSA, January 2015, p.xix, <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812069>