



ADVOCATES  
FOR HIGHWAY  
& AUTO SAFETY

**STATEMENT OF CATHERINE CHASE  
PRESIDENT  
ADVOCATES FOR HIGHWAY AND AUTO SAFETY**

**ON**

**“DRIVING INNOVATION: THE FUTURE OF AUTOMOTIVE  
MOBILITY, SAFETY, AND TECHNOLOGY”**

**SUBMITTED TO THE**

**UNITED STATES SENATE  
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION  
SUBCOMMITTEE ON SURFACE TRANSPORTATION, MARITIME,  
FREIGHT, AND PORTS**

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## **Introduction**

Advocates for Highway and Auto Safety (Advocates) is a coalition of public health, safety, law enforcement and consumer organizations, insurers and insurance agents that promotes highway and auto safety through the adoption of federal and state laws, policies and regulations. Advocates is unique both in its board composition and its mission of advancing safer vehicles, safer motorists and road users, and safer infrastructure. We respectfully request this statement be included in the hearing record.

According to the National Highway Traffic Safety Administration (NHTSA), 36,096 people were killed and an estimated 2.81 million more were injured in traffic crashes in 2019.<sup>1</sup> NHTSA currently values each life lost in a crash at \$11.6 million.<sup>2</sup> The crashes, injuries, and fatalities impose a financial burden of well over \$800 billion in total costs to society -- \$242 billion of which are direct economic costs, equivalent to a “crash tax” of \$784 on every American.<sup>3</sup> When adjusted solely for inflation, total costs reach nearly a trillion dollars annually. In 2018, crashes alone cost employers \$72.2 billion.<sup>4</sup>

Adding to this burden are serious and fatal crashes involving vehicles with autonomous capabilities which are occurring with alarming frequency. Only ten days ago, a crash involving a Tesla Model S in Houston claimed the lives of both of its occupants. Officials at the scene reported that it was traveling at “a high rate of speed” while “no one was driving the vehicle at the time of the crash.”<sup>5</sup> In fact, investigators believe neither occupant was in the driver’s seat at the time of the crash.<sup>6</sup> Moreover, NHTSA recently disclosed that it currently has 23 active investigations of crashes involving Tesla vehicles, at least three of which are recent including the Houston crash.<sup>7</sup> In addition, the recent fatal Tesla crash has raised yet more concerns about the worrisome pattern of incidents involving these systems such as the inability to ensure the human operator remains engaged in the driving task and proper safeguards to prevent misuse.<sup>8</sup> With the tragic and notable exception of the fatal Uber crash, these crashes have not killed people outside of the vehicles.<sup>9</sup> However, without needed safeguards, it seems only a matter of time until these vehicles crash not only into police cruisers and fire trucks, but also into actual first responders and other innocent road users.<sup>10</sup> Rather than waiting for this fait accompli, Congress must enact legislation to require regulation of the technology.

In sharp contrast to the deadly Tesla crash was the crash involving Tiger Woods, a prime example of the lifesaving benefits of regulations. Mr. Woods’ life was saved, at least in part, by a seat belt, air bags and roof crush performance standards, all of which are required as standard equipment in cars. As *Auto Week* succinctly explained, “The details of Tiger Woods’ crash are still being sorted out by investigators, but in general, the world’s greatest golfer can thank more than 50 years of government-mandated safety advances that he is alive.”<sup>11</sup>

## **Advocates Consistently Promotes Proven Technology to Prevent Crashes and Save Lives**

Advocates always has enthusiastically championed proven vehicle safety technology and for good reason -- it is one of the most effective strategies for preventing deaths and injuries. NHTSA has estimated that between 1960 and 2012, over 600,000 lives have been saved by motor vehicle safety technologies.<sup>12</sup> In 1991, Advocates led the coalition that supported enactment of the bipartisan Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991<sup>13</sup> which included a mandate for front seat airbags as standard equipment. As a result, by 1997,

every new car sold in the United States was equipped with this technology and the lives saved have been significant. Airbags have saved an estimated 50,457 lives from 1987 to 2017, according to NHTSA.<sup>14</sup>

Advocates continued to support proven lifesaving technologies as standard equipment in all vehicles in other federal legislation and regulatory proposals. These efforts include: tire pressure monitoring systems;<sup>15</sup> rear outboard 3-point safety belts;<sup>16</sup> electronic stability control;<sup>17</sup> rear safety belt reminder systems;<sup>18</sup> brake transmission interlocks;<sup>19</sup> safety belts on motorcoaches;<sup>20</sup> electronic logging devices for commercial motor vehicles (CMVs)<sup>21</sup>; and, rear-view cameras.<sup>22</sup>

Further, Advocates has been a leading safety voice in the fight against alcohol-impaired driving. Our organization supported the development of breathalyzer technology which is essential to enforcement of impaired driving laws and keeping drunk drivers off the road. Additionally, together with Mothers Against Drunk Driving (MADD), Advocates was a leading supporter in federal and state efforts to reduce blood alcohol concentration (BAC) laws from .10 to .08 percent and achieve a national law.<sup>23</sup> Lastly, Advocates has long supported a .05 percent BAC threshold for drunk driving and the enactment of all-offender ignition interlock device (IID), child endangerment and open container laws.<sup>24</sup>

### **Advanced Driver Assistance Systems (ADAS): Proven Technology that Can Prevent Crashes and Save Lives**

Every day on average, over 100 people are killed and nearly 7,500 people are injured in motor vehicle crashes. Compounding this tragedy is the fact that proven solutions are currently available that can prevent or mitigate most crashes. Advocates remains optimistic that in the future AVs may bring about meaningful and lasting reductions in motor vehicle crashes. However, that potential remains far from a near-term certainty or reality. As Dr. M. L. Cummings, the well-known and well-respected Director of the Humans and Autonomy Lab, Pratt School of Engineering, Duke University, notes in *Rethinking the maturity of artificial intelligence in safety-critical settings*:

While AI augmentation of humans in safety-critical systems is well within reach, this success should not be mistaken for the ability of AI to replace humans in such systems. Such a step is exponential in difficulty and with the inability of machine learning, or really any form of AI reasoning, to replicate top-down reasoning to resolve uncertainty, AI-enabled systems should not be operating in safety critical systems without significant human oversight.<sup>25</sup>

Yet, on the path to the future possibility of AVs, advanced driver assistance systems (ADAS) can prevent and lessen the severity of crashes now. The National Transportation Safety Board (NTSB) has included increasing implementation of collision avoidance technologies in its Most Wanted Lists of Transportation Safety Improvements since 2016.<sup>26</sup> It is a transformational time in transportation innovation with the availability of new safety technologies in vehicles to prevent or mitigate crashes and protect occupants and road users.

Currently available proven collision avoidance systems include automatic emergency braking (AEB), lane departure warning (LDW), blind spot detection (BSD), rear AEB and rear cross-traffic alert. The Insurance Institute for Highway Safety (IIHS) has found that:

- AEB can decrease front-to-rear crashes with injuries by 56 percent;
- LDW can reduce single-vehicle, sideswipe and head-on injury crashes by over 20 percent;
- BSD can diminish injury crashes from lane change by nearly 25 percent;
- Rear AEB can reduce backing crashes by 78 percent when combined with rearview camera and parking sensors; and,
- Rear cross-traffic alert can reduce backing crashes by 22 percent.<sup>27</sup>

However, the widespread distribution of these technologies is hamstrung by members of the auto industry which are selling them as part of an additional, expensive trim package along with other non-safety features, or including them as standard equipment in high end models or vehicles. This practice both slows mass deployment and inequitably provides access only to those who can afford an upcharge of thousands of dollars. Moreover, there are currently no minimum performance standards to ensure the technologies execute as expected and needed.

Furthermore, an industry work-around to technology requirements which give an illusion of advancement is a voluntary agreement. Time and again these have been demonstrated to be ineffective as most recently evidenced by the March 2016 voluntary agreement among 20 automakers to have AEBs in most new light vehicles by 2023. As of December 2020, two manufacturers, accounting for nearly a third of the U.S. auto market, demonstrate this lackluster response to the detriment of public safety. Only 46 percent of General Motors vehicles and 13.5 percent of Fiat Chrysler vehicles were sold with AEB between September 1, 2019 through August 31, 2020. Moreover, the performance requirements in the agreement are exceptionally weak and consequently can result in these systems not performing as well as they should. Additionally, at any time, an automaker could decide it no longer wants to comply with the agreement without any ramifications.

It should also be noted that IIHS found that equipping large trucks with AEB and FCW could eliminate more than two out of five crashes in which a large truck rear-ends another vehicle.<sup>28</sup> Considering that in 2019 over 5,000 people were killed and 159,000 people were injured in crashes involving a large truck,<sup>29</sup> Congress should take swift action to require the U.S. DOT to issue a safety standard by a date certain requiring this essential equipment in new trucks.

Additionally, more than 990 children have died in hot cars since 1990. Inexpensive technology is available today that can detect the presence of an occupant in a car and engage a variety of alerts in the form of honking horns, flashing lights, dashboard warnings or text messages. Such detection systems may have other useful applications. For example, this type of technology could detect whether occupants are properly restrained and may satisfy requirements for occupant protection. In fact, the Moving Ahead for Progress in the 21st Century (MAP-21) Act (Pub. L. 112-141) directed the U.S. DOT to issue a rule requiring rear seat belt reminders in all new cars by October 2015. This regulation, which is long overdue, could be potentially met by an occupant detection sensor. In the future this type of technology also could communicate to an AV system that the car is occupied and if occupants are restrained properly.

Legislation passed by the U.S. House of Representatives in July 2020, the Moving Forward Act,<sup>30</sup> would achieve the goal of providing lifesaving technologies as standard equipment on new vehicles. Additional legislation which also promotes these issues include: Protecting Roadside First Responders Act (116th Congress, S. 2700/H.R. 4871)(cosponsored by Committee Member

Sen. Tammy Duckworth (D-IL)); 21st Century Smart Cars Act (116th Congress, H.R. 6284); Safe Roads Act (116th Congress, H.R. 3773); School Bus Safety Act (116th Congress, S. 2278/H.R. 3959)(sponsored by Committee Member Sen. Tammy Duckworth (D-IL)); Stay Aware for Everyone Act (116th Congress, S. 4123)(sponsored by Committee Members Sens. Richard Blumenthal (D-CT) and Ed Markey (D-MA)); Five-Stars for Safe Cars Act (116th Congress, H.R. 6256); and the Hot Cars Act (116<sup>th</sup> Congress, H.R. 2593), among others. These measures should be included in any surface reauthorization legislation.

On the path to AVs, requiring minimum performance standards for these foundational technologies will ensure the safety of all road users while also building consumer confidence in the capabilities of these newer crash avoidance technologies.

### **Impaired Driving is a Significant Threat to Public Safety, Yet Available Technology Can Combat this Preventable Danger**

In 2019, over 10,000 people were killed in crashes involving impaired driving across the nation.<sup>31</sup> According to NHTSA, the estimated economic cost of all alcohol-impaired crashes in the United States in 2010 (the most recent year for which cost data is available) was \$44 billion.<sup>32</sup> When inflation rates are factored into this figure, the annual cost is \$55.5 billion. In 2018, alcohol-impaired crashes cost employers \$8.0 billion.<sup>33</sup> Recognizing the serious danger posed to the public by drunk drivers, the NTSB included ending alcohol and other drug impairment in its 2021-2022 Most Wanted List of Transportation Safety Improvements.<sup>34</sup> In addition, the Centers for Disease Control and Prevention (CDC) has decried the human and financial costs associated with impaired driving noting several commonsense preventative measures including the implementation of ignition interlock devices (IIDs).<sup>35</sup>

The problem of impaired driving is far from a new issue for automobile manufacturers. In fact, the industry has been working on a technological solution to drunk driving since at least the 1970s.<sup>36</sup> In 2007, a major manufacturer announced it was developing an alcohol detection system, but over a decade later the technology is still not in vehicles.<sup>37</sup> This tortured history, replete with the preventable fatalities of 10,000 people per year on average, demonstrates that a system to prevent impaired driving will not be in new vehicles until NHTSA issues a federal standard requiring such action.

Technology for driver monitoring, eye tracking, hands-on-the-wheel detection, and other indicators is already being developed, and even installed by some manufacturers, to target many key crash causes such as impairment, distraction, and drowsy driving.<sup>38</sup> In fact, a feature in *MADDvocate*, “*Tragedy Inspires a New Direction for Advanced Drunk Driving Prevention Technology*,” recounted information from industry sources that “the technology has been available for six or seven years. But, . . . will only become available if the government mandates it.”<sup>39</sup> The IIHS conducted research showing that impairment detection systems could save upwards of 9,000 lives each year.<sup>40</sup>

We commend Committee Members Senators Ben Ray Lujan (D-NM) and Rick Scott (R-FL) for their leadership and dedication to curb impaired driving by introducing the Reduce Impaired Driving for Everyone (RIDE) Act.<sup>41</sup> This bipartisan legislation will ensure that verified technology to passively detect impairment and prevent driving is standard in new cars. We urge

this Committee and Congress to advance this legislation.<sup>42</sup> With each passing hour, another person is killed in an alcohol-impaired driving fatality, on average.<sup>43</sup>

### **Autonomous Vehicles: Unproven Technology that Must be Subject to Government Oversight to Ensure Public Safety**

While AVs may someday in the future bring about benefits to society including reductions in motor vehicle crashes, these potentials remain far from a certainty. Congress must not continue a “hands off” approach to “hands-free” driving. Commonsense safeguards and regulations are essential.

#### ***The Artificial Rush to Pass Federal Legislation Enabling Mass Exemptions from Safety Standards and the Use of Fear Tactics to Propel It***

Federal safety standards have been established using thorough objective research, scientific studies and data. They are also subject to a robust and transparent public process and ensure the safety and security of all road users. No demonstrable evidence has been presented to show that the development and deployment of AVs requires larger volumes of exemptions from federal safety standards which are essential to public safety. In fact, since the first AV bill was introduced in 2017, AV development has not come to a grinding halt. For example, in December 2020, General Motors announced it was launching self-driving cars on the streets of San Francisco.<sup>44</sup> In February 2021, Ford announced it was investing seven billion dollars in AV technology through 2025.<sup>45</sup>

Moreover, current law already permits manufacturers to apply for an unlimited number of exemptions. For each exemption granted, manufacturers can sell up to 2,500 exempt vehicles. Advocates strongly opposes any change to this law. Allowing huge numbers of exempt vehicles on the road (potentially millions) de facto turn everyone -- in and around these vehicles -- into unknowing and unwilling human subjects in a risky experiment. Allowing a massive influx of new vehicles exempt from FMVSS will have serious, costly and potentially deadly ramifications, both those that can be predicted or some that cause unintended consequences.

Responding affirmatively to an artificial rush to pass legislation that provides tens of thousands of exemptions from current FMVSS, fueled by AV manufacturers wanting to be the first to market and recoup their substantial investments which already surpass \$100 billion, could significantly undermine safety as well as public acceptance and the ultimate success of these vehicles.<sup>46</sup> Numerous industry executives and technical experts have stated that the technology is not ready now and may not be ready for years ahead. “We’ve had multiple years of claims that ‘by the end of the year it’s going to be magically self-driving by itself without a human in the car,’” Ford’s autonomous vehicles head, John Rich, said at a recent Princeton University conference. “It is not helpful, OK? It is confusing the public. Frankly even the investor community is very, very confused as to what paths are plausible and what the capabilities of the different systems are.”<sup>47</sup> In June of 2019, Gill Pratt, Director of the Toyota Research Institute said, “None of us have any idea when full self-driving will happen.”<sup>48</sup> Bryan Salesky, CEO of Argo AI, said in July of 2019, “Level 5 as it’s defined by the SAE levels is a car that can operate anywhere – no geographic limitation. We’re of the belief, because we’re realistic, that Level 5 is going to be a very long time before it’s possible. I’m not saying that Level 5 isn’t possible but it is something that is way in the future.”<sup>49</sup> John Krafcik, CEO of Waymo, said in late 2018, “This

is a very long journey. It's a very challenging technology and we're going to take our time. Truly every step matters."<sup>50</sup>

Some proponents of advancing the deployment of AVs contend the U.S. is falling behind other nations. However, this fear-inducing claim is misleading as other countries are taking a more calculated, careful and cautious approach. For example, Germany requires a human to be behind the wheel of a driverless car in order to take back control and has other important elements including requirements for vehicle data recording.<sup>51</sup> In the United Kingdom, testing has largely been limited to a handful of cities, and the government has proposed and published a detailed code of practice for testing AVs.<sup>52</sup> In Canada, several provinces prohibit certain types of AVs from being sold to the public.<sup>53</sup> In Asia, Japan has allowed on-road testing with a driver behind the wheel and is currently working on regulatory and legal schemes for controlling the commercial introduction of AVs, but even so has not begun to address the highest levels of automation.<sup>54</sup> In China, all AV operations remain experimental.<sup>55</sup> In sum, no country is selling fully automated vehicles to the public and by many accounts, none will be for a significant amount of time.<sup>56</sup> The U.S. is not behind other countries in allowing them to go to market, but we are behind in establishing comprehensive safeguards to ensure that this progress happens without jeopardizing or diminishing public safety.

### ***The Dangerous Shortcomings of the Current State of the Technology***

Several serious crashes involving cars equipped with autonomous technology have already occurred, many of which have been subject to investigation by the NTSB. These investigations have and will continue to identify safety deficiencies, determine contributing causes, and recommend government and industry actions to prevent future deadly incidents. As stated by NTSB Chairman Robert Sumwalt during a November 19, 2019, meeting, "our entire purpose for being here is to learn from tragic events like this so that they can be prevented in the future... This investigation has the ability to have far reaching implications down the road."<sup>57</sup>

During this meeting, the NTSB considered the probable cause of the tragic crash that occurred on March 18, 2018, in Tempe, Arizona, in which Elaine Herzberg was killed by an Uber test vehicle equipped with self-driving features. Among the key issues the NTSB identified was the glaring need for sensible safeguards, protocols and regulations for AVs which are not yet being sold but are being tested on public roads. Basic safeguards are urgently needed as the NTSB also emphasized that a dearth of a safety culture at Uber contributed to this tragic outcome. Although Uber may have taken some responsive actions following the Arizona crash, it is unclear whether they are sufficient to prevent another fatal crash. Additionally, there is absolutely no assurance about the adequacy of the safety culture of numerous other companies developing and testing AVs on public roads. Some relevant and compelling quotes from the NTSB hearing buttress the views of consumer and safety groups:

The lessons of this crash do not only apply to Uber ATG [Advanced Technologies Group] and they're not limited to just simply something went wrong and now it's fixed. Rather, it's something went wrong and something else might go wrong unless its prevented... This crash was not only about Uber ATG test drive in Arizona, this crash was about testing the development of automated driving systems on public roads. Its lessons should be studied by any company testing in any state. If your company tests automated driving systems on public roads, this crash, it was about you. If you use roads

where automated driving systems are being tested, this crash, it was about you. And if your work touches on automated driving systems at the federal or state level, guess what, this crash, it was about you.

- NTSB Chairman Robert Sumwalt<sup>58</sup>

NHTSA's mission is to save lives, first and foremost, to prevent injuries and to reduce economic costs due to road traffic crashes through education, research, safety standards, which we are lacking here, and enforcement activity but first and foremost it's to save lives...In my opinion, they have put technology advancement here before saving lives.

- NTSB Board Member Jennifer Homendy<sup>59</sup>

Advocates urges Congress to heed critical information from our nation's preeminent crash investigators. Findings from all these investigations should be released and incorporated as applicable into any proposed legislation. The findings are essential to developing sound and safe public policies.

### ***Safeguards Necessary to Protect Public Safety in the Deployment of AVs***

Advocates and numerous stakeholders have developed the "AV Tenets," policy positions which should be a foundational part of any AV policy.<sup>60</sup> It has four main, commonsense categories including: 1) prioritizing safety of all road users; 2) guaranteeing accessibility and equity; 3) preserving consumer and worker rights; and, 4) ensuring local control and sustainable transportation. Many promises have been made about AVs bringing reductions in motor vehicle crashes and resultant deaths and injuries, traffic congestion and vehicle emissions. Additionally, claims have been made that AVs will expand mobility and accessibility, improve efficiency, and create more equitable transportation options and opportunities. Without the commonsense safeguards in the AV Tenets, the possibilities are imperiled at best and could be doomed at worst. Additionally, the absence of protections could result in adverse effects including safety risks for all people and vehicles on and around the roads. Requiring that AVs meet minimum standards and that operations are subject to adequate oversight will save lives and boost consumer confidence in this burgeoning technology.

Additionally, federal, state and local roles in the oversight of motor vehicles and traffic safety laws should not be drastically altered by Congress. The statutory mission of the U.S. DOT established by Congress in 1966 is to regulate the performance of motor vehicles to ensure public safety, which now includes automated driving system technology and AVs.<sup>61</sup> For more than 50 years, the U.S. DOT, through the NHTSA, has issued safety performance standards for passenger and commercial motor vehicles. The role of states is to regulate road safety by the passage of traffic safety laws. However, in the absence of comprehensive and strong minimum federal standards and regulations, the states retain a legal right and a duty to its citizens to develop proposals and implement solutions to ensure public safety. Legislation should not attempt to prohibit states, in any way, from advancing AV safety in the absence of federal rules. In fact, during the November 19, 2019, NTSB hearing, Board Member Homendy said, "If you have a void at the federal level, the states are going to need to fill that because they have to ensure the safety of their citizens." It is confounding that certain proponents of AVs advocate for completely disregarding established law by flipping the concept of preemption on its head in order to limit the rights of state and local governments to protect their citizens.



Lastly, numerous public opinion polls show a high skepticism and fear about the technology, and for good reason. For example, a public opinion poll conducted by the American Automobile Association (AAA) last month found that that only 22% of people feel manufacturers should focus on developing AVs while a majority (58 percent) want safety systems such as AEB in their next vehicle.<sup>62</sup> According to a January 2020 public opinion poll conducted by ORC International, an overwhelming majority of respondents expressed concern about sharing the road with driverless vehicles as motorists, bicyclists and pedestrians.<sup>63</sup> In addition, an April 2019 Reuters/Ipsos opinion poll found that 64 percent of Americans said they would not buy a self-driving car.<sup>64</sup> Further, 71 percent of U.S. drivers surveyed by the American Automobile Association (AAA) in March of 2019 would be afraid to ride in a fully self-driving vehicle.<sup>65</sup> Any legislation should take into account and be responsive to these critical findings about public attitudes.

### **Conclusion**

Fully driverless cars may have a future potential to reduce the carnage on our roads and expand mobility, but commonsense, lifesaving solutions can and must be implemented now. During this transformational time in surface transportation history, we should pay heed to Benjamin Franklin's infamous quote from 1736, "An ounce of prevention is worth a pound of cure." While motor vehicle crashes often involve human behavioral causes, it is essential to remember these same fallible humans are developing AVs. The solution to safety is not to replace one human-error problem with another. Safeguards, transparency and oversight are vital to enable AVs to achieve the promises that have been put forth.

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<sup>1</sup> Traffic Safety Facts Research Note: Overview of Motor Vehicle Crashes in 2019, NHTSA, Dec. 2020, DOT HS 813 060. Statistics are from the U.S. Department of Transportation unless otherwise noted.

<sup>2</sup> John Putnam, US DOT Deputy General Counsel, Guidance on the Treatment of the Economic Value of a Statistical Life (VSL) in U.S. Department of Transportation Analyses – 2021 Update.

<sup>3</sup> "The Economic and Societal Impact of Motor Vehicle Crashes, 2010," NHTSA (2015).

<sup>4</sup> Cost of Motor Vehicle Crashes to Employers 2019, Network of Employers for Traffic Safety, March 2021.

<sup>5</sup> Bryan Pietsch, No Driver in Tesla Crash That Killed 2, Officials Say, NY Times (Apr. 9, 2021).

<sup>6</sup> *Id.*

<sup>7</sup> David Shepardson, U.S. safety agency reviewing 23 Tesla crashes, three from recent weeks, Reuters (Mar. 18, 2021).

<sup>8</sup> Rebecca Elliot, Congressmen, Consumer Reports Raise Concerns Over Tesla's Autopilot, Wall Street Journal (Apr. 22, 2013).

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<sup>10</sup> Clifford Atiyeh, NHTSA Investigating Indiana Crash Where Tesla Model 3 Hit Fire Truck, Car and Driver (Jan. 11, 2020); Alex Kierstein, Tesla on "Autopilot" Slams Into Stationary Michigan Cop Car, Motor Trend (Mar. 17, 2021)

<sup>11</sup> Mark Vaughn, Tiger Woods Owes His Life to Decades of Government Safety Standards, Auto Week (Feb 26, 2021).

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<sup>13</sup> Pub. L. 102-240 (Dec. 18, 1991).

<sup>14</sup> Traffic Safety Facts 2018, A Compilation of Motor Vehicle Crash Data, DOT HS 812 981, NHTSA (Nov. 2020).

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- <sup>52</sup> *Id.*
- <sup>53</sup> *Id.*
- <sup>54</sup> Kyodo, JiJi, Cabinet paves way for self-driving vehicles on Japan's roads next year with new rules, The Japan Times (Sep. 20, 2019).
- <sup>55</sup> Dentons, Global Guide to Autonomous Vehicles 2020.
- <sup>56</sup> Lawrence Ulrich, Driverless Still a Long Way From Humanless, N.Y. Times (Jun. 20, 2019); Level 5 possible but "way in the future", says VW-Ford AV boss, Motoring (Jun. 29, 2019).

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<sup>57</sup> NTSB Board Meeting: Collision Between Vehicle Controlled by Developmental Automated Driving System and Pedestrian (Nov. 19, 2019).

<sup>58</sup> *Id.*

<sup>59</sup> *Id.*

<sup>60</sup> The AV Tenets are attached as Appendix A.

<sup>61</sup> National Traffic and Motor Vehicle Safety Act of 1966, Pub. L. 89-563 (1966)

<sup>62</sup> Ellen Edmonds, AAA: Today's Vehicle Technology Must Walk So Self-Driving Cars Can Run, AAA (Feb. 25, 2021)

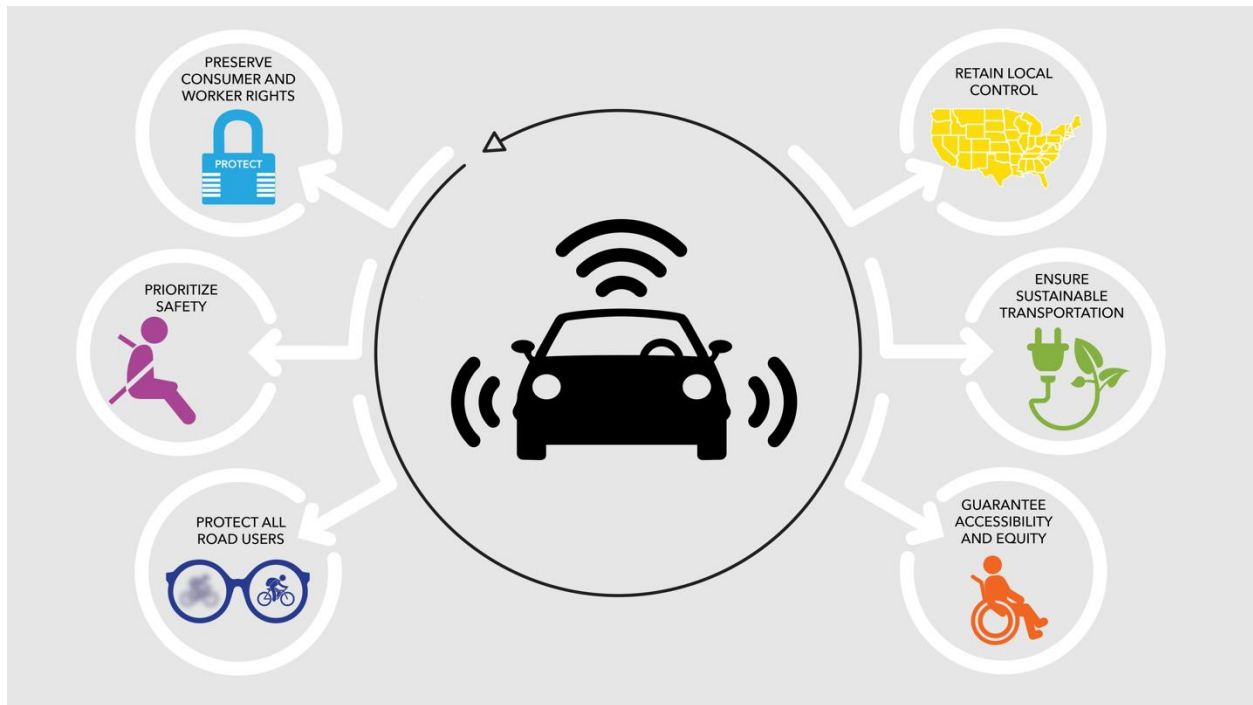
<sup>63</sup> ORC International and Advocates for Highway and Auto Safety, CARAVAN Public Opinion Poll, January 2020.

<sup>64</sup> Americans still don't trust self-driving cars, Reuters/Ipsos poll finds, April 2019.

<sup>65</sup> AAA Annual Automated Vehicle Survey, March 2019.

# Autonomous Vehicle (AV) Tenets<sup>1</sup>

November 30, 2020



## *Prioritizing Safety of All Road Users*

**Safety Rulemakings:** All levels of automated vehicles<sup>2</sup> must be subject to comprehensive and strong federal standards ensuring they are safe and save lives. While the U.S. Department of Transportation (DOT) has the authority to issue motor vehicle safety standards for all levels of automated vehicles, for the last four years, it has abrogated this responsibility by focusing its efforts on inadequate voluntary initiatives. When Congress considers legislation on AVs, it is imperative that the protection of all road users is the guiding principle and that legislation requires the DOT to commence rulemakings on safety standards and issue final rules by a prompt date certain with a reasonable compliance date. The rulemakings must address known and foreseeable safety issues, many of which have been identified by the National Transportation Safety Board (NTSB) and other research institutions, including:

- **Revising Federal Motor Vehicle Safety Standards:** Any actions by the National Highway Traffic Safety Administration (NHTSA, Agency) to revise or repeal existing Federal Motor Vehicle Safety Standards (FMVSS) in order to facilitate the introduction of AVs must be preceded by and conducted in a public rulemaking process and cannot be undertaken by internal Agency actions. Any revision must meet the safety need provided by current standards.
- **Collision Avoidance Systems:** Certain advanced safety technologies, which may be foundational technologies for AVs, already have proven to be effective at preventing and mitigating crashes

<sup>1</sup> These tenets are limited to vehicles with a gross vehicle weight rating (GVWR) of 10,000 pounds or less unless otherwise noted; however, it is imperative that automated delivery vehicles (including those used on sidewalks and other non-roadways) and commercial motor vehicles be subject to comprehensive regulations, including rules regarding the presence of a licensed, qualified driver behind the wheel.

<sup>2</sup> Partially automated vehicles (SAE International Level 2) and conditional / highly automated vehicles (SAE International Levels 3, 4, 5).

across all on-road modes of transportation and must be standard equipment with federal minimum performance requirements. These include automatic emergency braking with pedestrian and cyclist detection, lane departure warning, and blind spot warning, among others. A lack of performance standards has contributed to instances of dangerous malfunctions of this technology, highlighting the need for rulemakings for collision avoidance systems and other fundamental AV technologies. As collision avoidance technology continues to improve and evolve, it should also be required to detect and prevent collisions with all vulnerable road users and objects in the operating environment.

- **“Vision Test” for AVs:** Driverless cars must be subject to a “vision test” to guarantee an AV will operate on all roads and in all weather conditions and properly detect and respond to other vehicles, all people and objects in the operating environment including but not limited to Black and Brown people, pedestrians, bicyclists, wheelchair users and people with assistive technology, children and strollers, motorcycles, roadway infrastructure, construction zones and roadside personnel, and interactions with law enforcement and first responders. Any algorithm that will inform the technology must be free of bias. Risk assessments for AVs must ensure adequate training data which is representative of all users of the transportation system. Manufacturers and developers must be required to meet basic principles in the development and use of algorithms including: the use of algorithms should be transparent to the end users; algorithmic decision-making should be testable for errors and bias while still preserving intellectual property rights; algorithms should be designed with fairness and accuracy in mind; the data set used for algorithmic decision-making should avoid the use of proxies; and, algorithmic decision-making processes that could have significant consumer consequences should be explainable. The DOT must review algorithms and risk assessment procedures for potential issues, and any identified problems must be then corrected by the developer or manufacturer and verified by the DOT. Coordination and oversight should be led by the Office of the NHTSA Civil Rights Director in partnership with the Office of the Assistant Secretary for Research and Technology, NHTSA Office of Vehicle Safety Research, and NHTSA Chief Counsel's office. The Office of the NHTSA Civil Rights Director should be given adequate resources, expertise and authority to accomplish this role.
- **Human-Machine Interface (HMI) for Driver Engagement:** Research demonstrates that even for a driver who is alert and performing the dynamic driving task, a delay in reaction time occurs between observing a safety problem, reacting and taking needed action. For a driver who is disengaged from the driving task during autonomous operation of a vehicle (i.e., sleeping, texting, watching a movie), that delay will be longer because the driver must first be alerted to re-engage, understand and process the situation, and then take control of the vehicle before taking appropriate action. Therefore, an AV must provide adequate alerts to capture the attention of the human driver with sufficient time to respond and assume the dynamic driving task for any level of vehicle automation that may require human intervention. This mechanism must be accessible to all occupants, including people with disabilities and vulnerable populations.
- **Cybersecurity Standard:** Vehicles must be subject to cybersecurity requirements to prevent hacking and to ensure mitigation and remediation of cybersecurity events. The Federal Aviation Administration (FAA) has a process for the certification and oversight of all U.S. commercial airplanes, including avionics cybersecurity, although improvement is needed according to a recent Government Accountability Office (GAO) study.<sup>3</sup> The DOT should be directed, in cooperation with the National Institute of Standards and Technology (NIST), to develop a cybersecurity standard for automated driving systems. The DOT should then require the cybersecurity standard be applied to all new vehicles. The DOT must be engaged in all relevant discussions on artificial intelligence.

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<sup>3</sup> United States Government Accountability Office, Aviation Cybersecurity, FAA Should Fully Implement Key Practices to Strengthen Its Oversight of Avionics Risks, GAO-21-86 (Oct. 2020).

- ***Electronics and Software Safety Standard:*** Vehicles must be subject to minimum performance requirements for the vehicle electronics and software that power and operate vehicle safety and driving automation systems individually and as interdependent components.
- ***Operational Design Domain (ODD):*** The NHTSA must issue federal standards to ensure safeguards for driving automation systems to limit their operation to the ODD in which they are capable of functioning safely. An ODD includes elements such as: the type of roadway, geographical area, speed range, vehicle operating status, and environmental and temporal conditions in which the vehicle is capable of operating safely; any roadway or infrastructure asset required for the operation of the vehicle, such as roadside equipment, pavement markings, signage, and traffic signals; and, the means by which the vehicle will respond if the defined ODD changes or any circumstance which causes vehicle to operate outside of its defined ODD. The rule shall also: specify requirements for how the vehicle will safely transition to a minimal risk condition as a result of a malfunction or when operating outside of the ODD, including the necessity for human intervention that is accessible to all occupants including people with disabilities and vulnerable populations; and, the ability of the vehicle to comply with local laws as part of whether the vehicle is operating inside the ODD.
- ***Functional Safety Standard:*** Requires a manufacturer to ensure the design, development, verification and validation of safety-related electronics or software demonstrates to NHTSA that an AV will perform reliably and safely under the conditions the vehicle is designed to encounter. Additionally, NHTSA must validate that the manufacturer's certifications of functional safety are accurate and reliable by conducting their own testing as needed.
- ***Safe Fallback:*** Every driving automation system must be able to detect a malfunction, a degraded state, or operation outside of ODD and safely transition to a condition which reduces the risk of a crash or physical injury. In the event of a failure, it is essential that the occupants of a driverless car have the ability to assume manual control to complete or command a safe transition to reach a safe location and safely exit the vehicle. This mechanism must be accessible to all occupants, including people with disabilities and vulnerable populations. Commercial vehicles, including those used for public transportation or freight, present distinct challenges, such as the need to identify qualifications necessary to operate, that will need to be addressed separately.
- ***Crash Procedures Standard:*** Requires manufacturers to have procedures in place, including proper shutdown protocols, for when an AV is involved in a crash to ensure the safety of all occupants of the AV, other road users and emergency responders.
- ***Standard for Over-the-Air (OTA) Updates:*** Requires consumers be given timely and appropriate information on the details of the OTA update and ensures any needed training or tutorials are provided. Limits the circumstances in which manufacturers can update a vehicle OTA and provides requirements for OTA updates that necessitate a recall or an additional demonstration of safety. OTA updates that enhance the safety of a vehicle should not be optional or require the consumer to incur any additional expense. During the update process cybersecurity must be maintained. In developing the OTA standard, NHTSA should develop rigorous testing around the most effective way to push out OTA updates to owners and operators of vehicles. Updates must be accessible for all users, including people with disabilities. In addition, information on OTA updates should be available in multiple languages, similar to compliance with Section 508 of the Rehabilitation Act of 1973 (Pub. L. 93-112), and via video with closed captioning as appropriate, as well as other means of communication to promote access. In a commercial setting, it will be especially critical for there to be clear protocols for how and when OTA updates are carried out.

**Safety and Performance Data:** With the increasing number of vehicles with different automated technologies being tested and some being sold to the public, standardized data elements, recording, and access to safety event data are necessary for the proper oversight and analysis of the performance of the driving automation systems. Vehicles on the road today are already producing enormous amounts of data,

and the amount and type of data will only increase as driving automation evolves. There are many stakeholders who need that data for numerous and varied reasons, most importantly safety. The DOT must issue a FMVSS requiring all vehicles to be equipped with technology that captures all necessary data to understand and evaluate the safety performance of AVs on the road. Moreover, following best practices, data on disengagements and near-misses would help to identify flaws in the technology and may allow cities and states to proactively invest in infrastructure improvements or update the design of dangerous intersections and corridors to ensure safety for all street users. Real-time data on vehicle speeds, travel times, and volumes enables states, cities, and communities to manage congestion and speed, uncover patterns of excessive speeds, evaluate the success of street design projects, and ultimately improve productivity and quality of life. It could also facilitate emergency response by summoning and providing important information to emergency personnel, assist in the safe extraction of occupants, and provide a way for first responders to safely disable and secure the vehicle. Safety and performance data should be made available to relevant stakeholders such as state and local governments, federal agencies, operators or dispatchers of the vehicle itself, independent research bodies, law enforcement, first responders, insurers, and the public, with appropriate privacy protections.

**Manufacturer Submissions to NHTSA:** Any submission to NHTSA by AV manufacturers or developers must be mandatory, publicly available and include thorough and adequate data and documentation. Additionally, NHTSA must be directed to review and evaluate all submissions to assess whether an approach to automated driving system (ADS) development and testing includes appropriate safeguards for operation on public roads. Moreover, submissions should be substantive and include, but not be limited to the following issues: ADS control capabilities; ODD; other limitations and constraints; methods and timing of driver engagement (if applicable); data definitions; recording; and, accessibility. Miles accumulated by simulation, as opposed to on-road testing, cannot substitute for on-road testing or serve as the sole basis for the data included in the submission. (See section below on Proper Oversight of Testing.) If NHTSA finds information indicating further operation of these vehicles on public streets poses a danger, the Agency must be able to intervene and enforce the law<sup>4</sup> effectively, which will require not just the greater use of its existing authority but also new, stronger enforcement authorities that should be enacted by Congress (See section below on Additional Resources and Enforcement Authorities for NHTSA). If the Agency determines that a submission is deficient, manufacturers must be required to submit any additional information requested. The legislation should clarify that the Agency has civil and criminal penalty authority for false, fictitious or fraudulent submissions under 18 United States Code (USC) 1001. This submission process cannot be a substitute for NHTSA promptly issuing minimum performance standards through a public rulemaking process.

**Proper Oversight of Testing:** AV testing is already underway in many states and localities. Fundamental and commonsense safeguards must be instituted for testing on public roads including the establishment of independent institutional review boards (IRBs) to certify the safety of the protocols and procedures for testing of AVs on public roads. The IRB requirements established by the Department of Health and Human Services (HHS) in 45 Code of Federal Regulations (CFR) 46 should serve as a basis for the requirements for IRBs overseeing AV road testing and be modified as needed for this particular use. Test vehicles should be prohibited from providing a service for compensation. In Section 24404 of the Fixing America's Surface Transportation Act (FAST) Act (Pub. L. 114-94), Congress excluded test vehicles from having to comply with federal standards as long as those vehicles are not sold to the public.

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<sup>4</sup> Motor Vehicle Safety Act, Pub. L. 89-563 (1966).

NHTSA actions required:

- Develop empirical data reporting standards and metrics for such data;
- Mandate developer reporting of the metrics to the public to enable comparison of AV safety performance among developers;
- Require manufacturers to provide data on the safety and performance of test vehicles and systems and to report safety-critical events including crashes and incidents that occur during testing that result in death, injuries or property damage;
- Verify developer compliance with all applicable laws;
- Make safety-critical event information publicly available with the rebuttable presumption in favor of disclosure, unless it is deemed proprietary or confidential in accordance with federal law;
- Determine which safety-critical events must result in the suspension of testing until a thorough review is completed and additional safeguards are implemented and verified by the Agency, as necessary; and,
- Prior to the introduction of the AV into commerce, review and analyze testing for oversight and research purposes, including but not limited to rulemaking.

**Additional Resources and Enforcement Authorities for NHTSA:** Ensuring NHTSA has adequate resources, funds, staff, and enforcement authority is essential for the Agency to successfully carry out its statutory mission and address the multiple challenges presented by the testing and deployment of self-driving technologies. The Agency also should be given additional enforcement powers including imminent hazard authority, and enhanced authority to pursue criminal penalties and levy larger civil penalties to ensure industry accountability and thwart misconduct.<sup>5</sup>

### *Guaranteeing Accessibility for All*

**Access for Individuals with Disabilities and Older Adults:** Nearly one in five people in the U.S. has a disability (more than 57 million), and 16 percent of the U.S. population is over the age of 65. Yet, significant barriers to accessible, affordable and reliable transportation remain across all modes, and many people with disabilities are unable to obtain a driver's license and cannot afford to purchase an accessible vehicle. Autonomous driving technology has the potential to increase access and mobility for older adults and individuals with disabilities, including those with sensory, cognitive, and physical disabilities, wheelchair users, and people with neurological conditions, who have varying needs as well as traditionally underserved communities. This goal can be realized by Congressional directive ensuring access for everyone, including accessible HMI, and ramps and securement for wheelchair users. Discrimination on the basis of disability in licensing for SAE International level 4 and 5 AVs must also be prohibited. In addition, the diverse needs of all members of the disability community and older adults must be accommodated for systems that require human engagement as well as when developing a safe fallback.

**Access for Underbanked Populations:** Access to on-demand transport services is often predicated on the ability to make digital payments. Twenty-five percent of U.S. households are unbanked or underbanked, with higher incidence in working-age disabled households, lower-income households, less-educated households, younger households, Black and Hispanic households, and households with volatile income. AV-based transport services must consider a variety of ways in which payment for service can be made in order to ensure that this technology supports equitable access and the inclusion of all.

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<sup>5</sup> If NHTSA is not to have authority over the commercial operation of an AV, these same oversight powers must be conveyed to the respective modal agency responsible for overseeing the deployment of commercial AVs.



**Equity:** Transportation is an imperative part of life. It is the connector for people's work, medical care, worship, recreation, essentials for life and all other tasks. As new modes of transportation continue to grow and evolve, investment and development must include a process where all people can safely participate.

**Accessibility, Passenger Safety, and Transportation Services:** The safety of passengers is not a monolith, and the measurement and descriptions of safety differ for all people in particular for those who are part of marginalized communities. The use of public transportation safely is currently partially in control of the operators of the modes and vehicles. Human interaction remains essential even when there is an AV and no operators. There must be clear plans that coordinate the safe transportation for all people including the need for delivery of medical care as well as laws that embrace social equity to protect those who are marginalized (Black and Brown people, Indigenous people, lesbian, gay, bisexual, transgender, queer, + (LGBTQ+) people, people with disabilities, women, older adults, and all other groups) in the implementation of these transportation services.

### *Preserving Consumer and Worker Rights*

**Consumer Information:** Consumer information regarding AVs should be available at the point of sale, in the owner's manual, including publicly accessible electronic owner's manuals, and in any OTA updates. The vehicle identification number (VIN) should be updated to reflect whether certain features were built into the vehicle, either as standard or optional equipment. Additionally, similar to the user-friendly safecar.gov website, NHTSA must establish a website accessible by VIN with basic safety information about the AV level, safety exemptions, and limitations and capabilities of the AV driving system including those resulting from OTA updates. The U.S. New Car Assessment Program (NCAP) was the first government program to provide the public with comprehensive auto safety ratings, including crash test results. It is vital that Congress require NHTSA to act upon consumer and stakeholder recommendations to modernize U.S. NCAP ([See Claybrook/Advocates for Highway and Auto Safety paper](#)) and include ratings on how vehicles perform in crashes with motorcyclists, pedestrians and bicyclists. This enhancement of NCAP will be especially crucial as AVs are introduced into the marketplace. Consumer information should be available in multiple languages, similar to compliance with Section 508 of the Rehabilitation Act of 1973 (Pub. L. 93-112), and via video with closed captioning as appropriate, as well as other means of communication to promote access.

**Privacy:** Passenger vehicles have the potential to collect significant amounts of data that could interfere with personal privacy rights. Therefore, all manufacturers of passenger motor vehicles, including AVs, should be required to comply with robust data privacy safeguards and policies. Any personally identifiable information (PII) should only be collected or shared for purposes of delivering the services a consumer has requested or affirmatively opted-in to, with appropriately tailored exceptions for essential public purposes, safety, data security, compliance with regulatory requirements, and analytics/performance monitoring, among other purposes. Companies should be required to be transparent with consumers and workers operating a vehicle about the collection and sharing of information, protect information associated with the vehicle and the vehicle itself from data breaches, obtain consumers' express permission to sell or disclose their PII to third parties, and provide consumers the ability to access and delete PII that is not needed to support essential public purposes, safety, data security, compliance with regulatory requirements, and analytics/performance monitoring. The ability of NHTSA, the NTSB, and local law enforcement to access critical safety performance data, while preserving the integrity of personal, private or identifying data, in a timely manner for research, crash investigation and other governmental purposes must be preserved. In addition, radio spectrum needed for traffic safety purposes including vehicle-to-everything communications must be limited to non-commercial use.

**Workforce Protections:** The deployment of AV technology will have a significant impact on our Nation's workforce. While these technologies will create new business and employment opportunities, they will also lead to displacement and major shifts in jobs and job functions that will not necessarily be linked to those new opportunities, especially for those same individuals who are being displaced. Policymakers have a major role to play in determining whether AV deployment will help or harm working people and whether the benefits from these technologies will be broadly shared. Absent strong leadership, AV technology risks worsening severe inequalities already inherent in our society, predominantly for blue collar workers. Existing and foreseeable issues which stand to be greatly exacerbated by this technology must be addressed before this technology is broadly deployed on our roads. Similarly, unforeseeable issues throughout deployment will need to be resolved with input from affected stakeholders. Congress must ensure that workers and unions are partners in the development and implementation of AV technology and policy. It must recognize the projected negative effects of a transition to AVs, including but not limited to ensuring strong worker protections in federal funding and procurements, and providing worker support programs for current and future workers including training and re-skilling to ensure that displaced and otherwise affected workers are able to move into middle class jobs created by technological change. In order to achieve these goals, Congress must also take action to require companies and government agencies that plan to transition to AV fleets to be transparent and honest with their workers regarding budgets, plans - including training programs - and timelines for the implementation of new technology. In workplaces where the employees are unionized and thus bargain collectively, these issues should be negotiated.

**Whistleblower Protections:** Employees or contractors of any manufacturer, supplier, or operator of software or hardware for AVs who want to report safety defects to NHTSA should not be prevented from doing so as the result of a non-disclosure agreement (NDA). The type of protections afforded whistleblowers in Section 31307 of the Moving Ahead for Progress in the 21st Century (MAP-21) Act (Pub. L. 112-141) as well as Section 24352 in the FAST Act (Pub. L. 114-94) must be extended in any AV bill. In addition, the Department of Labor prohibits a NDA that prevents an individual from providing information to the federal government. However, only a limited number of cases have been filed with the Occupational Safety and Health Administration. Therefore, more must be done to inform employees as to their rights and responsibilities when such a situation arises.

**Consumer and Worker Rights<sup>6</sup>:** The well-established rights of consumers to seek accountability in a court of law for injuries suffered as a result of AVs must be preserved. Nothing in this bill shall exempt a person from liability at common law or under a state law, or permit a consumer to be required to forgo their rights by a manufacturer or provider of AVs. Moreover, exploitative independent contractor relationships that shield AV companies from liability and deny workers basic workplace rights should be explicitly prevented.

### ***Ensuring Local Control and Sustainable Transportation***

**Local, State and Federal Regulatory Roles:** The statutory mission of the DOT established by Congress in 1966 is to regulate the performance of motor vehicles to ensure public safety, which now includes AVs. In keeping with existing law and practice, the federal government should prescribe regulations for the performance of these vehicles, leaving regulation of the operation of these vehicles to the states. Even after federal regulations are in place regarding AVs, existing federalism practices demand that states retain a legal right and a duty to their residents to develop proposals and implement solutions to ensure public safety. In addition, state and local governments have the authority to manage the operation of vehicles on their streets to address concerns such as safety, noise, local air quality, and congestion. Any action on the

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<sup>6</sup> Advocates for Highway and Auto Safety does not take a position on this issue.

regulation of AVs shall not preempt states and localities from regulating the operation of these vehicles just as they do for traditional motor vehicles.

**In-Depth Study of AV Impacts on Transportation Systems and Environment:** AVs could have direct and indirect negative impacts on safety, congestion, pollution, land use, accessibility, transportation infrastructure capacity and needs, energy consumption, public transit, jobs and job functions, mobility and equity. DOT must be directed to undertake a comprehensive study to inform policymakers and the public about how these vehicles will impact our existing transportation systems and ensure effective mitigation of problems identified. Implementation of infrastructure to support the safe operations of AVs, such as placement of electric vehicle charging stations, visible lane striping, and uniform and unobstructed signage, must be equitable for all communities to ensure equal opportunity for people of all racial and socioeconomic backgrounds.

***NOTE:*** The AV Tenets outlined in this document do not constitute the entirety of each supporting organization's policy priorities related to AVs.

## Glossary of Acronyms

**ADS** – Automated Driving System

**AV** – Autonomous Vehicle

**CFR** – Code of Federal Regulations

**DOT** – Department of Transportation

**FAA** – Federal Aviation Administration

**FAST** – Fixing America’s Surface Transportation Act, Pub. L. 114-94

**FMVSS** – Federal Motor Vehicle Safety Standard

**GAO** – Government Accountability Office

**GVWR** – Gross Vehicle Weight Rating

**HHS** – Health and Human Services

**HMI** – Human-Machine Interface

**IRB** – Institutional Review Board

**LGBTQ+** -- Lesbian, Gay, Bisexual, Transgender, Queer, +

**MAP-21** – Moving Ahead for Progress in the 21<sup>st</sup> Century Act, Pub. L. 112-141

**NCAP** – New Car Assessment Program

**NDA** – Non-Disclosure Agreement

**NHTSA** – National Highway Traffic Safety Administration

**NIST** – National Institute of Standards and Technology

**NTSB** – National Transportation Safety Board

**ODD** – Operational Design Domain

**OTA** – Over-the-Air

**PII** – Personally Identifiable Information

**SAE** – Society of Automotive Engineers

**USC** – United States Code

**VIN** – Vehicle Identification Number