ADVOCATES
FOR HIGHWAY
& AUTO SAFETY

May 17, 2021

The Honorable Jan Schakowsky, Chair
The Honorable Gus M. Bilirakis, Ranking Member
Committee on Energy and Commerce
Consumer Protection and Commerce Subcommittee
United States House of Representatives
Washington, D.C. 20510

Dear Chairwoman Schakowsky and Ranking Member Bilirakis:

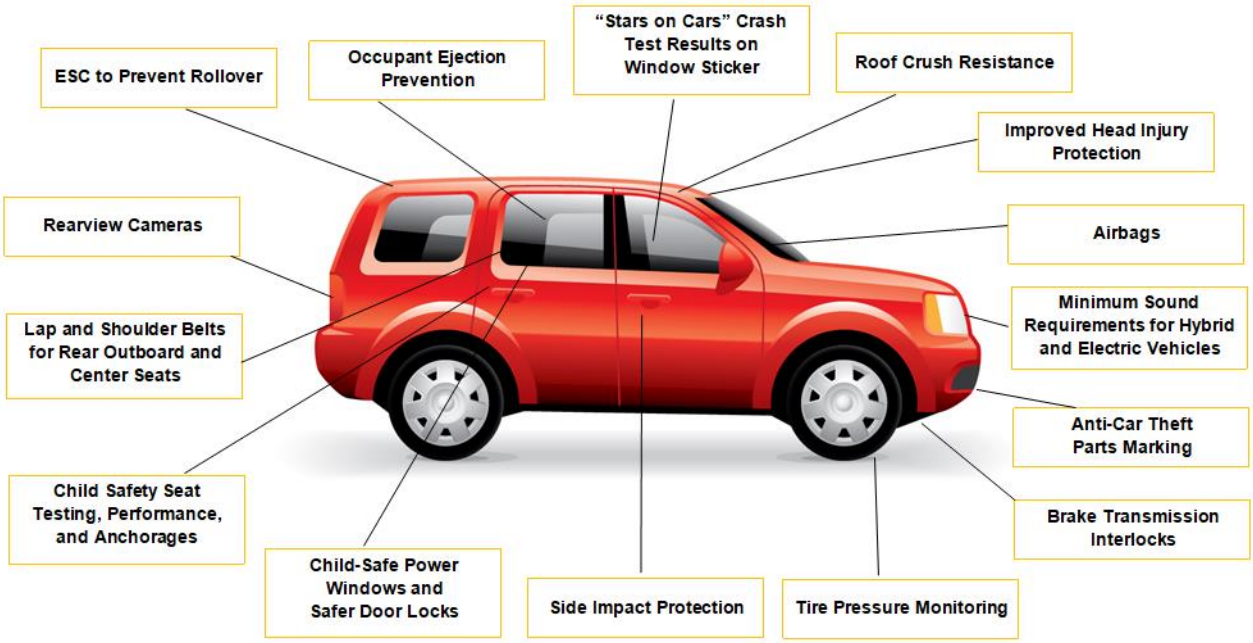
Thank you for holding tomorrow's hearing, "Promises and Perils: The Potential of Automobile Technologies." Advocates for Highway and Auto Safety (Advocates) appreciates your leadership on this important topic and urges you to prioritize safety as you consider policies and laws for vehicle technologies. Advocates is an alliance of consumer, medical, public health, law enforcement, and safety groups and insurance companies and agents working together to improve road safety in the United States (U.S.). Advocates' mission is the adoption of federal and state laws, policies and programs that prevent motor vehicle crashes, save lives, reduce injuries, and contain costs. We respectfully request this letter be included in the hearing record. We offer it as a roadmap of how to achieve the "promises" and avoid the "perils" of "the potential of automobile technologies."

The Death and Injury Toll on Our Nation's Roads Demands Swift Action by Congress to Advance Proven Solutions

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.[1] The NHTSA currently values each life lost in a crash at $11.6 million.[2] 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.[3] When adjusted solely for inflation, total costs reach nearly a trillion dollars annually. In 2018, crashes alone cost employers $72.2 billion.[4]

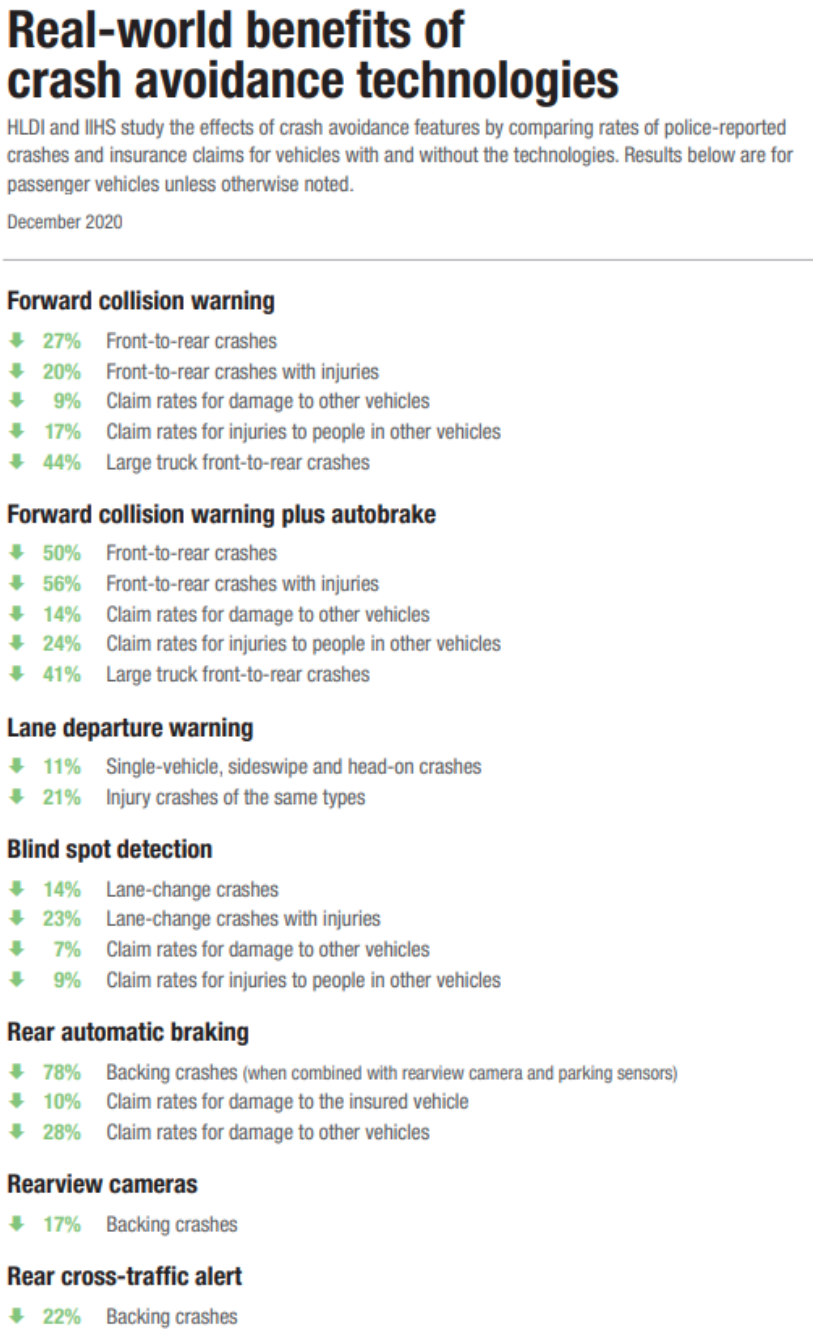
The good news is that we have a highly effective strategy to reduce the death and injury toll – requiring proven and available safety technologies with minimum performance standards. The NHTSA has estimated that between 1960 and 2012, over 600,000 lives have been saved by motor vehicle safety technologies.[5] Advocates always has enthusiastically championed this approach. In 1991, Advocates led the coalition that supported enactment of the bipartisan Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991[6] 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.[7] 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;[8] rear outboard 3-point safety belts;[9] electronic stability control;[10] rear safety belt reminder systems;[11] brake transmission interlocks;[12] safety belts on motorcoaches;[13] electronic logging devices for commercial motor vehicles (CMVs);[14] and, rear-view cameras.[15]



The recent crash involving Tiger Woods is 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."[16]

The vehicle of Tiger Woods after he was involved in a rollover crash in Rancho Palos Verdes, CA. Harrison Hill, USA Today February 23, 2021



Real-world benefits of crash avoidance technologies

HLDI and IIHS study the effects of crash avoidance features by comparing rates of police-reported crashes and insurance claims for vehicles with and without the technologies. Results below are for passenger vehicles unless otherwise noted.

December 2020

Forward collision warning

- ↓ 27% Front-to-rear crashes
- ↓ 20% Front-to-rear crashes with injuries
- ↓ 9% Claim rates for damage to other vehicles
- ↓ 17% Claim rates for injuries to people in other vehicles
- ↓ 44% Large truck front-to-rear crashes

Forward collision warning plus autobrake

- ↓ 50% Front-to-rear crashes
- ↓ 56% Front-to-rear crashes with injuries
- ↓ 14% Claim rates for damage to other vehicles
- ↓ 24% Claim rates for injuries to people in other vehicles
- ↓ 41% Large truck front-to-rear crashes

Lane departure warning

- ↓ 11% Single-vehicle, sideswipe and head-on crashes
- ↓ 21% Injury crashes of the same types

Blind spot detection

- ↓ 14% Lane-change crashes
- ↓ 23% Lane-change crashes with injuries
- ↓ 7% Claim rates for damage to other vehicles
- ↓ 9% Claim rates for injuries to people in other vehicles

Rear automatic braking

- ↓ 78% Backing crashes (when combined with rearview camera and parking sensors)
- ↓ 10% Claim rates for damage to the insured vehicle
- ↓ 28% Claim rates for damage to other vehicles

Rearview cameras

- ↓ 17% Backing crashes

Rear cross-traffic alert

- ↓ 22% Backing crashes

Every major surface transportation law has included a safety title to advance solutions that reduce crashes, save lives, mitigate injuries and lessen crash costs.[17] It is incumbent upon the 117th Congress to continue this progress by including the following issues.

Advanced Driver Assistance Systems (ADAS)

It is a transformational time in surface transportation innovation with the availability of new safety technologies, advanced driver assistance systems (ADAS), in some vehicles to prevent or mitigate crashes and protect occupants and road users. 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.[18]

However, the widespread distribution of these technologies and their lifesaving capability 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 slow walks mass dissemination 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. When consumers walk into auto showrooms to purchase a vehicle, which is often one of the most considerable expenditures for families, they expect the assurances of minimum safety standards to protect them, as has been the case since the first regulation in 1966.[19] The current void of regulations for ADAS renders all road users, including bicyclists, pedestrians and others, vulnerable to dangers.

Legislation passed by the U.S. House of Representatives in July 2020, the Moving Forward Act, H.R. 2,[20] addressed this shortfall by requiring lifesaving technologies as standard equipment on

new vehicles. We thank Energy and Commerce Committee Chair Frank Pallone (D-NJ) and Consumer Protection and Commerce Subcommittee Chair Jan Schakowsky (D-IL) as well as Transportation and Infrastructure Chair Peter DeFazio (D-OR) and Highways and Transit Subcommittee Chair Eleanor Holmes Norton (D-DC) for their leadership in advancing that bill. Additional legislation which also promotes these issues includes the Protecting Roadside First Responders Act (H.R. 2868/S. 1386) and the 21st Century Smart Cars Act (H.R. 6284, 116th Congress) which was sponsored by Subcommittee Chair Schakowsky; among others. These measures should be included in any surface reauthorization legislation.

Passive Impaired Driving Prevention Systems

In 2019, over 10,000 people were killed in crashes involving impaired driving across the nation.[21] According to NHTSA, the estimated economic cost of all alcohol-impaired crashes in the U.S. in 2010 (the most recent year for which cost data is available) was $44 billion.[22] When inflation rates are factored into this figure, the annual cost is $55.5 billion. In 2018, alcohol-impaired crashes cost employers $8 billion.[23] 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.[24] 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.[25]

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.[26] 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.[27] Despite considerable research subsidized in large part by tens of millions of dollars of taxpayer funding over more than a decade into developing the Driver Alcohol Detection System for Safety, known as DADSS, the auto industry continues to prolong installing this technology into vehicles.[28] In fact, according to the Congressional testimony of the Automotive Coalition for Traffic Safety (ACTS) in March of 2019, the systems being developed will not be ready to be installed into private vehicles until 2023 or 2024 at the earliest and has only been installed in four test vehicles.[29] As a frame of reference for how miniscule this number is, the auto industry sold over 17 million vehicles in 2019.[30] This tortured history, replete with more than 525,000 people killed in crashes involving at least one driver with a blood alcohol concentration (BAC) of 0.08 percent or higher between 1982 and 2019, 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.[31] 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."[32] The Insurance Institute for Highway Safety (IIHS) conducted research showing that impairment detection systems could save upwards of 9,000 lives each year.[33]

With each passing hour, another person is killed in an alcohol-impaired driving fatality, on average.[34] Again, provisions in the Moving Forward Act [35]addressed this urgent safety need. We laud Committee Members Reps. Debbie Dingell (D-MI), David McKinley (R-WV) and Kathleen Rice (D-NY) for sponsoring the Honoring Abbas Family Legacy to Terminate (HALT) Drunk Driving Act (H.R. 2138) and urge this Subcommittee to advance it.

Distracted Driving

Distracted driving, which experienced a 10 percent increase in fatalities in 2019, amounting to 3,142 people killed,[36] must be mitigated. Safety research, studies and data show that the use of electronic devices for communications (such as smart phones and text messaging), telematics and entertainment can readily distract drivers from the driving task. Crashes in which at least one driver was identified as being distracted impose an annual economic cost of $40 billion dollars. Adjusted for inflation only, that amounts to $48 billion in 2021 dollars.[37] The NTSB has consistently listed eliminating distractions on the Most Wanted List of Transportation Safety Improvements.[38] As more auto manufacturers integrate autonomous driving system features, yet still require an alert and engaged driver participating in the driving task, distraction resulting from overreliance on technology and automation complacency must be addressed as well. This Subcommittee should direct NHTSA to require driver monitoring technology with a minimum performance standard on new vehicles to reduce distraction and ensure driver engagement.

Electronics and Cyber Standards for All Vehicles

Modern vehicles are equipped with increasingly complex electrical and computer systems that should be required to meet a minimum safety standard and to ensure protection against unwarranted activity including hacking.[39] These safeguards are necessary now as well as for future automated driving systems. In fact, the January 2020 public opinion poll by ENGINE Insights found that 74 percent of respondents supported the government issuing cybersecurity rules to protect against hacking of autonomous vehicles.[40] Additionally, a 2018 public opinion poll showed strong support (80 percent) for minimum performance requirements for the computers that operate driverless cars, similar to those for computers that operate commercial airplanes.[41] This Subcommittee should direct NHTSA to issue minimum performance requirements for the vehicle electronics and software that power and operate vehicle safety systems, individually and as components of a system, and to ensure proper firewalls between safety and infotainment systems. Additionally, NHTSA should be directed to issue cybersecurity requirements to prevent hacking and to ensure mitigation and remediation of cybersecurity events, including during the process of over-the-air updates.

Hot Cars, Headlamps, Keyless Ignition System Problems, Limo Safety and School Bus Safety

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) directed the U.S. Department of Transportation (DOT) to issue a rule requiring rear seat belt reminders in all new cars by October 2015.[42] 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 autonomous vehicle (AV) system that the car is occupied and if occupants are restrained properly.

According to NHTSA, 52 percent of fatalities (18,729 people) occurred at nighttime in 2018. Moreover, 73 percent of pedestrian fatalities and 53 percent of cyclist fatalities happen when it is dark out, according to NHTSA data from 2018. This is particularly alarming considering that only approximately 28 percent of vehicle miles traveled occur at night.[43] Research from IIHS shows that the current headlight performance standard is outdated and inadequate.[44] In addition, the NTSB has recommended upgrading headlight standards.[45] This Subcommittee should direct NHTSA to upgrade Federal Motor Vehicle Safety Standard (FMVSS) 108 to improve headlight performance and technology.

Keyless ignition systems present certain safety risks including carbon monoxide poisoning and vehicle rollaway. As more vehicles equipped with keyless ignitions are sold, prevalence of these dangers is increasing. Safety systems for keyless ignition vehicles including an automatic shutoff to prevent carbon monoxide poisoning and to stop a vehicle from rolling away should be standard equipment.

Limousines lack essential standards creating dangerous gaps in safety which can cause a family's happiest moments to turn into their worst nightmare.[46] On October 6, 2018, a limousine crash in Schoharie, New York resulted in 20 fatalities, the deadliest motor vehicle crash in recent history.[47] The NTSB investigation found multiple issues that must be corrected.[48]

Every year, nearly 500,000 school buses transport more than 25 million children to and from school and school-related activities, according to the NTSB.[49] School bus crashes are similar in many respects to aviation crashes – crashes are infrequent but when they do occur, the results can be catastrophic. This Subcommittee should direct NHTSA to issue a final rule on important safety advances including three-point seat belts, automatic emergency braking (AEB) and electronic stability control (ESC). Additionally, this Subcommittee should direct NHTSA to undertake research followed by issuance of a final rule on fire prevention and mitigation, motion-activated detection systems that can perceive pedestrians located near the outside of the school bus, and seat belt reminder systems.

The Moving Forward Act included lifesaving technologies as standard equipment on new vehicles to address these issues.[50] Again, we thank Committee Chair Pallone and Subcommittee Chair Schakowsky for their commitment to advancing these issues including Chair Schakowsky cosponsoring the Hot Cars Act (H.R. 3164) and the PARK IT Act (H.R. 3145/S. 543, 116th Congress). In addition, we laud Committee Member Rep. Paul Tonko (D- NY) for sponsoring the Safety, Accountability, and Federal Enforcement (SAFE) of Limos Act (H.R. 2956) and the Take Unsafe Limos Off the Road Act (H.R. 2957). Lastly, the School Bus Safety Act (S. 2278/H.R. 3959, 116th Congress) would address many of the safety shortcomings with school buses identified by the NTSB. We urge swift action to advance these bills by Congress and this Subcommittee.

Crash Data, Recalls and the New Car Assessment Program (NCAP)

Adequate information, crash data and consumer information must be collected and made publicly available to better inform consumers, to improve our understanding of crash causation and to advance effective countermeasures. There is no requirement that vehicles be equipped with an event data recorder (EDR), despite this being required in Europe and recommended by the NTSB for more than three decades.[51] While there is a requirement for what data voluntarily installed EDRs must capture, this information is insufficient to properly ascertain important facts about vehicle performance and crashes, especially as vehicles become more highly automated. Additionally, more than forty years ago, the U.S. was a global leader in developing NCAP to

provide consumers with information about vehicle safety. Although not a substitute for sufficient safety regulations, U.S. NCAP must be upgraded as it has fallen woefully behind our international counterparts. This Subcommittee should direct NHTSA to mandate the installation of EDRs in all new vehicles and update the data elements to collect sufficient, standardized crash and performance data. It should be recorded and publicly accessible to assess performance and identify safety critical problems while addressing privacy issues. Additionally, NHTSA should be directed to upgrade NCAP by improving crash testing and ratings to modernize this important consumer information tool, as required in the Moving Forward Act and the Five-Stars for Safe Cars Act (H.R. 6256, 116th Congress). Lastly, NHTSA should be directed to update and modernize the component categories for manufacturers' data submission to the Early Warning Reporting systems used to identify potential defects to ensure NHTSA has adequate information to identify defect trends from incidents involving fatalities and serious injuries.

Commercial Motor Vehicle (CMV) Safety: AEB, Underrides and Speed Limiters

In 2019, more than 5,000 people were killed in crashes involving a large truck. Since 2009, the number of fatalities in large truck crashes has increased by 48 percent.[52] An additional 159,000 people were injured in crashes involving a large truck, and the number of large truck occupants injured increased by 18 percent.[53] In fatal crashes involving a truck and a passenger vehicle, 96 percent of the fatalities were passenger vehicle occupants, according to the IIHS.[54] The cost to society from crashes involving commercial motor vehicles (CMVs) was estimated to be $143 billion in 2018, the latest year for which data is available.[55]

According to NHTSA, from 2003 through 2008, large trucks were the striking vehicle in approximately 32,000 rear-end crashes resulting in 300 fatalities and injuring over 15,000 people annually.[56] Available proven collision avoidance systems have the capability to prevent and mitigate crashes caused by numerous behavioral issues such as distraction, impairment, fatigue, speeding and reckless driving. A study by IIHS found that equipping large trucks with FCW and AEB reduced the rate of rear-end crashes by 44 and 41 percent, respectively.[57] Large trucks equipped with FCW had a 22 percent lower rate of crashes while trucks with AEB had a 12 percent lower rate of crashes than those without either of these vital safeguards.[58] FCW and AEB were found to reduce speed at the moment of impact by more than half, which reduces the severity of crashes and improves survivability.[59] Based on new truck sales data, if the installation of AEB was limited to Class 7 and 8 trucks, potentially thousands of new vehicles every year would not be equipped with this lifesaving technology. The NTSB has recommended repeatedly, including most recently in its 2021-2022 Most Wanted List of Transportation Safety Improvements, that AEB and other crash avoidance technologies should be standard equipment on all vehicles. The NTSB makes no distinction for different classes of trucks.[60] They support every vehicle being equipped with ADAS technologies. Safety groups petitioned NHTSA to initiate a rulemaking on AEB for all vehicles with a gross vehicle weight rating (GVWR) of 10,000 pounds or more in 2015.[61] The petition was granted but no regulatory action has been taken by the agency.[62] Congress should direct NHTSA to issue a rule requiring all new CMVs be equipped with AEB subject to minimum performance requirements as was included in the Moving Forward Act and the Safe Roads Act of 2019 (H.R. 3773, 116th Congress).

Technology is currently available that can prevent a passenger vehicle from traveling underneath the rear or side of a trailer and significantly increase the chances of survival. The NTSB has recommended rear, side, and front underride protection.[63] In 2017, IIHS performed its first tests of a side underride guard designed for an automobile.[64] The device bent but did not allow the car to go underneath the trailer, enabling the car's airbags and safety belt to properly restrain the test dummy in the driver seat.[65] Congress should direct NHTSA to upgrade the weak FMVSS 223

and 224 for rear underride guards and require the installation of comprehensive underride protection (side and front) for the entire CMV as included in the Stop Underrides Act (H.R. 1622/S. 605) and partially in the Moving Forward Act.

According to the FMCSA, 10,440 people were killed from 2004 to 2013 in crashes where the speed of the CMV likely contributed to the severity of the crash.[66] On average, that is over 1,000 lives lost annually to speeding CMVs.[67] The NTSB has recommended the use of speed limiting devices on trucks, buses, and motorcoaches. [68] Congress should direct NHTSA and FMCSA to partner and issue a final rule requiring all new CMVs to be equipped with speed limiting devices and to compel their use in CMVs in which they already are installed. Speed limiters should be set at speeds no higher than 65 miles per hour.

Connected Vehicles

Connected vehicle technologies allow a vehicle to send and receive communications with other vehicles (vehicle-to-vehicle (V2V)), the infrastructure (vehicle-to-infrastructure (V2I), and "everything" (vehicle-to-everything (V2X)). These messages can relay information ranging from the relative location and direction of motion of other vehicles (and the potential for all road users) to warning messages that traffic lights are about to change or inclement weather conditions are soon to be encountered. Further, digital alert technologies could allow emergency and first response vehicles to communicate their location in an effort to prevent collisions with personnel on the roadside. The NHTSA estimated that two potential applications of V2V alone could yield a 50 percent reduction in crashes, injuries and fatalities, on average. NHTSA notes, "this could potentially prevent 400,000 to 600,000 crashes, 190,000 to 270,000 injuries, and save 780 to 1,080 lives each year."[69] This Subcommittee should direct NHTSA to update and complete the 2017 Notice of Proposed Rulemaking (NPRM) to require vehicle-to-vehicle (V2V) technology. Congress should also direct NHTSA to partner with the Federal Highway Administration (FHWA) to study the needs and benefits of vehicle-to-infrastructure (V2I) with the goal of vehicle-to-everything (V2X) communications for safety.

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.

Government Inaction and Voluntary Agreements Lead to Deaths, Injuries and Catastrophes Including Uber and Tesla Crashes, Colonial Pipeline Hacking and Boeing MAX Disasters

In stark contrast to the effectiveness of federal standards, several serious crashes involving cars equipped with autonomous technology, which is unregulated, have already occurred, many of which have been subject to investigation by the NTSB and NHTSA.[70] 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."[71]

Source: Tempe, AZ Police. March 21, 2018

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[72]

> 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[73]

The NHTSA disclosed that it currently has 23 active investigations of crashes involving Tesla vehicles including a crash in Houston last month.[74] In addition the California Highway Patrol recently arrested an individual observed sitting in the rear seat of a Tesla while the vehicle was operating under its "Autopilot" system.[75] These incidents have raised yet more concerns about the worrisome pattern of crashes involving these systems such as the inability to ensure the human operator remains engaged in the driving task and the lack of proper safeguards to prevent misuse.

Advocates urges this Subcommittee 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.

Last week's hacking and shutdown of the Colonial Pipeline drastically illustrate the real-world consequences of having inadequate federal safety standards in place such as those involving cybersecurity.[76] Additionally, the two crashes involving the Boeing 737 MAX airplane in 2018 and 2019, which killed 346 people, tragically highlight the catastrophic results that can occur when automated technology potentially malfunctions and is not subject to thorough oversight. Reports indicate that many aspects of the plane's certification were delegated to Boeing. In fact, the Federal Aviation Administration (FAA) never fully evaluated the flawed automated system. The behavior of the planes in both crashes prior to the impact focused suspicion on the automated system known as the Maneuvering Characteristic Augmentation System (MCAS). The pilots, who were not trained in MCAS but were following Boeing's instructions, attempted to shut off and override the MCAS system when it was activated erroneously. However, they were unable to regain control of the aircraft. Had the FAA exercised adequate oversight and undertaken a thorough evaluation of this system before being sold, its flaws may have been detected and corrected, preventing two needless disasters and the loss of hundreds of innocent lives.

In a 2020 article, Dr. M.L. Cummings, the well-known and well-respected Director of the Humans and Autonomy Lab, Pratt School of Engineering, Duke University, writes about "lapses in accurately assessing the readiness of new technology" including the MAX which she characterizes as "an example of what happens when immature and untested software code is embedded in an aircraft thought to be a physically mature platform."[77] She offers that "Given its flight criticality, even though the airframe was thought to be a more mature technology, the entire system's TRL [Technology Readiness Level] was only as good as its lowest common denominator."[78] The article continues with an apt comparison to AVs:

> When a technology is in its final form, one would expect that not only are the hardware elements fairly stable, but that the software code underpinning the perception, sensor fusion and control algorithms has also reached some measure of stability. It is not clear that in the case of self-driving cars that either hardware or software maturity has been reached. There is broad consensus across the self-driving car industry that LIDARs (Light Detection And Ranging) are critical for safe operations, but the LIDAR industry is still in significant flux and many new types and kinds of LIDARs have recently been introduced (Lienert and Klayman 2019).[79]

Subsequent to the certification of the MAX airplane, at the direction of Congress in the FAA Reauthorization Act of 2018, the FAA alarmingly has been given even less responsibility for the oversight of new technologies and equipment placed in planes.[80] This change in policy was deeply concerning to regulators at the FAA who noted such a change in policy would "not be in the best interest of safety."[81] Moreover, FAA inspectors warned that doing so would turn the FAA into a "rubber stamp."[82] Yet, instead of ensuring proper government oversight, Congress created an advisory committee that has since become dominated by industry resulting in a federal agency being deferential to the industry it is tasked with regulating.[83] Alarmingly, according to media reports, Boeing employees joked about the MAX's potential flaws with one individual going so far as to remark that "this airplane is designed by clowns, who are in turn supervised by monkeys," and said that they wouldn't put their families on a MAX.[84]

Upon reviewing aspects of the crashes involving the MAX, comparisons to the early stages of AV development should give all policy makers and regulators serious pause. Safety systems that could have assisted the pilots were not required as standard equipment but were offered as an option at an additional cost, similar to what is occurring today with crash avoidance technology for vehicles.

Pilots receive extensive training on how to properly fly a commercial airplane including how to utilize complex operational systems.[85] In sharp contrast, there are no training requirements for individuals testing or operating automated vehicle technology or for the consumers who purchase these vehicles and are using them on public roads. News reports indicate that the pilots may have had as little as 40 seconds to address a malfunction with the MCAS system and recover control of the plane and were unable to do so. In AVs where drivers are expected to monitor their operation or serve as fall back operators, drivers could be faced with much shorter time periods in more congested and complex space to respond before a crash occurs. We urge this Subcommittee to seriously consider these important observations and act in the interest of public safety as it considers proper safeguards of AVs for testing and public sale.

Time and again voluntary agreements have been demonstrated to be ineffective to advance safety as evidenced by the March 2016 voluntary agreement among 20 automakers to have AEBs in most new light vehicles by 2023. As of December 2020, which is the most recent update, 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 is especially tragic that AEB is not ubiquitous in the marketplace considering that IIHS found that forward collision warning plus autobrake (i.e., AEB) reduce passenger vehicle: front-to-rear crashes by 50 percent; front-to-rear crashes with injuries by 56 percent; claim rates for damage to other vehicles by 14 percent; and, claim rates for injuries to people in other vehicles by 24 percent.[86] Additionally, IIHS determined 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.[87]

The most recent voluntary agreement announced by the auto industry in September 2019 was to put technology to prevent hot car deaths of children into cars by 2025.[88] However, the agreement failed to include the vitally important component that the systems must detect the presence of children who have been unknowingly left in or gained access to hot cars.[89] The absence of a detection requirement paves the way for auto manufacturers to put inadequate alarms into cars which do not address the problem while also giving families a false sense of security that the potential dangers have been removed. In fact, Consumer Reports found many of these systems need to be reactivated for each new ignition cycle. If the driver stops and turns off the engine, the system requires the rear doors to be opened and closed to be reactivated.[90] . Additionally, there has been no transparency by the industry on the progress of the voluntary agreement. What we do know is that children have continued to die and suffer injuries in hot cars since the adoption of the voluntary agreement in 2019, according to Kids and Car Safety. Once again, this type of a pact unnecessarily prolongs the timeline to get effective equipment into new cars which is available now at a very minimal cost.[91] In fact, twenty years ago General Motors announced it would equip its new cars with technology that "can detect motion as subtle as the breathing of an infant sleeping in a rear-facing child safety seat" with the intent to begin rollout in 2004.[92] This technology was never installed. The 2019 voluntary agreement harkens back to that empty and unfulfilled promise while children continue to needlessly die or sustain serious injuries.

Additionally, the first edition of the AV Guidelines issued by the U.S. DOT in 2016 encouraged the submission of voluntary safety self-assessment (VSSA) reports, and the subsequent three editions have not altered this insufficient process.[93] Despite the fact that approximately 80

entities are testing AV technology,[94] only 23 reports have been filed with the U.S. DOT in five years.[95] Moreover, the U.S. DOT failed to implement standard requirements for the information to be provided in the VSSA. Further, some of the VSSAs posted on the NHTSA website are several years old calling into question the usefulness of the information contained in the documents. The end result has been manufacturers submitting incomplete, uninformative and sometimes outdated glossy, marketing-style brochures with little, if any, substantive or relevant information from which to ascertain critical information about safety and performance.

Lastly, in September 2020, the U.S. DOT announced a new voluntary plan, the Automated Vehicle Transparency and Engagement for Safe Testing (AV TEST) Initiative.[96] It focuses on the voluntary submission of information from AV manufacturers and operators, and state and local authorities. Similar to the VSSAs, the lack of a mandate and the lack of a standard for submissions will provide little if any value to assist in evaluating or comparing the AV testing taking place.[97] These substantial and critical issues could be addressed and resolved if the initiative was mandatory, included precise requirements for the information to be provided and incorporated public participation.

Autonomous Vehicles: A Safe Path Forward

Advocates remains optimistic that in the future AVs may bring about meaningful and lasting reductions in motor vehicle crashes. To accomplish this goal, commonsense safeguards and regulations are essential. The positive news is that we have time to do so and to do so thoughtfully and proactively. Numerous industry executives and technical experts have stated that the technology is not ready now and may not be ready for years ahead.

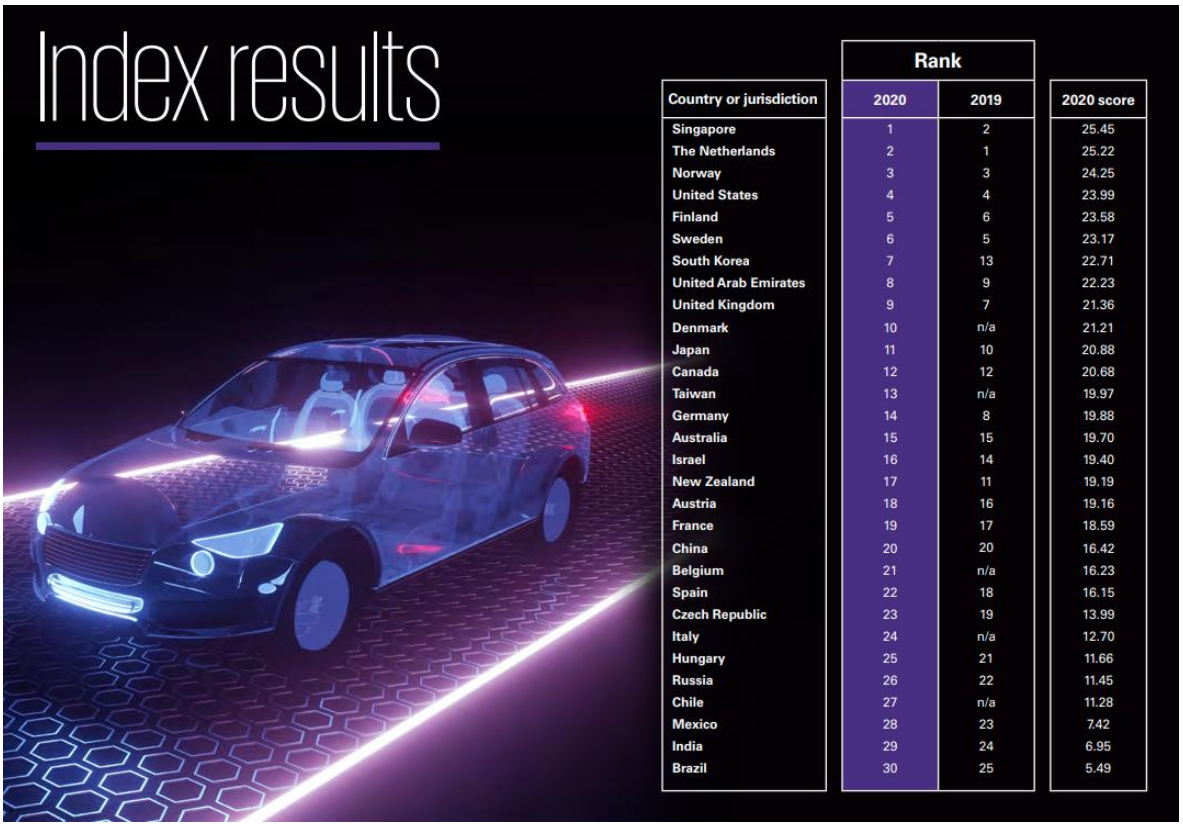
- "We've had multiple years of claims that 'by the end of the year it's going to be magically self-driving by itself without a human in the car,'" Ford's autonomous vehicles head, John Rich, said at a recent Princeton University conference. "It is not helpful, OK? It is confusing the public. Frankly even the investor community is very, very confused as to what paths are plausible and what the capabilities of the different systems are."[98]
- 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."[99]
- 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."[100]
- 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."[101]

Some proponents of advancing the deployment of AVs contend the U.S. is falling behind other nations. However, this fear-inducing claim is misleading. In fact, the United States is ranked fourth in the KPMG 2020 Autonomous Vehicles Readiness Index while Japan is ranked 11th, Germany is 14th and China is 20th.[102]

Other countries are taking a more calculated, careful and cautious approach.

- 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.[103]
- 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.[104]

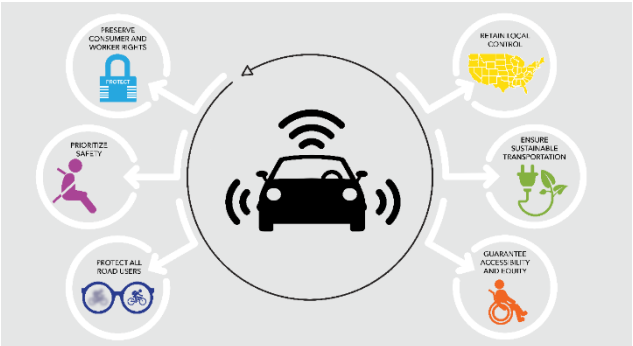
- In Canada, several provinces prohibit certain types of AVs from being sold to the public.[105]
- In Asia, Japan has allowed on-road testing with a driver behind the wheel and is currently working on regulatory and legal schemes for controlling the commercial introduction of AVs, but even so has not begun to address the highest levels of automation.[106]
- In China, all AV operations remain experimental.[107]



Country or jurisdiction	Rank 2020	Rank 2019	2020 score
Singapore	1	2	25.45
The Netherlands	2	1	25.22
Norway	3	3	24.25
United States	4	4	23.99
Finland	5	6	23.58
Sweden	6	5	23.17
South Korea	7	13	22.71
United Arab Emirates	8	9	22.23
United Kingdom	9	7	21.36
Denmark	10	n/a	21.21
Japan	11	10	20.88
Canada	12	12	20.68
Taiwan	13	n/a	19.97
Germany	14	8	19.88
Australia	15	15	19.70
Israel	16	14	19.40
New Zealand	17	11	19.19
Austria	18	16	19.16
France	19	17	18.59
China	20	20	16.42
Belgium	21	n/a	16.23
Spain	22	18	16.15
Czech Republic	23	19	13.99
Italy	24	n/a	12.70
Hungary	25	21	11.66
Russia	26	22	11.45
Chile	27	n/a	11.28
Mexico	28	23	7.42
India	29	24	6.95
Brazil	30	25	5.49

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.[108] 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. Congress can change this predicament.

Advocates and numerous stakeholders have developed the "AV Tenets," policy positions which should be a foundational part of any AV policy.[109] 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, lowering traffic congestion and vehicle emissions, expanding mobility and accessibility, improving efficiency, and creating more equitable transportation options and opportunities. The commonsense safeguards in the AV Tenets will help

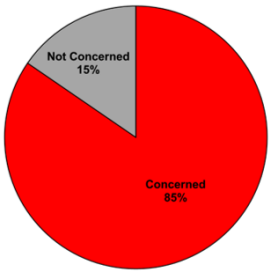


accomplish these goals. The AV Tenets are supported by a coalition of more than 60 groups and are based on expert analysis, real-world experience and public opinion. Requiring that AVs meet minimum standards, including for cyber security, and that operations are subject to adequate oversight, including a comprehensive database accessible by vehicle identification number (VIN) with basic safety information, will save lives and boost consumer confidence in this burgeoning technology.

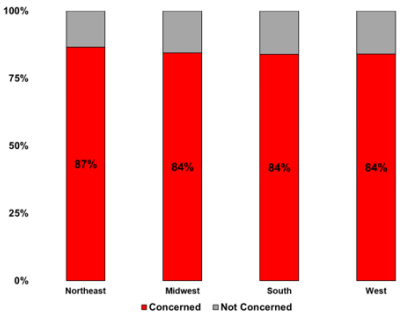
Currently there is a deep disconnect between the public's view of AVs and the clammer inside the Beltway about this developing technology. Public opinion polls show a high skepticism and fear about the technology, and for good reason.

- A public opinion poll conducted by the American Automobile Association (AAA) in February found that that only 22 percent of people feel manufacturers should focus on developing AVs while a majority (58 percent) want safety systems such as AEB in their next vehicle.[110]
- 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.[111]

The public is overwhelmingly concerned about sharing the road with driverless vehicles as motorists, bicyclists and pedestrians.



The public has said loud and clear – they are concerned about sharing the road with driverless cars. This apprehension is widespread across demographics including region, generation and type of community (suburban, urban, and rural). Notably, three-quarters of Generation Z (18 - 23) respondents expressed concern, and across the country the level of apprehension was nearly identical.



- An April 2019 Reuters/Ipsos opinion poll found that 64 percent of Americans said they would not buy a self-driving car.[112]
- 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.[113]

Any legislation should take into account and be responsive to these critical findings about public attitudes. Consumer confidence is an essential ingredient to realizing the improvements AVs will hopefully offer. Minimal safety performance standards, which have been established using thorough objective research, scientific studies and data, set the "foundation" to establish that trust. They are also subject to a robust and transparent public process. From this baseline, AV manufacturers can innovate without any "ceiling."

Lastly, no demonstrable evidence has been presented to show that the development of AVs requires larger volumes of exemptions from federal safety standards which are essential to public safety. 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. 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.[114] In February 2021, Ford announced it was investing seven billion dollars in AV technology through 2025.[115] 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. 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.

Conclusion

Fully driverless cars may have a future potential to reduce the carnage on our roads, expand mobility and address other transportation and environmental challenges. To do so, commonsense, lifesaving solutions and safeguards can and must be implemented now. While it is true that motor vehicles crashes are often caused by human behavior, it is essential to remember that it is also humans who are developing AVs. The solution to safety is not to replace one human-error problem with another. We urge Congress to pay heed to Benjamin Franklin's infamous quote from 1736, "An ounce of prevention is worth a pound of cure."

Thank you for your consideration of these critically important safety issues. As always, we are ready and willing to be of assistance to you in furtherance of our shared goal of improving safety for all road users.

Sincerely,

Catherine Chase, President

cc: Members of the Committee on Energy and Commerce
Encls.

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ADVOCATES FOR HIGHWAY & AUTO SAFETY

Crashes and Failures Involving Vehicles Equipped with Autonomous Driving Systems: Public Roads Serving as Proving Grounds and Endangering All Road Users

May 5, 2021, Fontana CA, Tesla Model 3: A Tesla struck a previously overturned truck which was blocking two lanes on the highway. According to the California Highway Patrol, "Autopilot" was engaged at the time of the crash. The National Highway Traffic Safety Administration (NHTSA) is investigating the crash.

April 17, 2021, The Woodlands, TX, Tesla Model S: A Tesla travelling at a "high rate of speed" around a curve went off the road about 100 feet and hit a tree. NHTSA and the National Transportation Safety Board (NTSB) are investigating the crash.

Photo Source: Reuters

March 17, 2021, Eaton County, MI, Tesla Model Y: A Tesla ran into a state patrol car parked on the side of the highway. The patrol car had emergency lights activated at the time. Michigan State Police said the driver was using "Autopilot" at the time of the crash. NHTSA is investigating.

Photo Source: Michigan State Police

August 26, 2020, Zebulon, NC, Tesla Model S: A Tesla ran into a police cruiser parked on the side of the highway, causing the cruiser to collide with a state trooper's vehicle. According to media reports, police said the driver was watching a movie on his phone and that "Autopilot" was engaged when the crash happened.

Photo Source: WRAL-TV

December 29, 2019, Cloverdale, IN, Tesla Model 3: A Telsa collided with a firetruck killing the passenger in the Tesla. The use of "Autopilot" has not been determined. NHTSA is investigating.

Photo Source: Indiana State Police

December 29, 2019, Gardena, CA, Tesla Model S: A Tesla ran a red light and struck another vehicle killing the two occupants in the other vehicle. The use of "Autopilot" has not been determined. NHTSA is investigating.

Photo Source: Loudlabs

December 7, 2019, Norwalk, CT, Tesla Model 3: a Tesla slammed into a parked police cruiser and another vehicle. Media reports that the "Autopilot" was engaged at the time of the crash. NHTSA is investigating.

Photo Source: Connecticut State Police

March 1, 2019, Delray Beach, FL, Tesla Model 3: The driver was killed when his vehicle, operating on "Autopilot," crashed into the side of a truck tractor combination, traveling underneath the trailer. (NTSB Investigation HWY19FH008, brief completed)

Photo Source: NTSB

May 29, 2018, Laguna Beach, CA, Tesla Model S: A Tesla reportedly on "Autopilot" crashed into a parked Laguna Beach Police Department Vehicle. The driver suffered minor injuries.

Photo Source: LA Times

March 23, 2018, Mountain View, CA, Tesla Model X: While on "Autopilot", a Tesla struck a safety barrier, causing the death of the driver. (NTSB Investigation HWY18FH011, report completed)

Photo Source: Forbes

March 18, 2018, Tempe, AZ, Uber Self-Driving Test Vehicle: The Uber vehicle, which was operating on "self-driving mode," struck and killed a pedestrian walking a bicycle. (NTSB Investigation HWY18MH010, report completed)

Photo Source: NBC News

January 22, 2018, Culver City, CA, Tesla Model S: A Tesla, reportedly on "Autopilot," was traveling at 65mph when it crashed into the back of a parked firetruck that was responding to the scene of a separate crash. (NTSB Investigation HWY18FH004, brief issued)

Photo Source: Culver City Firefighters

November 8, 2017, Las Vegas, NV, Driverless Shuttle Bus: A driverless shuttle was involved in a crash during its first day of service. There were no deaths or injuries. (NTSB Investigation HWY18FH001, brief issued)

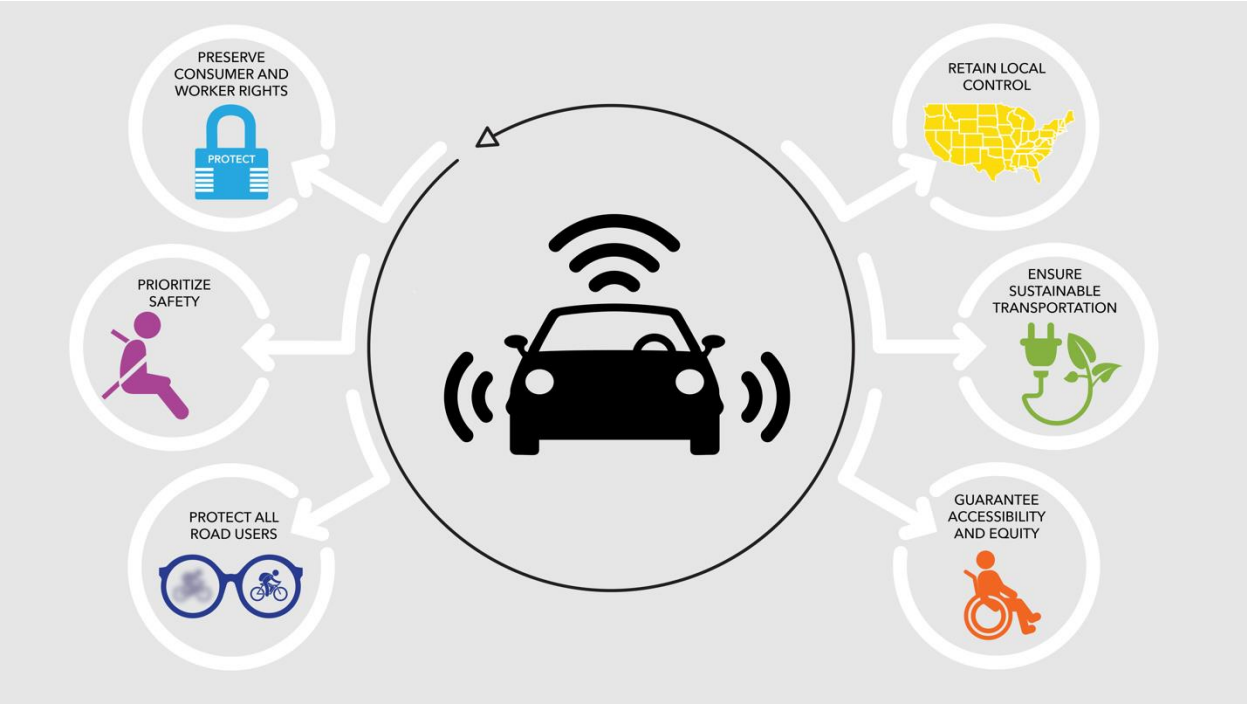
Photo Source: Fox5 Vegas

May 7, 2016, Williston, FL, Tesla Model S: The driver was killed when his vehicle, operating on "Autopilot," crashed into the side of a truck tractor combination, traveling underneath the trailer. (NTSB Investigation HWY16FH018, report completed)

Photo Source: NTSB

Autonomous Vehicle (AV) Tenets[1]

November 30, 2020



Prioritizing Safety of All Road Users

Safety Rulemakings: All levels of automated vehicles [2] 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

[1] 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.

[2] 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.[3] 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.

[3] 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[4] 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.

[4] 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.[5]

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.

[5] 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 safercar.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[6]: 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

[6] 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 21st 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

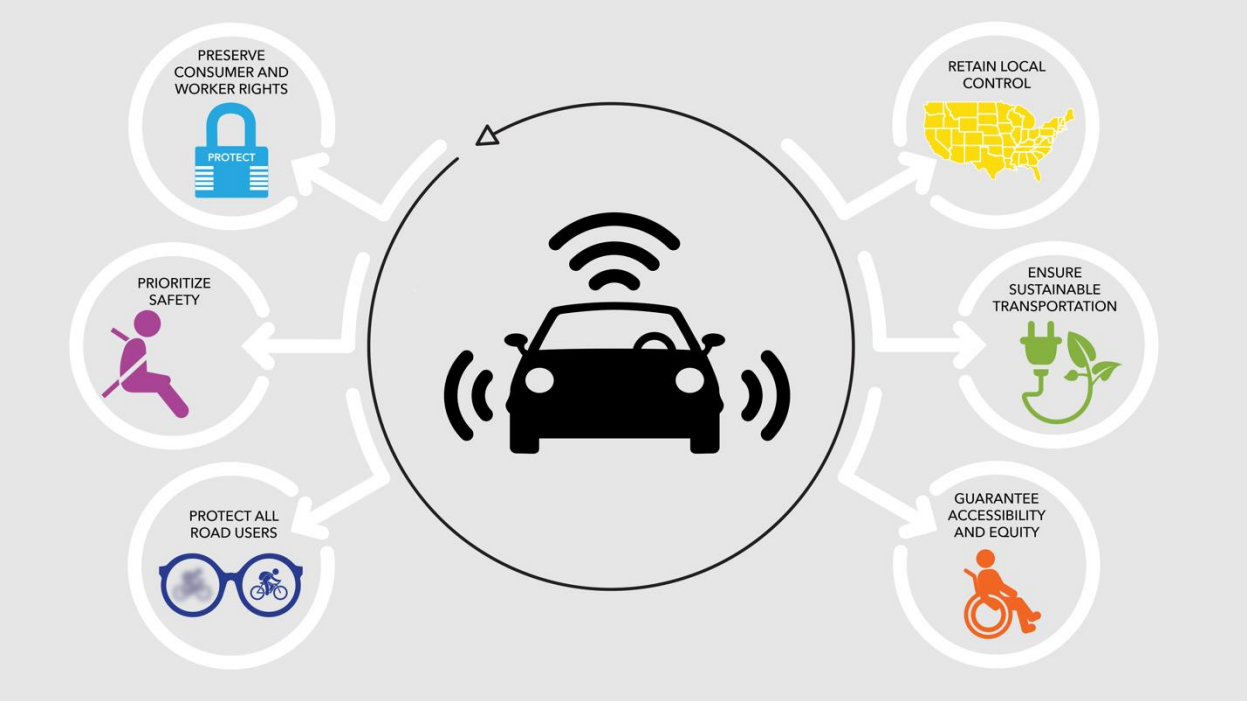
PII – Personally Identifiable Information

SAE – Society of Automotive Engineers

USC – United States Code

VIN – Vehicle Identification Number

Supporters of Autonomous Vehicle (AV) Tenets
As of December 2, 2020



Active Transportation Alliance (Metro Chicago)
Advocates for Highway and Auto Safety
American Association for Justice
American Motorcyclist Association
American Public Health Association
American Trauma Society
Association of Pedestrian and Bicycle Professionals
Bicycle Coalition of New Mexico
BikeNWA
BikeOklahoma
Bike Pittsburgh
BikeSD
BikeWalkKC
Brain Injury Association of America
California Association of Bicycling Organizations
Cascade Bicycle Club
Center for Auto Safety
Center for Disability Rights, Inc.
Citizens for Reliable and Safe Highways
Consumer Action
Consumer Federation of America
Consumers for Auto Reliability and Safety
Consumer Reports

Disability Rights Education and Defense Fund
Emergency Nurses Association
Environmental Law & Policy Center
Families for Safe Streets
Federal Law Enforcement Officers Association
GorgePedal.com
Health by Design
Idaho Walk Bike Alliance
International Brotherhood of Teamsters
Joan Claybrook, President Emeritus, Public Citizen, Former Administrator, National Highway Traffic Safety Administration
KidsAndCars.org
LA Walks
League of American Bicyclists
Missouri Bicycle and Pedestrian Federation
National Association of City Transportation Officials (NACTO)
National Coalition for Safer Roads
National Consumers League
New Urban Mobility Alliance
Parents Against Tired Truckers
Public Citizen
Owner-Operator Independent Drivers Association
Rails-to-Trails Conservancy
Ride Illinois
San Francisco Families for Safer Streets
Shenandoah Valley Bicycle Coalition
SoCal Families for Safe Streets
The Daniel Initiative
Transport Workers Union
Transportation Alternatives
Transportation for America
Transportation Trades Department, AFL-CIO
Trauma Foundation
Truck Safety Coalition
Walk SF
Washington Bikes
Whirlwind Wheelchair International
Wyoming Pathways