



ADVOCATES
FOR HIGHWAY
& AUTO SAFETY

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

ON

**“AUTONOMOUS VEHICLES: PROMISES AND CHALLENGES OF
EVOLVING AUTOMOTIVE TECHNOLOGIES”**

SUBMITTED TO THE

**UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON CONSUMER PROTECTION AND COMMERCE**

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Introduction

Advocates for Highway and Auto Safety (Advocates) is a coalition of public health, safety, 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.

In 2018, 36,560 people were killed and 2.7 million people were injured in motor vehicle crashes.¹ Moreover, crashes impose a financial toll of well over \$800 billion in total costs to society and \$242 billion in direct economic costs, equivalent to a “crash tax” of \$784 on every American.² This carnage and expense are unacceptable.

Our Nation is at a Transformational Time in Transportation History with Innovative and Cost-Efficient Safety Solutions Proven to be Effective and Available

Every day on average, over 100 people are killed and nearly 7,500 people are injured in motor vehicle crashes. While far too many lives are lost and people are injured on our Nation’s roads each year, proven solutions are currently available that can prevent or mitigate these senseless tragedies. The National Highway Traffic Safety Administration (NHTSA) currently values each life lost in a crash at \$9.6 million. Each one of these preventable deaths not only irreparably harms families and communities, but they also impose significant economic costs on society that can and should be avoided. Advocates remains optimistic that in the future autonomous vehicles (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.³

Therefore, it is essential to take lifesaving action now to require all new vehicles be equipped with available vehicle technologies, also known as advanced driver-assistance systems (ADAS), which prevent and lessen the severity of crashes. The National Transportation Safety Board (NTSB) has included increasing implementation of collision avoidance technologies in its Most Wanted Lists of Transportation Safety Improvements since 2016.⁴ It is a transformational time in transportation innovation with the recent availability of new safety technologies in vehicles to prevent or mitigate crashes and protect occupants and road users.

¹ Statistics are from the U.S. Department of Transportation unless otherwise noted.

² “The Economic and Societal Impact of Motor Vehicle Crashes, 2010,” NHTSA (2015).

³ Cummings, M.L, "Rethinking the maturity of artificial intelligence in safety-critical settings," AI Magazine, in review.

⁴ NTSB Most Wanted List Archives, https://ntsb.gov/safety/mwl/Pages/mwl_archive.aspx

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.⁵

These crash avoidance safety systems are often sold as part of an additional, expensive trim package along with other non-safety features, or included as standard equipment in high end models or vehicles. Moreover, there are currently no minimum performance standards to ensure they execute as expected. The IIHS has also found that while nighttime visibility is essential for safety, few vehicles are equipped with headlights that perform well.⁶ Federal Motor Vehicle Safety Standard (FMVSS) 108 should be upgraded to improve headlight performance.

Unfortunately, directives from Congress are needed to accomplish these needed improvements because of Agency inaction and industry resistance. Furthermore, voluntary industry agreements have been demonstrated to be ineffective as most recently evidenced by the March 2016 agreement among 20 automakers to have AEBs in most new light vehicles by 2023. To date, two manufacturers, which account for nearly a third of the U.S. auto market, demonstrate this lackluster response to the detriment of the motoring public. Only 29 percent of General Motors' vehicles and 9.5 percent of Fiat Chrysler vehicles were sold with AEB between September 1, 2018 through August 31, 2019. Moreover, at any time, an automaker could decide it no longer wants to comply with the agreement without any ramifications.

Advocates urges Congress to require that advanced technologies which have proven to be effective at preventing and mitigating crashes be standard equipment with minimum performance standards. Advocates is a long-time proponent of this strategy which has produced numerous safety successes including airbags, electronic stability control, and most recently rearview cameras. In fact, in 2015 NHTSA estimated that since 1960, more than 600,000 lives have been saved by motor vehicle safety technologies.⁷

Legislation already has been introduced in the 116th Congress which, if enacted, would achieve the goal of providing lifesaving technologies as standard equipment on new motor vehicles. The Protecting Roadside First Responders Act (H.R. 4871/S. 2700) directs the U.S. Department of Transportation (DOT) to require certain crash avoidance technologies that meet a minimum performance requirement in all new vehicles. We urge Congress to enact this legislation promptly. Congress should also swiftly enact the Safe Roads Act of 2019 (H.R. 3773) and the

⁵ IIHS, Real world benefits of crash avoidance technologies, available at: <https://www.iihs.org/media/259e5bbd-f859-42a7-bd54-3888f7a2d3ef/e9boUQ/Topics/ADVANCED%20DRIVER%20ASSISTANCE/IIHS-real-world-CA-benefits.pdf>

⁶ IIHS, Headlights improve, but base models leave drivers in the dark (Nov. 29, 2018).

⁷ Lives Saved by Vehicle Safety Technologies and Associated Federal Motor Vehicle Safety Standards, 1960 to 2012, DOT HS 812 069 (NHTSA, 2015).

School Bus Safety Act of 2019 (H.R. 3959/S.2278), legislation which would require advanced technologies in commercial motor vehicles (CMVs) and school buses.

Additionally, more than 900 children have died in hot cars since 1990. Education and awareness are at an all-time high, yet the number of children dying in hot cars is also at an all-time high. Inexpensive technology exists and 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. Congress should enact the Hot Cars Act (H.R. 3593) which directs the Secretary of Transportation to issue a rule requiring such technology in all new cars. 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. Specifically, 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, as driverless cars are deployed, this type of technology could communicate to the AV system that the car is occupied and would support determining if those occupants are restrained properly.

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.

Autonomous Vehicles: What the Public is Thinking, What's Happening on Public Roads, What Other Countries are Doing, and What Industry Executives are Predicting

AVs, also known as driverless cars, are being developed and tested on public roads without sufficient safeguards to protect both those within the AVs and everyone sharing the roadways with them, and without express consent. Advocates is very concerned that an artificial rush to pass legislation, fueled by AV manufacturers wanting to be the first to market and recoup their substantial investments, already surpassing \$100 billion, could significantly undermine safety as well as public acceptance and the ultimate success of these vehicles.⁸

What the Public Is Thinking:

Numerous public opinion polls show a high skepticism and fear about the technology, and for good reason. For example, according to a July 2018 public opinion poll conducted by ORC International, an overwhelming majority of respondents expressed concern about their safety when sharing the road with driverless vehicles as motorists, bicyclists and pedestrians.⁹ In addition, an April 2019 Reuters/Ipsos opinion poll found that 64 percent of Americans said they would not buy a self-driving car.¹⁰ 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.¹¹ As Congress moves forward with legislation addressing the development and

⁸ Cummings, M.L, "Rethinking the maturity of artificial intelligence in safety-critical settings," AI Magazine, (in review), citing Eisenstein, P. A. 2018. "Not everyone is ready to ride as autonomous vehicles take to the road in ever-increasing numbers." CNBC.

⁹ ORC International and Advocates for Highway and Auto Safety, CARAVAN Public Opinion Poll: Driverless Cars, July 2018.

¹⁰ Americans still don't trust self-driving cars, Reuters/Ipsos poll finds, April 2019.

¹¹ AAA Annual Automated Vehicle Survey, March 2019.

deployment of driverless cars, these critical findings about public attitudes should be informative, illuminating and instructive, and most certainly not ignored.

What's Happening on Public Roads:

The “if you build it, they will come” mentality is arrogant and risky at best and dooming and deadly at worst. The race to “build it first” should never overshadow the need to ensure readiness for broad public use in real life scenarios. 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. 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. 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.”¹²

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 Sumwalt¹³

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,

¹² NTSB Board Meeting: Collision Between Vehicle Controlled by Developmental Automated Driving System and Pedestrian (Nov. 19, 2019).

¹³ *Id.*

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 Homendy¹⁴

What Other Countries are Doing:

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.¹⁵ 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.¹⁶ In Canada, several provinces prohibit certain types of AVs from being sold to the public.¹⁷ 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.¹⁸ In China, all AV operations remain experimental.¹⁹ 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.²⁰ 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.

What Industry Executives are Predicting:

Furthermore, numerous industry executives and technical experts have stated that the technology is not ready now and may not be ready for years ahead. 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."²¹ 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."²² 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."²³ (See Appendix A.)

The disconnect between the readiness of the technology and the artificial urgency to pass legislation to allow for widespread deployment is alarming, especially if provisions allow needless repeals or rollbacks of current federal law to allow for thousands of exemptions from FMVSS. The perceived need perpetuated by some to expedite enactment of AV legislation, especially absent safety rulemaking requirements, is unwarranted and unwise.

¹⁴ *Id.*

¹⁵ Dentons, Global Guide to Autonomous Vehicles 2020.

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ Kyodo, JiJi, Cabinet paves way for self-driving vehicles on Japan's roads next year with new rules, The Japan Times (Sep. 20, 2019).

¹⁹ Dentons, Global Guide to Autonomous Vehicles 2020.

²⁰ 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).

²¹ Lawrence Ulrich, Driverless Still a Long Way From Humanless, N.Y. Times (Jun. 20, 2019).

²² Level 5 possible but "way in the future", says VW-Ford AV boss, Motoring (Jun. 29, 2019).

²³ WSJ Tech D.Live Conference (Nov. 13, 2018).

Boeing 737 MAX Crashes – Lessons Learned and Applicability to AVs

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 Dr. M.L. Cummings's recent article, she 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."²⁴ 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."²⁵ 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).²⁶

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.²⁷ 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."²⁸ Moreover, FAA inspectors warned that doing so would turn the FAA into a "rubber stamp."²⁹ 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

²⁴ Cummings, M.L., "Rethinking the maturity of artificial intelligence in safety-critical settings," AI Magazine, in review.

²⁵ *Id.*

²⁶ *Id.*

²⁷ Pub. L. 115-254 (2018).

²⁸ Natalie Kitroeff and David Gelles, Before Crashes, Boeing Pushed To Undercut F.A.A. Oversight, N.Y. Times (Oct. 27, 2019).

²⁹ *Id.*

deferential to the industry it is tasked with regulating.³⁰ Alarming, according to recent 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.³¹

Upon reviewing aspects of the crashes involving the MAX, comparisons to the early stages of AV development should give all lawmakers 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.³² 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 heed these important observations and act in the interest of public safety as it considers proper safeguards of AVs for testing and public sale.

Safeguards Necessary to Protect Public Safety in the Development and Deployment of AVs

Legislation to allow for the successful development and deployment of AVs must advance a public safety agenda and not just an economic agenda. Both goals are compatible and achievable, and preferable for both public safety and consumer acceptance. Any bipartisan, bicameral bill must ensure that the U.S. DOT conducts thorough oversight, establishes regulations that set minimum safety performance standards and require industry accountability before driverless cars are available in the marketplace and sold to the public. There is a discernable difference between the frequently used phrase "regulatory framework" and "regulations." The former sounds promising but comes with no concrete assurances, no specific requirements and no legal obligations, whereas the latter upholds that minimum performance standards must be met. Further, any driverless car legislation must also regulate partially-autonomous (SAE Levels 2 and 3) vehicles. Crashes involving partially autonomous vehicles which comply with current FMVSS are occurring with frequency on our roads. (See Appendix B.) It is vital that Congress adequately addresses the broad range of impacts on safety, accessible mobility, public transit diversion and infrastructure, among others, rather than rush enactment of a flawed bill that jeopardizes public safety and consumer confidence.

To date, staff of the Senate Commerce, Science, and Transportation Committee and House Energy and Commerce Committee have released six draft sections of potential AV legislation. Despite many meetings, letters from numerous groups that share our concerns, and lengthy written responses and analyses from our organization and others to Committee staff regarding safety priorities, recommended provisions and crucial objections, these draft sections do not

³⁰ *Id.*

³¹ Natalie Kitroeff, Workers At Boeing Mocked F.A.A., N.Y. Times (Jan. 9, 2020).

³² The pilots were not trained on how to use MCAS. See: Benjamin Zhang, Boeing's CEO explains why the company didn't tell 737 Max pilots about the software system that contributed to 2 fatal crashes, Business Insider (Apr. 29, 2019).

address our concerns. Advocates' vehemently opposes the use of these sections as fundamental components of our Nation's first federal AV law. In fact, the sections distributed thus far are very similar in structure and concepts and, in some instances mirror House and Senate bills from 2017-2018, which Advocates and other public health and safety groups, law enforcement, emergency responders, bicycle and pedestrian interests, disability rights activists and many others opposed in letters, testimony and meetings with Members of Congress and their staff.

Unfortunately, the process has been deeply flawed and objectionable from the outset. First, there has been an overall lack of transparency given that none of the submissions in response to staff drafts of legislative sections have been made public to facilitate a sharing and exchange of ideas. Secondly, the disseminations of only a few sections at a time with short deadlines for feedback has hampered adequate review and comprehensive evaluation. While it may not be onerous for a large lobbying firm or company to respond, the process sets up an innate disadvantage to small nonprofit organizations with limited resources.³³ Thirdly, organizations that have provided feedback have not been given any information regarding what has resulted from their input. This discourages meaningful discussion and debate about critically important provisions that dramatically revise current law and propose new law. Fourth, Advocates is hopeful, but does not know with certainty, that an opportunity will be given to provide a comprehensive analysis of draft legislation in its totality without being tied to previous submissions. Lastly, it will be essential that all Members of Congress know what is in the bill(s) and the concerns of the parties that have participated in this process before introduction of any legislation, before any hearings, and before any votes are taken. It bears reiterating that there is no urgency to move legislation, and it is essential that our Nation's first AV law put the safety of people before corporate profit.

Despite these major shortcomings in the process, for the purposes of submitting feedback to comply with the Committees staffs' request, Advocates has outlined our concerns, redlined the sections accordingly, provided pro-safety substitute language that must be included in any AV bill, and recently hosted a Congressional briefing to educate staff on the safety, accessibility and transparency concerns of a broad coalition of stakeholders. The following are our high-level concerns and essential priorities.

New Rulemakings to Set Performance Standards are Essential.

Legislation should include requirements for DOT to issue minimum performance standards by a date certain before AVs are available for sale in the marketplace. Congress has already established this precedent with other lifesaving and cost-beneficial laws resulting in airbags, tire pressure monitoring, rollover and ejection prevention, and recently, rearview cameras. Issues include:

- **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 effectively alerted to re-engage, understand and process the situation, and then take control of the vehicle before taking appropriate action. Dr. Mica Endsley, former Chief Scientist of the U.S. Air Force and an expert on situation

³³ Pete Bigelow, Here's How Much the Major Automakers Spend on Government Lobbying, Car and Driver Magazine (May 29, 2018).

awareness, decision making and automation, has remarked, “Automation actually causes drivers to lose the situation awareness that is required for safe driving and taking over control when needed.”³⁴ Additionally, according to an article published by Dr. M.L. Cummings and Jason Ryan entitled *Who Is in Charge? The Promises and Pitfalls of Driverless Cars*, “Drivers in an autonomous or highly automated car were less attentive to the car while the automation was active, were more prone to distractions, especially to using cellular phones, and were slower to recognize critical issues and to react to emergency situations, for example, by braking.”³⁵ The failure of the automated driving system to keep the driver engaged in the driving task was identified as a problem by the NTSB in its investigation of the 2016 fatal crash in Florida involving a Tesla Model S. Furthermore, IIHS highlighted this major safety problem in their August 7, 2018, Status Report: “Experimental studies have shown that drivers can lose track of what automated systems are doing, fail to notice when something goes wrong and have trouble retaking control.”

- **Cybersecurity Standard:** AVs must be subject to cybersecurity requirements to prevent against hacking including stemming from personal or professional animosities, vendettas and retributions. NHTSA must issue a minimum cybersecurity standard by a date certain to protect against potentially catastrophic hacks of AVs. As such, Advocates supports the enactment of the SPY Car Act of 2019 (S. 2182). Numerous high-profile cyber attacks on a variety of industries have already occurred, and AVs will not be immune to this threat. In 2015, hackers demonstrated their ability to take over the controls of a sport utility vehicle (SUV) that was traveling 70 miles-per-hour on an Interstate outside of St. Louis, Missouri by accessing the vehicle’s entertainment system using a laptop computer located miles away from the vehicle. Traditional vehicles, which are less complex than AVs, have been weaponized and used in terrorist attacks including in New York City (2017), Toronto, Canada (2018), Berlin, Germany (2016) and Nice, France (2016).
- **Electronics Safety Standard:** AVs must be subject to minimum performance requirements for the vehicle electronics that power and operate safety and autonomous driving systems individually and as interdependent systems. Electronic glitches are commonplace and relatively harmless in instances of computer or cell phone crashes. However, if an AV fails to operate properly on public roads, the outcomes could be catastrophic and result in mass casualties. Interference from entertainment functions and non-safety systems can affect the electronics that power critical safety systems if they share the same wiring and circuits. For example, in one reported instance a vehicle model lost power to its dashboard lights when an MP3 player was plugged in.³⁶
- **“Vision Test” for AVs:** Driverless cars must be subject to a “vision test” to guarantee an AV will properly detect and respond to other vehicles, pedestrians, bicyclists, wheelchair users, roadway infrastructure, interactions with law enforcement and first responders, and

³⁴ Statement of Dr. Mica Endsley, Press Conference: Safety, Consumer, Law Enforcement & Bicyclist Leaders, and Experts in Tech & Automation Urge Congress to Fix Major Shortcomings with Driverless Car Legislation and Not to Attach it to the FAA Bill (Jul. 2018).

³⁵ Cummings, M.L., & J.C Ryan, “Who Is in Charge? Promises and Pitfalls of Driverless Cars.” TR News, (May-June 2014) 292, p. 25-30. *See also:* United States. Cong. Senate. Committee on Commerce, Science, and Transportation, *Hands Off: The Future of Self-Driving Cars*, Mar. 15, 2016, 114th Cong. 2nd Sess. (statement of Mary Cummings, PhD, Director, Duke Robotics Professor of Mechanical Engineering and Materials Science, Professor of Electrical and Computer Engineering Duke University).

³⁶ General Motors, LLC, Receipt of Petition for Decision of Inconsequential Noncompliance, NHTSA, 79 FR 10226, Feb. 24, 2014.

other objects in the operating environment in all conditions. A failure to properly detect and react to any of these road users or conditions could have tragic results, as demonstrated by the aforementioned March 2018 crash in Tempe, Arizona that killed a woman walking a bicycle. According to the NTSB, the Uber vehicle in driverless mode misidentified the woman three times before the crash. Additionally, research has shown that simple modifications of a standard stop sign could cause an AV system to interpret it as a 45-mile-per-hour speed limit sign.³⁷ According to Dr. Cummings's most recent study, "Self-driving systems, even with their multiple sensors and software advancements, still cannot reliably work in rain and snow conditions (Zang et al. 2019), during time of low sun angles (Dowling 2019), and often where lines on the road are either non-existent or with faded paint (Sage 2016)."³⁸

- **Standard for Over-the-Air Updates:** It is anticipated that updates will be made to AV systems over the air that may change the functionality, capabilities and operational design domain (ODD) of the vehicle. In fact, Tesla is already performing these types of updates. In one reported instance, an update to a Tesla Model 3 left the vehicle without the use of essential safety systems including AEB.³⁹ To protect against this type of problem and other safety-critical issues that can arise from over-the-air (OTA) updates, a standard must be issued and provide that consumers be given timely and appropriate information on the details of the update as well as ensure any needed training or tutorials are provided. Safety upgrades should not be optional or force the consumer to incur additional expenses. Also, during the update process cybersecurity must be maintained.
- **Manual Override:** Occupants of a driverless car need the ability to assume control or shut the system down and get to a safe location in the event of a failure. A standard should be established to ensure the capability for a human to assume control of an AV when it malfunctions or travels outside the ODD. The manual override must be accessible to all occupants, including people with cross-disabilities, children and other vulnerable populations. Law enforcement and other first responders will also need to access a manual override at times, to protect themselves, the vehicle occupants and other road users. The means to do so should be standardized. It is implausible to expect first responders to learn specific protocols for each manufacturer. For example, following the crash of a Tesla vehicle in Mountain View, California in March of 2018, first responders had to contact Tesla for assistance in controlling the temperature of the vehicle's battery and how to dismantle it once it caught fire after being involved in a crash. Despite this, days later the battery re-ignited.⁴⁰
- **Functional Safety Standard:** Functional safety is a process by which a product is designed, developed, manufactured and deployed to ensure that the product as a whole will function safely and as intended. Basically, a functional safety standard assures consumers that a vehicle will do what a manufacturer states it does, will do so safely, and will not operate outside of conditions under which it can operate safely. Legislation should direct NHTSA to establish a functional safety standard that requires a manufacturer to verify to the Agency that an AV has been tested to ensure it will operate

³⁷ Ivan Evtimov, Kevin Eykholt, Earlence Fernandes, Tadayoshi Kohno, Bo Li, Atul Prakash, Amir Rahmati, Dawn Song, Robust Physical-World Attacks on Deep Learning Models, arXiv preprint 1707.08945, August 2017.

³⁸ Cummings, M.L, "Rethinking the maturity of artificial intelligence in safety-critical settings," AI Magazine, in review.

³⁹ Patrick Olsen, Over-the-Air Update Left Tesla Model 3 Without Key Safety Features, Consumer Reports (Sep. 14, 2018).

⁴⁰ Kevin Forestieri, Driver identified in fiery Tesla crash, Mountain View Voice (Mar. 26, 2018).

reliably and safely under the conditions the vehicle is designed to encounter.

Additionally, NHTSA should confirm the manufacturer's certifications are accurate by conducting their own testing as needed.

- **Revising Federal Motor Vehicle Safety Standards:** Any actions by NHTSA to revise existing FMVSS in order to facilitate the introduction of AVs must be conducted in a public rulemaking process and meet the safety need and equivalency provided by current standards. For example, the rearview camera standard only requires that a view of the area behind a vehicle be provided to a driver, but the safety need is met when the driver stops the vehicle so it does not come into contact with the person or object in the area behind the vehicle. Revisions to the rearview camera standard which fail to address the safety need, and only focus on the image being provided to the automated driving system but not the active braking part, will decrease safety.

The December 2, 2019, Committee staff draft section, "Updated and New Motor Vehicle Safety Standards for Automated Vehicles," falls well-short of promulgating these and other necessary rules. Additionally, any reporting requirement or required submission by industry to NHTSA required by legislation cannot be a substitute for NHTSA issuing minimum performance standards through a public rulemaking process. Submissions to NHTSA can be a value to the Agency, but the Agency must be given thorough and adequate data, have sufficient personnel and funding resources, and be directed to review and evaluate all submissions to assess whether an approach to automated driving system development and testing met the minimal intent of the safety areas.

Broadening Statutory Exemptions from FMVSS is Unwise, Unnecessary and Unsafe.

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, 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 current law.

The proposed exemption process and resultant huge numbers of exempt vehicles permitted on the road (potentially millions) *de facto* turn everyone -- in and around exempted vehicles -- into unknowing and unwilling human subjects in a risky experiment. Moreover, 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).

Ensuring Proper Oversight of Testing is Fundamental.

Under the FAST Act (Pub. L. 114-94, Sec. 24404), automakers are permitted to test or evaluate an unlimited number of vehicles that do not comply with FMVSS. Please note that Advocates and other organizations strongly opposed this provision during deliberations on the FAST Act because no safety conditions were required of manufacturers that put experimental vehicles on neighborhood streets and roads. Nonetheless, AV testing is already underway, as affirmed by the University of Florida Transportation Institute which noted that approximately 80 companies

are currently testing autonomous technology and AVs in the U.S.⁴¹ Fundamental and commonsense safeguards should be added to the existing statutory language enacted in the FAST Act. The need for such protections was underscored when the NTSB noted that “at the time of the [Uber] crash and the writing of this report there was no Federal oversight of the testing of autonomous vehicles.”⁴²

At a minimum during the testing phases of AVs on public roads, an independent institutional review board (IRB) comprised of objective experts should be established. This is a common practice for experiments involving human subjects and provides critical objective oversight. It is also a process which is required for research conducted using federal funding for 20 federal departments or agencies including the Department of Transportation.⁴³ Given that these experiments are being conducted on federal and state funded public roads, state and federal governments should be requiring IRB approvals before allowing testing of experimental AVs on their roads.

Advisory Committees Should Not Take the Place of Agency Action.

Advisory committees are unacceptable substitutes for the Agency fulfilling its statutory mission and issuing safety standards through open public rulemakings. The work of an advisory committee should in no way impair, constrain or supplant the authority of the Secretary or NHTSA to issue timely regulations, institute oversight actions and propose program policies for AVs. For example, the U.S. DOT should not delay or defer regulatory actions on AVs while awaiting any report, recommendations or approval from any advisory committees.

These types of committees, even so-called “balanced” ones, allow for undue industry influence, as demonstrated by the Boeing tragedy chronicled recently in *The New York Times* on October 27, 2019.⁴⁴ Committees are also time consuming and drain Agency resources. Rather than expend scarce Agency funds and staff time on an advisory committee, NHTSA should be given the resources to hire experts with requisite knowledge.

Privacy Protections are Needed to Guard Against Misuse.

AVs will be collecting significant amounts of personal data including the operation and location of the vehicle. Manufacturers must have robust safeguards and policies in place to protect this data from being stolen and/or misused. However, the ability of NHTSA, the NTSB and local law enforcement to access critical crash data in a timely manner must be preserved. In addition, the use of communication bandwidth needed for vehicle-to-everything communication must be limited to non-commercial use. (See Appendix C.)

Consumers Must Be Given Sufficient Information about AVs.

During a September 2017 NTSB hearing on the 2016 fatal Tesla crash, the Board correctly criticized the lack of adequate and consistent consumer information about the capabilities, limitations and any exemptions granted for AV systems. Consumer information should be

⁴¹ Brookings Institution, *Autonomous cars: Science, technology, and policy* (Jul. 25, 2019).

⁴² The Operations Factors Group Chairman’s Factual Report (HWY18MH010).

⁴³ Federal Policy for the Protection of Human Subjects (‘Common Rule’), U.S. Department of Health and Human Services, Office of Human Research Protections, available at <https://www.hhs.gov/ohrp/regulations-and-policy/regulations/common-rule/index.html>

⁴⁴ Natalie Kitroeff and David Gelles, *Before Crashes, Boeing Pushed To Undercut F.A.A. Oversight*, N.Y. Times (Oct. 27, 2019).

available at the point of sale, in the owner's manual and in any OTA updates. NHTSA should be directed to immediately issue an interim final rule (IFR) requiring such readily available information be provided to consumers. Additionally, similar to the user-friendly safecar.gov website, NHTSA must establish a website accessible by vehicle identification number (VIN) with basic safety information about the AV level, safety exemptions, and limitations and capabilities of the AV driving system, including any changes made by OTA updates. This information will be essential to second-hand owners of AVs which may not have paper owner's manuals and even if they did, would not capture subsequent updates. The website will also allow NHTSA and other research groups to perform independent evaluations of the comparative safety performance of AV systems.

The 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 and NHTSA act upon recommendations to modernize U.S. NCAP. (See Appendix D.) This enhancement of NCAP will be especially crucial as AVs are introduced to the marketplace.

Collect Standardized Data, Make it Publicly Available and Require EDRs.

With the increasing number of AVs of different automation levels being tested and some being sold to the public, standardized recording and access to AV event data are necessary for the proper oversight and analysis of crashes. Vehicles on the road today are already producing enormous amounts of data and the amount and type of data will only increase as we evolve further towards fully automated vehicles. There are many stakeholders who need that data for numerous and varied important reasons including safety. For example, IIHS studies the safety performance of vehicles. The ratings issued by IIHS are often used by consumers when purchasing a vehicle. Making more data available about the on-road performance more widely available and understandable will increase consumer confidence hopefully contributing to safer driving conditions.

In fact, the lack of standardization and collection of data is already hampering understanding and investigations of AVs. For example, as a result of the 2016 fatal Tesla crash in Florida, the NTSB recommended that NHTSA implement data collection requirements for all new vehicles equipped with AV control systems and to define a standard format for reporting this data. The NTSB also called for this data to be readily available, at a minimum, to the NTSB and NHTSA. This data should also be made public. Unfortunately, NHTSA has not yet acted on this critically important recommendation.

Every vehicle should be required to be equipped with an event data recorder (EDR). While there is currently a NHTSA requirement for what data voluntarily-installed EDRs must capture, this information is insufficient to properly ascertain important facts about crashes involving AVs. IIHS also reiterated the need for EDRs in the August 7, 2018, Status Report: "IIHS has asked the agency to require event data recorders to encode information on the performance of automated driving systems in the moments before, during and after a crash. This information would help determine whether the human driver or vehicle was in control and the actions each entity took prior to the event."⁴⁵

⁴⁵ IIHS, Status Report, Reality Check-Research, deadly crashes show need for caution on road to full autonomy, Vol. 53, No. 4 (Aug. 7, 2018).

Other data needs include:

- Manufacturers must be required to report AV safety critical events to NHTSA, including crashes and disengagements;
- NHTSA’s crash databases should be updated to capture AV crashes. This includes a revision of Early Warning Data to ensure manufacturers provide more information about crashes and incidents that could indicate a safety defect and lead to a recall;
- NHTSA should have real-time access to data involving AV crashes; and,
- A structure should be established to facilitate mandatory sharing of AV failures by manufacturers. Data and information about known flaws or problems encountered during development and while in use must be shared among manufacturers and with NHTSA and the public to ensure that all AV systems are learning about problems in real time and can benefit from the experience of other AV systems. This type of collaborative development is already taking place in the industry with respect to cybersecurity issues with the creation of the Automotive Information Sharing and Analysis Center (Auto ISAC).

Provide Additional Resources and Enforcement Authorities to 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 deployment of self-driving technologies. Even without the upcoming enormous challenges AV development and deployment will create, the Agency is chronically underfunded; NHTSA’s Operations & Research (O&R) budget is meager (only about \$350 million annually in the past two years). The Agency cannot effectively oversee a multi-billion dollar industry and protect hundreds of millions of motorists without a significant increase in resources – both financial and staff. Currently, 95 percent of transportation-related fatalities and 99 percent of transportation injuries, involve motor vehicles. Yet, NHTSA receives only one percent of the overall DOT budget. Furthermore, it is estimated that currently more than 70 million cars are on the road with an open recall.⁴⁶

Any AV legislation must include the following provisions to address inadequate funds, staff and enforcement ability:

- A significant increase in funding for NHTSA’s O&R budget;
- Imminent hazard authority to take immediate action when the Agency determines a defect substantially increases the likelihood of death and injury;
- The current cap on civil penalties that can be levied by the Agency for a safety defect should be eliminated; and,
- Criminal penalty authority in appropriate cases in which corporate officers who acquire actual knowledge of a product danger that could lead to serious injury or death and fail to inform NHTSA and warn the public.

Guarantee Access for Individuals with Cross-Disabilities.

Autonomous driving technology has the potential to increase access and mobility for individuals with disabilities who have varying needs. However, that goal can only be realized by Congressional directive in legislation. People with disabilities have different requirements for access and mobility – AVs may help increase mobility for some members of the disability

⁴⁶ Consumer Federation of America, Over 70 Million Vehicles On The Road With Open Recalls (Sep. 18, 2018).

community but provide little or no assistance to others. Installing an automated system in a vehicle or removing the driver in a ridesharing service will not sufficiently eliminate mobility barriers and may even exacerbate them. For example, wheelchair users may require a ramp or lift system as well as assistance in ensuring the wheelchair is properly secured or stowed during the ride. As such, full accessibility for all users must be ensured for all types of common and public use AVs. Additionally, funding should be authorized to promote research and development of accessible AVs and standards, including vehicle safety and crashworthiness standards, and technical assistance.

As previously stated, allowing AVs to be exempt from safety standards is dangerous for all road users, but could pose even more serious problems for people with cross-disabilities should the vehicle be involved in a crash, not function as intended, or have a defect. In the event of a failure, a person could be stranded in the vehicle with no driver. The diverse needs of members of the cross-disability community must be taken into account for systems that require human engagement as well as when developing a human failsafe. Should there be an emergency that requires human intervention (such as a manual override), such a safeguard must be useable by any potential occupant of the vehicle regardless of a person's abilities.

Federal, State and Local Roles Should Not be Altered.

The statutory mission of the U.S. DOT established by Congress in 1966 (Pub. L. 89-563) is to regulate the performance of motor vehicles to ensure public safety, which now includes automated driving system technology and driverless cars. 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 the staff draft text, similar to last session's legislation, attempts to completely disregard established law and flip the concept of preemption on its head by taking an unprecedented approach to limiting the rights of state and local governments to protect their citizens.

Upgrades to America's Infrastructure Are Required for the Safe Deployment of AVs

According to the American Society of Civil Engineers (ASCE), one in eleven of the Nation's nearly 615,000 bridges in the National Bridge Inventory is structurally deficient.⁴⁷ America's roads continue to receive a grade of "D" from ASCE which noted that 20 percent of the Nation's highways alone had poor pavement conditions in 2014.⁴⁸ This does not include those highways with mediocre conditions and all other non-highway roads.⁴⁹ The Federal Highway Administration (FHWA) estimates that \$142 billion in capital investment would be needed on an

⁴⁷ 2017 Infrastructure Report Card – Bridges, ASCE, available at <http://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Bridges-Final.pdf>.

⁴⁸ 2017 Infrastructure Report Card – Roads, American Society of Civil Engineers (ASCE).

⁴⁹ *Id.*

annual basis over the next 20 years to significantly improve conditions and performance.⁵⁰ Undoubtedly, additional substantial investments in our infrastructure will be required to ensure that AVs can safely operate on every road in every state -- rural and urban.

AVs will not be operating in closed environments. In fact, they are already being tested on public roads in Washington D.C., San Francisco and Pittsburgh, among others. It is therefore critical that our Nation's infrastructure accommodate the safe and successful deployment of AVs. America's crumbling infrastructure poses significant safety and economic concerns. The AV industry has often claimed that the introduction of these vehicles will reduce congestion, improve environmental quality, and advance transportation efficiency.⁵¹ However, many of these claims may amount to nothing more than fanciful theories. Instead, AVs may bring about so-called "hyper-commuters" who work from their vehicles on long commutes to enable living farther from offices and/or city centers. Likewise, the possibility of empty AVs adding substantial miles on the roads as they re-position autonomously after dropping off riders could undermine many of the benefits claimed.⁵²

Significant consideration must be given to how AV driving could change wear patterns on roadways. The lower variance of an AV's position within a lane could lead to accelerated wear in lanes, and condensed convoys of automated trucks, commonly known as platooning, could place further strain on roads and bridges. For example, the spacing between automated commercial motor vehicles (ACMVs) in a platoon could have wide-ranging implications. If these large vehicles travel too closely together, their combined weight load could place severe stress on a bridge. In addition, lengthy platoons that consist of many ACMVs could be difficult to pass and affect merging and exiting from roadways. These are just a few of many critical concerns that must be evaluated to consider operational constraints for AVs before further damage is inflicted upon our Nation's roads and bridges. (See Appendix E.)

Taking into account the long-term ramifications, the budgetary constraints, and necessary coordination among a diverse group of interested parties when it comes to infrastructure projects at any level, research is needed now more than ever on the impact of AVs on our roads and public transit systems. Already, transportation network companies (TNCs) or ride hailing companies are creating congestion and diverting ridership from transit to single use vehicles in certain cities. The early deployment of AVs has been predicted to follow the TNC model but at lower costs as a driver will not need to be compensated. Lessons learned from the growth of TNCs must be applied to the future of AVs. In addition, further research is required to examine the differing infrastructure upgrades that will be required for urban, suburban and rural regions. More consideration must be given to this complex issue before AVs can be deployed on a large scale.

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. While it is

⁵⁰ 2015 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance, Chapter 8, FHWA 2016, available at <https://www.fhwa.dot.gov/policy/2015cpr/>.

⁵¹ Self-Driving Coalition For Safe Streets, FAQs.

⁵² Bliss, L., Even Shared Autonomous Vehicles Could Spell Traffic Disaster, Citylab, May 10, 2017.

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. Safeguards, transparency and oversight are vital to enable AVs to achieve the promises that have been put forth. Advocates urges Congress to direct the U.S. DOT to implement essential protections proposed in this testimony before the wide-scale deployment of driverless cars onto public roads. It is the right action to take and the reasonable action overwhelmingly supported by the public. Minimum safety performance standards will not hamper innovation, but rather help advance public acceptance and support. Federal standards will set a baseline which AV manufacturers can compete to exceed and produce the best product.

As President John F. Kennedy said, “Our problems are man-made, therefore they may be solved by man.”⁵³ More than 100 people dying on our roads each day is a man-made problem. Advocates firmly believes people have and can continue to reduce this fatality toll and can get started now with the solutions offered in this testimony. We look forward to working with Chairwoman Schakowsky, Ranking Member McMorris Rodgers and all the members of the Subcommittee to make our roads safer for all. Thank you for the opportunity to testify today.

⁵³ Address at American University (Jun. 10, 1963).



Auto and Tech Industry Executives and Experts State Fully Driverless Cars Are Not Ready for Prime Time Any Time Soon

Sam Anthony, Chief Technology Officer, Perceptive Automata: “The difference between a good self-driving car and a perfect self-driving car is massive. Humans underestimate how complicated driving is. We’re effortlessly good at looking at other humans and understanding their behavior. That’s a really hard thing to replicate.” (HuffPost 8/9/19 [LINK](#))

Jack Weast, Mobileye Vice President for Autonomous Vehicle Standards: Jack Weast, who oversees automated vehicle standards at Mobileye, cites research suggesting that it would require roughly 30 billion miles of real-world testing. “With a fleet of 100 cars, that would take you about 1,000 years,” he says. “And you better not update the software. If you do, you have to start over.” (Quartz 7/20/19 [LINK](#))

Gill Pratt, Toyota Research Institute Director: “None of us have any idea when full self-driving will happen,” (New York Times 6/20/19 [LINK](#))

Bryan Salesky, Argo AI CEO: “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.” (Motoring.com 7/29/19 [LINK](#))

Jessica Nigro, Daimler North America Corp General Manager, Head of Technology & Innovation Policy: “It is a sobering reality that this technology is more complicated than we thought it would be five to seven years ago.” “We’re not ready to deploy in such numbers that we would need immediate relief from regulation nationwide.” (AASHTO Journal 5/10/19, Politico Morning Transportation 5/8/19)

Maarten Sierhuis, Chief Technology Director at Nissan’s Silicon Valley research center: “Show me an autonomous system without a human-in-the-loop and I’ll show you a useless system.” (Drive.com 4/12/19 [LINK](#))

Ford CEO Jim Hackett at Detroit Economic Club: “You overestimate the arrival of the technology and you underestimate the impact. In this case we’ve overestimated the arrival of autonomous vehicles. We’re coming in 2021. We’ll be ready. But its applications will be narrow, what we call geo-fenced, because the problem is so complex.” (Detroit Economic Club [LINK](#) / Wired Magazine 4/9/19 [LINK](#))

John Krafcik, CEO of Waymo: “This is a very long journey. It’s a very challenging technology and we’re going to take our time. Truly every step matters.” (The Wall Street Journal, 11/13/18)

Steve Wozniak, Co-Founder of Apple: "Artificial intelligence in cars is trained to spot everything that is normal on the roads, not something abnormal... They aren't going to be able to read the words on signs and know what they mean. I've really given up." (Arabian Business, 9/26/18)

Ryan Chin, Co-founder and CEO of Optimus Ride: "I challenge any car company to drive through a complex urban environment without a driver under any weather conditions... We're not there yet as an industry. Even the best systems aren't there yet." (Quartz, 9/23/18)

John Leonard, Vice President for Automated Driving Research at Toyota Research Institute: "Taking me from Cambridge to Logan Airport with no driver in any Boston weather or traffic condition—that might not be in my lifetime." (Bloomberg, 9/19/18)

Ian Robertson, BMW Board Member: "If we are working towards a 'brain off' scenario, where perhaps we expect travelers to even sit in the back of the car and relax, then that clearly isn't possible today, despite what some might tell you." (Autocar, 8/8/18)

Bill Ford Jr., Executive Chairman of Ford Motor Company: "There's been a lot of over-promising and I think a lot of misinformation that's been out there. It's really important that we get it right, rather than get it quickly." (CBS News, 6/20/18)

Ogi Redzic, Senior Vice President of Connected Vehicles and Mobility Services at Nissan: "Say a 2021 target is the example. What they may be saying is in a little, geofenced area with certain speed and conditions. If you ask generic statements, like 'when will all cars be driverless?', well of course we are talking about the very distant future." (news.com.au, 2/15/18)

Kay Stepper, Vice President of Automated Driving and Driver Assistance for Robert Bosch LLC: "You could spend years of testing and validation on public roads and not encounter every specific scenario that can happen in a vehicle's life." (Design News, 2/7/18)

Gill Pratt, CEO of Toyota Research Institute: "It's a mistake to say that the finish line is coming up very soon. Things are changing rapidly, but this will be a long journey." (Bloomberg, 1/9/18)

Mike Ramsey, Gartner Inc. Transportation Analyst: "I don't care what GM or Waymo say, the idea that these will be free-range vehicles that can go anywhere is not realistic." (The Economic Times, 1/4/18)

November 2019



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

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



Photo Source: Indiana State Police

December 29, 2019, Gardena, CA, Tesla Model S: The 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.



Photo Source: Loudlabs

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



Photo Source: Connecticut State Police

March 1, 2019, Delray Beach, FL, Tesla Model 3: Driver killed when his vehicle, operating on “Autopilot,” crashed into the side of a truck tractor combination, traveling underneath the trailer. (NTSB Investigation HWY19FH008, ongoing)



Photo Source: NTSB

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



Photo Source: LA Times

March 23, 2018, Mountain View, CA, Tesla Model X: While on “Autopilot”, the vehicle struck a safety barrier, causing the death of the driver. (NTSB Investigation HWY18FH011, hearing scheduled 2/25/20)



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: The Tesla, reportedly on “Autopilot,” was traveling at 65mph when it crashed into the back of a parked fire truck that was responding to the scene of a separate crash. Remarkably, neither the driver nor the first responders were injured. (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. Fortunately, there were no deaths or injuries. (NTSB Investigation HWY18FH001, brief issued)



Photo Source: Fox5 Vegas

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



Photo Source: NTSB

October 28, 2019

The Honorable Ajit Pai, Chairman
Federal Communications Commission
445 12th St. SW
Washington, D.C. 20554

Re: ET Docket No. 13-49, GN Docket No. 18-357

Dear Chairman Pai,

The undersigned safety organizations urge the Federal Communications Commission (FCC) to help save lives on our roadways. According to the National Highway Traffic Safety Administration (NHTSA), in 2017, 37,133 people died in motor vehicle crashes.¹ That equates to over 100 people a day dying on American roads, and these deaths are preventable. One way to make large, sustained gains in reducing roadway deaths and injuries is through technology, and therefore, we urge you to preserve the 5.9 GHz band for transportation safety.

With the tremendous potential to improve transportation safety and the growth in demand for vehicle-to-everything (V2X) services, it is essential that the entire 5.9 GHz band – all seven channels – be retained for V2X, and that all measures are taken to smooth the path for deployment. Unless and until the FCC and the U.S. Department of Transportation complete the agreed-upon three phases of testing to inform DSRC/Wi-Fi sharing and prove that safety will not be compromised, these safety innovations must have dedicated spectrum to ensure they work properly every time, without signal interference. Harmful interference from unlicensed devices sharing the same band could affect the speed at which a V2X message is delivered or even prevent delivery entirely. As new technology continues to be deployed, now is the time for the FCC to commit to protecting the progress and investment made in V2X communications. Sharing or rechanneling the 5.9 GHz band could nullify progress already made, unnecessarily delay implementation, devalue prior 5.9 GHz technology investment, and most importantly could lead to the unnecessary loss of lives.

We have the potential to save thousands of lives if the dedicated spectrum is maintained for its original use. In order to accelerate the deployment of new life-saving technologies, we urge you and your colleagues to maintain the entire 5.9 GHz band for transportation safety.

Sincerely,

AAA
Advocates for Highway and Auto Safety
American Association of Motor Vehicle
Administrators
American Association of State Highway and
Transportation Officials
Center for Auto Safety
Consumer Reports
Governors Highway Safety Association

Insurance Institute for Highway Safety
International Association of Fire Chiefs
Institute of Transportation Engineers
MADD
National Association of State EMS Officials
National Safety Council
National Sheriffs' Association
Safe Kids Worldwide

cc: Commissioner Michael O'Rielly
Commissioner Brendan Carr
Commissioner Jessica Rosenworcel
Commissioner Geoffrey Starks
Aaron Goldberger

Erin McGrath
Will Adams
Umair Javed
William Davenport

¹ <https://www.nhtsa.gov/press-releases/us-dot-announces-2017-roadway-fatalities-down>

NCAP at 40: Time to Return to Excellence
By Joan Claybrook and Advocates for Highway and Auto Safety
October 17, 2019



ADVOCATES
FOR HIGHWAY
& AUTO SAFETY

Introduction:

Since the inception of the United States New Car Assessment Program, or NCAP, 40 years ago it has provided essential vehicle safety performance information to the public as well as stimulated the development of safer vehicles by the motor vehicle industry. As we celebrate this important benchmark, it is important to renew and reinvigorate the U.S. program that has been neglected for too many years. It needs to be made once again dynamic, relevant and useful.

The good news is that since the mid-1990's, a number of other countries across the globe selling motor vehicles have adopted and improved the U.S. NCAP programs for vehicles sold in their countries and their programs are far more vibrant and informative than the now outdated U.S. NCAP program. They now serve as a new benchmark for the U.S. program.

This report identifies current NCAP program deficiencies that need to be addressed but were allowed for years to needlessly languish. Since the mid-1990's, other countries that copied the U.S. NCAP programs have far out-paced the U.S. by improving the safety information available to consumers and out-performed the U.S. in motivating industry innovation to advance safety. This unique vehicle safety information program was created to help consumers make vehicle purchase decisions and to push the auto manufacturers to upgrade the safety of their vehicles. It is critical that it be updated by NHTSA. The other NCAP countries have set a high bar for NHTSA to emulate. It should immediately undertake this task.

In addition, this report provides an historical overview of the early beginnings and development of this innovative vehicle safety information for consumers. It was created in 1979 under the leadership of Joan Claybrook, then Administrator of the National Highway Traffic Safety Administration (NHTSA or the Agency), the agency within the U.S. Department of Transportation (DOT) responsible for regulating the auto industry for safety and fuel economy.

International NCAPs Race Ahead While U.S. Program Stagnates

There are currently eight (8) New Car Assessment Programs in the world.

ANCAP	Australia NCAP
ASEAN NCAP	Southeast Asian Countries NCAP
C-NCAP	China NCAP
EURO NCAP	European NCAP
JNCAP	Japan NCAP
KNCAP	Korea NCAP
LATIN NCAP	Latin American and the Carribbean
US NCAP	United States NCAP

While the U.S. NCAP was the first of its kind, many other countries have replicated the program and have vastly expanded and improved upon the evaluations performed in the U.S. The other NCAP programs are located in the Southeast Asian Countries, Australia, China, Europe (the most advanced), Japan, Korea and Latin America including the Caribbean. Other countries and regions in the process of developing NCAP programs are India and Africa.

Presently, the U.S. NCAP only includes five tests in its ratings:

- full width rigid frontal barrier test to test frontal occupant protection,
- side impact moving deformable barrier test,
- side impact rigid pole test to examine occupant side impact protection,
- measurement of the vehicle's static stability factor, and
- dynamic handling test to evaluate rollover resistance.

For comparison, the Euro NCAP, while only having started in 1997, as compared to the U.S. NCAP in 1979, has a total of 21 tests. Listed below are the Euro NCAP tests used in its ratings but **not performed in the U.S.:**

- offset deformable barrier crash test,
- rear seat occupant protection in frontal crashes,
- far side impact protection,

- rear impact whiplash protection,
- child seat installation and occupant protection (4 tests), and
- pedestrian head and leg impact protection (3 tests).

Additionally, the Euro NCAP also evaluates driver assistance systems not covered by U.S. NCAP ratings such as:

- forward collision warning,
- automatic emergency braking (AEB),
- seatbelt reminders,
- speed assistance systems,
- lane departure warning (LDW),
- lane keeping assist, and
- emergency lane keeping systems.

Many of the additional tests being conducted by the Euro NCAP have been replicated in other NCAPs despite not having been adopted in the U.S. The frontal impact deformable barrier test is conducted in six other programs. Rear whiplash, child occupant protection, and vulnerable road user impact protection are being evaluated in four other programs. Child occupant protection and seatbelt reminders are evaluated in three other NCAPs. Thus, depending on the area of safety considered, the U.S. NCAP appears to be falling behind a number of other programs.

While there have been attempts by the U.S. DOT in recent years to update the program, that early progress appears to have slowed considerably. At the end of 2015, the DOT issued a request for comments on a sweeping proposal to update the U.S. NCAP to cover a number of the areas covered by rival programs such as Euro NCAP. However in 2018, the DOT issued a significantly scaled back notice requesting comments on general questions about improving the program, not about specific tests.¹ Meanwhile, the Euro NCAP in 2017 issued a roadmap of improvements through 2025 which included not only improvements in the areas already tested but additional areas of testing and the timeframes in which they are expected. The U.S. DOT

¹ On October 16, 2019, the day before the issuance of this report, NHTSA yet again indicated that the agency was going to propose major upgrades to NCAP in 2020.

should emulate the comprehensive Euro NCAP program, including the process of preparing public roadmaps for future improvements and meeting those deadlines.

Euro NCAP			Introduced, Updated	US NCAP			Introduced
Adult Occupant Protection	Frontal	Full Width Rigid Barrier Crash Test	2015	Adult Occupant Protection	Frontal	Full Width Rigid Barrier Crash Test	1979
		Offset Deformable Barrier Crash Test	1997, 2015				
	Side	Moving Deformable Barrier Crash Test	1997, 2015		Side	Moving Deformable Barrier Crash Test	1997
		Pole Impact Crash Test	2001, 2015			Pole Impact Crash Test	2011
		Far Side Sled Test	2018, 2020				
	Rear Whiplash	Headrest Geometry Evaluation	2009				
Sled Tests		2009					
Child Occupant Protection	Child Seat	Vehicle Design	1997, 2016				
		Fit and Ease of Installation	2013, 2016				
	Frontal	Offset Deformable Barrier Crash Test	1997, 2016				
	Side	Moving Deformable Barrier Crash Test	1997, 2016				
Vulnerable Road Users	Impact Protection	Head Impact Test	1997, 2013				
		Upper Leg Impact Test	1997, 2015				
		Lower Leg Impact Test	1997, 2014				
				Rollover Resistance		Static Stability Factor	2001
						Dynamic Handling	2004
Driver Assistance Technologies	Forward Collision Warning (FCW) Automatic Emergency Braking(AEB)	City - Dynamic Test	2014, 2018				
		Interurban - Dynamic Test	2014, 2018				
		Pedestrian - Dynamic Test	2016, 2018				
		Cyclist - Dynamic Test	2018				
	Seatbelt Reminders		2002, 2018				
	Speed Assistance Systems (SAS)		2009, 2018				
	Lane Support Systems (LSS)	Lane Departure Warning (LDW)	2014, 2018				
		Lane Keeping Assist	2014, 2018				
Emergency Lane Keeping		2014, 2018					

A list of tests by other countries (other than EURO NCAP) which the U.S. NCAP does not include follows:

Frontal Offset Deformable Barrier Test: ANCAP, ASEAN NCAP, C-NCAP, JNCAP, LATIN NCAP

Rear – Whiplash Evaluation: ANCAP, C-NCAP, JNCAP, KNCAP

Child Occupant Protection: ANCAP, ASEAN, C-NCAP, LATIN NCAP

Vulnerable Road Users Impact Protection: ANCAP, C-NCAP, JNCAP, KNCAP

Forward Collision Warning / Automatic Emergency Braking: ANCAP, ASEAN, C-NCAP

Seatbelt Reminders: ASEAN, JNCAP, LATIN NCAP

Speed Assistance Systems: ANCAP

Lane Departure Warning / Lane Keeping Assist: ANCAP, ASEAN

Reforming NCAP and Reclaiming Leadership

The U.S. NCAP, although it inaugurated the concept, is now seriously behind the NCAPs of other countries. A list by type of tests and a further comparison of the U.S. and Euro NCAP programs can be found in Appendix A. Today, the Euro NCAP program is the most advanced.

NCAP must be updated to guarantee the effectiveness of the program as it has fallen woefully behind international counterparts in robust and comprehensive ratings of vehicle safety. Implementing several essential commonsense improvements will greatly enhance the effectiveness of NCAP in the future. Currently available safety technologies that have already been proven to have substantial safety benefits should be included in the NCAP ratings to further facilitate their widespread dissemination into new vehicles. Research conducted by the Insurance Institute for Highway Safety (IIHS) has demonstrated that current advanced driver assistance systems (ADAS) such as Automatic Emergency Braking (AEB), Lane Departure Warning (LDW), Blind Spot Detection (BSD) and rear automatic braking have safety benefits by reducing crashes (See Appendix B). Moreover, the National Transportation Safety Board (NTSB) has recommended that forward collision avoidance systems such as AEB be included in the NCAP ratings instead of simply informing consumers if the vehicle is equipped with such technologies.

Crash testing must also be enhanced. NHTSA should adopt, as needed, updated anthropomorphic test device (ATDs) in crash tests conducted as part of NCAP to ensure that the tests are accurately capturing the injuries and risk of injury observed in today's vehicles.

Additionally, NHTSA should use ATDs placed in the rear seats of vehicles during crash testing

to better assess the performance of vehicles in protecting occupants in the rear seats of vehicles. The Agency should also develop testing methods and injury and performance criteria for use in NCAP to ensure that the failure of seatbacks in rear impact crashes do not increase injury risk for rear seat occupants while offering optimal protection for front seat occupants. NCAP should also include crash tests, similar to those already conducted by Euro NCAP, which address additional crash modes beyond current U.S. NCAP requirements, including additional tests for adult and child occupant protection.

NCAP must also place greater focus on the safety of vulnerable users who share the roads with motor vehicles. Ratings should include the evaluation of the performance of pedestrian crash avoidance systems as well as those designed to reduce injuries to pedestrians, bicyclists, children and other vulnerable road users, particularly those injuries resulting from head and leg impacts against a vehicle's stiff hood, windshield or bumper. The NTSB recommended such action in a 2018 special investigation report on pedestrian safety.

As the American population ages, NCAP should include a separate "silver rating" for older adults. This new rating should use modified injury criteria to address the specific injury patterns suffered by older occupants. NHTSA should also develop an ATD representative of older occupants for use in safety testing.

The public must have better access to NCAP ratings and be given more opportunities to provide input to NHTSA on how to best enhance the program. As such, the Agency should improve ease of use of the NCAP public website so consumers can better access vehicle ratings as well as hold public meetings biennially to allow stakeholders to provide input on needed updates to NCAP. Lastly, in order to keep pace with rapidly evolving vehicle safety technology and provide clarity to all stakeholders, NHTSA should publish a five-year roadmap detailing plans to update the program as is done with Euro NCAP.

Fortunately, given the meager state of the U.S. NCAP program, other organizations funded by the U.S. insurance industry provide substantial support in promoting consumer awareness and protection. For example, Advocates for Highway and Auto Safety (Advocates) is a coalition of public health, safety, and consumer organizations, insurers and insurance agents that promotes

highway and auto safety through the adoption of safety laws, policies and regulations. Claybrook helped to establish this organization in 1989. Advocates has supported the U.S. NCAP since the organization's founding. For many years, Advocates and other safety groups fended off numerous attempts to cut funding for NCAP that would have certainly curtailed the effectiveness of the program or meant its outright end. Additionally, IIHS is a research organization that undertakes studies, evaluates highway and auto safety programs and conducts vehicle crash tests as well assigns crash ratings. The organization makes their data and research findings on driver behavior, roadway infrastructure and vehicle design and safety publicly available. This is also an important source of highway and auto safety information for consumers. IIHS was founded in 1959 by three major insurance associations representing 80 percent of the U.S. auto insurance market. At first, the Institute's purpose was to support highway safety efforts by others. In 1979, IIHS transitioned into an independent research organization. In 1992, IIHS opened its Vehicle Research Center where it performs the crash tests that form the basis of its vehicle ratings.

A New Program Empowers Consumers and Challenges Industry

In 1979, NHTSA inaugurated a new vehicle safety program named NCAP. This year, 2019, is the 40th anniversary of this ground-breaking consumer safety information program. It consists of making available to the public NHTSA crash test data and other tests of new vehicles. The crash tests are generally conducted at 5 miles per hour (mph) higher than the relevant Federal Motor Vehicle Safety Standard (FMVSS). Most, but not all, federal crash test standards are conducted at 30 mph. This approach determines whether vehicle manufacturers are designing their safety systems substantially higher than the minimum government performance standard or are just on the edge of passing it.

With the development of the internet, the information is now available online on the NHTSA website and on the websites of U.S. automakers and many auto dealers.²

When first inaugurated, the U.S. NCAP challenged automakers to upgrade safety in their vehicles beyond the minimum government requirements. With NHTSA publicly releasing the

² www.safercar.gov

new vehicle test results, all manufacturers became mindful as they needed to design new cars to improve their NCAP crash test results. This shift shows the power of factual, well-distributed consumer information. In fact, NCAP forced U.S. manufacturers for the first time in the early 1980s to admit that "safety sells," something the industry had denied for over 70 years. Thus, NCAP created a "consumer market" for safety performance.

The idea of using consumer information to encourage the car buying public to purchase vehicles that are the safest and consequently, to reward manufacturers that build the safest vehicles, has now spread around the globe. Currently eight NCAP or similar non-government programs provide ratings for both crashworthiness and crash avoidance. For example, Australia NCAP was launched in 1993, followed by Japan NCAP in 1995, Euro NCAP in 1997, Korean NCAP in 1999, China NCAP in 2006, Latin NCAP in 2010 and the NCAP for Southeast Asian Countries (ASEAN NCAP) in 2012. Two others, in India and Africa, are now being created. In parallel, IIHS, founded in 1959, began its crashworthiness ratings in 1995. The effectiveness of NCAPs has been recognized by the United Nations General Assembly, and its Secretary General Antonio Guterres has called on all Member States to participate in NCAPs.³

To serve as a platform for cooperation among various NCAPs, the Global NCAP was launched in 2011. Funded by Bloomberg Philanthropies and the FIA Foundation, Global NCAP has provided funding and technical support to new NCAPs in emerging markets including ASEAN and Latin NCAP as well as established pilot NCAPs in India and Africa. Led by its President and CEO David Ward, who previously played a leading role in the creation of Euro NCAP, Global NCAP has strongly promoted the combination of "regulatory push" through the application of minimum UN vehicle safety regulations and "demand pull" through consumer safety rating programs such as NCAP.

Around the world the NCAP model has proven to be powerfully effective. Providing the public with essential information about the safety performance of new vehicles has clearly influenced buying decisions which have contributed to significant declines in vehicle occupant deaths in the

³ United Nations General Assembly, Improving global road safety-Note by the Secretary General A/72/359. Recommendation 101(c) (Aug. 24, 2017)

European Union over the last twenty years.⁴ In 2003, it was estimated that cars awarded five stars by Euro NCAP “have a 36% lower intrinsic fatal accident risk than vehicles which are simply designed to meet the legal standard”⁵ and had brought “forward the benefits of new legislation by 5 years”⁶ by encouraging manufacturers to advance and exceed regulatory requirements thus accelerating the entry into the fleet of safer vehicles. In 2017, it was estimated that Euro NCAP had saved over 78,000 lives.⁷ Since 2009, its testing protocols have been subject to successive updates making it the most technically advanced NCAP in the world.⁸

In emerging markets, NCAP initiatives have been similarly successful even in regions where vehicle regulations are oftentimes either absent or only partially in effect. For example, ASEAN NCAP, which is based in Malaysia, has now tested models covering 90% of the regional market, and 90% of these achieved ratings of four and five stars which is far above any regulatory requirements, according to Global NCAP. Latin NCAP has similarly seen a marked increase in the availability of cars with four and five stars. A prime example is the region’s best-selling Chevrolet Onix which has improved from a zero star rating to five stars and been recognized with an award for meeting the UN standard for pedestrian protection.⁹

A Determined Administrator, A Defective Gas Tank, and a Decision to Inform Consumers

In 1977, President Jimmy Carter selected Joan Claybrook to lead NHTSA, the then 11-year old auto and highway safety regulatory agency. In 1966, she worked in the U.S. Congress for Members deeply involved in the creation of the new regulatory agency. It was there that she met Ralph Nader and helped to adopt some of his ideas into successful enactment of the nation’s first

⁴ Global NCAP.

⁵ European Road Safety Action Programme: Halving the number of road accident victims in the European Union by 2010: A Shared Responsibility, Commission of the European Communities, June 2, 2003.

⁶ Priorities in EU Road Safety, Progress Report and Ranking of Actions, Commission of the European Communities, Mar. 17, 2000.

⁷ Euro NCAP Marks 20th Anniversary of Life-Saving Crash tests, Euro NCAP, Feb. 2, 2017, available at <https://www.euroncap.com/en/press-media/press-releases/euro-ncap-marks-20th-anniversary-of-life-saving-crash-tests/>

⁸ See: <https://www.euroncap.com/en/press-media/press-releases/euro-ncap-launches-road-map-2025-in-pursuit-of-vision-zero/>

⁹ See: <https://www.latinncap.com/en/media-area/new/85d7a4df7c8e87/latin-ncap-latest-results-from-zero-to-hero-new-onix-plus-scores-five-stars-for-both-adult-and-child-occupants-and-advanced-award-for-pedestrian-protection-chery-disappoints-badly-with-zero-stars-result>.

auto safety laws. She then worked for the first Administrator, Dr. William Haddon, Jr, M.D., for four years. During her second and third years as Administrator of NHTSA, Claybrook spearheaded the creation of NCAP for several important reasons. One of the key motives was to create an incentive for automakers to improve the safety performance of their vehicles outside of the traditional federal government regulatory process.

An example of the effectiveness of incentivizing auto industry safety designs was the Air Bag/Passive Restraint rule which was developed by NHTSA, was issued in 1977 by the Secretary of Transportation and was in need of strengthening.¹⁰ First developed in the late 1960s, the speed of the air bag crash test was 30 mph.¹¹ However, highway speeds far exceeded that number by the mid-1970s despite the imposition in 1973 of the national 55 mph speed limit, established in the height of the energy crisis to conserve fuel.¹² In fact, the greatest societal benefit from limiting speeds to the 55 mph program was saving thousands of lives during the 1970s and 1980s.¹³ The conundrum facing the Agency was how to increase the effectiveness of air bags at higher speeds without amending the standard. At the time, the Air Bag/Passive Restraint rule was very controversial and it would have been difficult, if not impossible, to make any substantive changes until after it fully took effect in 1984 and all litigation was consummated. Therefore, NCAP testing vehicles at 5 mph higher than the air bag safety standard required was extremely helpful to evaluate and ascertain manufacturers' performance.

Another factor that influenced the establishment of NCAP was a conversation Claybrook had with Pete Estes, President of General Motors, in early 1978. He contacted NHTSA because of his concerns about NHTSA's investigation of the Ford Pinto defective gas tank. A *Mother Jones* magazine article in late 1977 cited internal Ford "cost-benefit" calculations showing that the company knowingly allowed its Pinto gas tank to be susceptible to fuel leakage in rear end

¹⁰ 42 F.R. 34289; July 5, 1977.

¹¹ Kahane, C, An Evaluation of the 1998-1999 Redesign of Front Air Bags, National Center for Statistics and Analysis, National Highway Traffic Safety Administration, Report No. DOT HS 810 685, p. vii (Aug. 2006).

¹² Federal-Aid Highway Amendments of 1974, Pub. L. 93-643, Sec. 154 (1975).

¹³ Johnson, P, et. al, The Effectiveness of the 55 MPH National Maximum Speed Limit as a Life Saving Benefit, NHTSA, Report No.: DOT HS 805-811 (Jan. 1981).

crashes because of the cost of making it stronger.¹⁴ Clarence Ditlow, Executive Director of the Center for Auto Safety, asked for a NHTSA investigation.¹⁵

Claybrook insisted that NHTSA conduct crash tests of the Pinto to determine if the fuel tank claims were true. Normally in such tests, a Stoddard solvent, which does not catch fire, is used to protect the proving ground workers who measure the amount of leakage. Because of the urgency to correct the gas tank vulnerability and to demonstrate the severity of the defect, Claybrook insisted the Agency use real gasoline to show real world results. The newly issued federal rear safety crash test was set at 30 mph and the Pinto test was conducted at a proving ground at 29.9 mph, a speed less than what was required by the federal standard. The fuel poured out of the gas tank because the filler neck separated from the tank and sharp edges in the underbody pierced the fuel tank when it was hit from the rear by a Chevrolet Impala in the tests. As a result, the Pinto burst into flames.

NHTSA provided the films to the media which shocked the auto companies, infuriated Ford, and influenced public opinion so strongly that it essentially stopped sales of the Pinto. It also put needed pressure on Ford to redesign the vehicle, something the company resisted doing until the Agency pressed forward with a safety defect investigation and demanded company internal documents. As a result, Ford was forced to turn over damaging materials including its infamous and shocking “cost-benefit” memo comparing the cost to Ford of fixing the Pinto to the number of lives that would be lost and horrible burn injuries suffered.

GM President Estes was aware of Ford’s public relations debacle. He called Claybrook to ask if NHTSA was investigating the fuel tank of GM’s Vega, a vehicle similar in size and price to the Pinto. According to Claybrook, Estes said GM did not want a “Pinto situation with the Vega.” She informed him that NHTSA had recently completed a rear end crash test that showed the Vega also had a deficient fuel tank. Claybrook then asked him about the speed at which GM normally tested its vehicles to assure conformity with the federal 30 mph rear end crash safety standard and he replied “at 31 mph”.

¹⁴ Mark Dowie, *Pinto Madness*, Mother Jones (Sep./Oct. 1977).

¹⁵ Robert D. McFadden, Clarence M. Ditlow III, 72, *Crusader for Auto Safety Who Forced Big Recalls*, NY Times (Nov. 11, 2016).

This was new information to Claybrook and other agency staff. Due to variations during manufacturing, in order to assure all vehicles meet a designated minimum federal standard, it was assumed that manufacturers routinely tested at a speed that is three or four mph higher. But, the Detroit manufacturers apparently had no fear that NHTSA would catch them in violation of a crash test safety standard. At the time, crash test safety standards were relatively new. However, an Agency test of the GM Vega's fuel tank integrity showed it also failed thereby leading Mr. Estes to recall the vehicle.¹⁶

Learning that automakers were not robustly testing the safety performance of their vehicles caused Claybrook and Agency staff to conclude that it was necessary to increase the crash test speed for air bags despite the challenges of doing so. Also, highway deaths were climbing steadily, from 44,525 in 1975 to 51,093 in 1979.¹⁷ The Agency needed to take strong and immediate steps to address this carnage.

Testing the Auto Industry and Informing the Public

At this point, a talented NHTSA crash testing engineer named James Hackney along with Dr. Kennerly Digges, who directed NHTSA's crash test research program in this area, suggested NHTSA conduct for comparison, a series of frontal crash tests at 35 mph involving different makes and models. There was no specific funding for this new venture so money from NHTSA's safety standard enforcement program was used. If a vehicle passed at 35 mph, no further enforcement testing was necessary. But if it failed, which many did initially, NHTSA would retest it at 30 mph to be sure each vehicle, at least, complied with the minimum safety standard.

It became apparent that there were many variations in the test results among different makes and models. Claybrook felt compelled to publicize the crash test results so consumers could use this safety information to make the best purchasing decisions. Among other interesting discoveries, the crash tests showed that the small cars manufactured by U.S. automakers were significantly safer than the Japanese small cars. This was particularly important because with fuel shortages

¹⁶ Larry Kramer, Nader: Vega's Gas Tank As Dangerous as Pinto's, WaPo (Aug. 31, 1978).

¹⁷ Traffic Safety Facts 2016, National Highway Traffic Safety Administration, Report No.: DOT HS 812 554 (May 2018).

in the U.S. in 1979, small fuel-efficient Japanese cars were very popular and challenging domestically manufactured vehicles. At this point, given the many makes and models involved and the differing results, a decision was made to create a program to organize the results of Agency crash tests and give it a name. The “New Car Assessment Program” (NCAP) was selected because it was a non-controversial name for a very controversial consumer information program.

The auto industry was infuriated that the government was informing consumers about the actual crash performance of its vehicles by make and model. For years, the industry leaders had publicly claimed that safety did not sell, but in truth it did. Because of the complexity of conveying the crash test results to consumers, in 1980, Claybrook decided, with resistance from NHTSA’s top engineering staff, to create a booklet with the crash test information for all makes and models tested by NHTSA. She did not know who in the Agency could be charged with developing such a booklet and sought out a professional staff person who had experience with marketing. Jack Gillis, who worked in the fuel economy office, was selected. Claybrook asked Gillis if he could do the job with the help of a contractor he could select, and he took on the challenge.

Initially, Claybrook wanted to educate readers by providing information about crash safety up front. However, Gillis wisely urged that a focus group be conducted before publication. Unanimously the focus group wanted the hard data, namely which vehicle makes and models passed or failed the government crash tests, at the beginning of the booklet. As a result, the book was organized so that in the very front is a four page “Purchasing Guide” organized by car size (Large, Intermediate, Compact and Subcompact). For each grouping, information is listed by make and model on how the vehicle performed in crash tests, safety belt comfort and convenience, fuel economy, preventive maintenance costs, repair costs, accident repair costs and insurance costs. The heart of the booklet was brand new information listing the crash testing results by make and model conducted with belted instrumented dummies at 35 mph, five mph higher than the safety standards from which the tests were developed.

Six test results were listed: two involved instrumented dummies with a driver and passenger in a full width barrier frontal crash test (used to test the air bag standard, No. 208 measuring results

affecting the head, chest and upper legs); frontal crash windshield retention test to measure whether the windshield remains attached to the car which prevents occupant ejection, the most deadly outcome in a car crash; windshield zone intrusion in which parts of the car could travel through the windshield in a frontal crash; fuel leakage after a frontal collision; and, fuel leakage after a rear end collision.

Within less than five months, Gillis produced a potent and provocative booklet named, “**The Car Book, A Consumer’s Guide to Car Buying.**” It was a substantial 68 pages long. No one had ever seen such data by make and model before. While the auto manufacturers and NHTSA conducted research crash tests regularly, the auto industry information was kept secret and the government test results were never formally organized for publication or made easily available to the public. **The Car Book** made it possible for consumers to make better decisions in purchasing a car. It also saved the Agency millions of dollars because staff did not have to individually answer requests from consumers with information about crash test data in the era before personal computers and the internet. And, auto dealers were unprepared for consumers coming into their showrooms loaded with such powerful information.

To publicize the release of **The Car Book**, Claybrook asked Phil Donohue, a national talk show host with a huge television audience, to invite her as a guest to his show to discuss NCAP and offer **The Car Book**, free of charge, to his viewing audience. As a result, NHTSA was overwhelmed when 450,000 people watching The Phil Donohue Show ordered the booklet. The U.S government publication office in Pueblo, Colorado that handles the distribution of all U.S. government publications said it was the largest response in a single day in their history, and the record has never been broken. News articles and electronic media coverage followed. *Consumer Reports*, a consumer magazine with a circulation of over 4 million, immediately published the information.

Several of the large domestic auto companies were incensed. They immediately secured a meeting with then-Secretary of Transportation Neil Goldschmidt to complain about NCAP and hopefully to stop publication of **The Car Book**. The industry’s major criticisms were that the NCAP program was “neither fish nor fowl” -- that it was not a safety standard and was not

otherwise authorized by law. Furthermore, they argued that the test results should not be released to the public because they were based on only one crash test per vehicle.

The Secretary immediately called Claybrook to his office to explain what NHTSA was doing. She informed the Secretary that NHTSA's crash test information had always been publicly available, but the information was difficult to convey, and it was expensive to respond to each consumer inquiry individually. Also, the DOT communications office had approved NHTSA's press release announcing the publication before her appearance on The Phil Donohue Show.

Changes in Administrations Result in Changes to Consumer Information

When President Jimmy Carter lost the presidential election in November 1980 to former California Governor Ronald Reagan, Claybrook's tenure as NHTSA Administrator ended, as did that of the Secretary of Transportation and other politically appointed staff in the department.

President Reagan was philosophically opposed to government regulation and spoke out during his election campaign against air bags. He appointed Raymond A. Peck Jr., a former attorney in the coal industry, to head NHTSA who quickly announced that the Agency would stop publication of **The Car Book**. However, under Congressional pressure he eventually decided to continue the NCAP crash testing program because it focused on informing the consumer and helping to make the marketplace work.

When the announcement was made that publication of **The Car Book** was being discontinued, Gillis was discouraged and decided to leave NHTSA and publish **The Car Book** privately. Subsequently, Gillis worked with Clarence Ditlow, Executive Director of the Center for Auto Safety, to independently publish a second edition of **The Car Book** in 1982 using the publicly available NCAP crash test data NHTSA was still generating. It was a difficult and risky personal and professional decision by Gillis to leave the agency and self-publish **The Car Book**. Shortly thereafter, Gillis became the Communications Director at the Consumer Federation of America (CFA), an umbrella association of state and local consumer organizations across America. In 2019, he became CFA's Executive Director. He continues to publish **The Car Book** today with the Center for Auto Safety. 2019 marks the 39th edition of its private publication. It remains enormously popular with significant annual sales even without the support of a major company

with serious resources to promote publication. Gillis accomplished this with his media savvy and skills coupled with his dedication and determination to put this valuable information in the hands of consumers. In 2018, for the first time, **The Car Book** was available on the internet.

NHTSA's decision to discontinue publishing **The Car Book** was a precursor of the attacks on safety regulations and NHTSA consumer information initiatives from 1981 to 1992 during the administrations of President Ronald Reagan and President George H.W. Bush. Unfortunately, throughout this period the Agency only issued one new safety standard and took no actions to expand the safety tests performed by NCAP.¹⁸ A 1982 government report issued during the Reagan Administration entitled "Actions to Help Detroit" included plans to cut back existing safety and clean air standards to financially assist the domestic auto industry despite the lack of any statutory authority to justify these actions. As a result, several Agency rules were eliminated, including a major conspicuity safety standard to improve the driver's field of view that took 10 years to develop, as well as other consumer information rules issued in the late 1960s.¹⁹ The NCAP program continued but with no new tests developed for over 14 years.

Over the years Congress has directed the U.S. DOT to improve its methods of informing consumers about NCAP.²⁰ Under the new Clinton Administration, NHTSA undertook a major effort to make the crash test ratings easier for consumers to understand. A star rating system (using up to 5 stars with 5 being the best) was adopted to grade the performance of the various make and models tested based on crash test dummy injury risk measures. Originally **The Car Book** used a tough pass/fail designation that the auto industry vehemently opposed. Claybrook's alternative preference was to use a rating system of letter grades, A to F, which she believed the public would better comprehend since it was similar to grading in U.S. schools. The Agency instead adopted the star system beginning with Model Year (MY) 1994 vehicles and it has since been used by NCAPs in other countries as well.

¹⁸ 49 F.R. 28962 (Jul. 17, 1984).

¹⁹ Michael Decourcy Hinds, Administrator Who Rescinded Auto Safety Rules Resigns Suddenly, N.Y. Times (Apr. 23, 1983).

²⁰ Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act, Pub. L. 106-414 (Nov. 2000).

Since enactment of the National Traffic and Motor Vehicle Safety Act in 1966, the U.S. DOT's work on auto safety has garnered incredible attention in the media including newspapers, magazines and television.²¹ The public, again and again, saw films of actual crash tests and learned about the importance of built-in lifesaving vehicle safety systems. In the late 1980s and early 1990s, following increased public attention to the NCAP ratings, several auto companies dropped their resistance to NCAP and in fact, started advertising the safety of their vehicles based on the NCAP test results. This, in turn, resulted in a dramatic increase in consumer concern and knowledge about the importance of motor vehicle safety.

In more recent years, NCAP has been given distinct funding in the U.S. DOT budget. Additionally, program improvements were made including the addition of side impact tests and ratings. The first ratings for side impact safety began with MY1997 using a moving deformable barrier test.²² The NCAP expanded testing and rating vehicles for side impact using the vehicle-to-pole test for MY2010.²³ The new side impact Motor Vehicle Safety Standard with a pole test was issued in 2007.²⁴

Additional improvements have been adopted since NCAP was created to cover additional vehicles. Originally some tests only applied to passenger cars, but then beginning with MY1983, NHTSA expanded NCAP to include light trucks, vans and sport utility vehicles (SUVs).²⁵ In order to better assess the safety performance of vehicles, test dummies were also upgraded.

Tire Defect Gives New Life to NCAP

In 2000, the Ford Motor Company and Firestone Tire Company were publicly accused of equipping Ford's popular Explorer with defective Firestone tires resulting in hundreds of deaths when these vehicles rolled over on high speed highways.²⁶ At the time, approximately 10,000 people were being killed annually in rollover crashes, then the most dangerous type of vehicle

²¹ Pub.L. 89-563 (1966).

²² NHTSA, NHTSA Releases Side Crash Test Results in New Consumer Information Program, Doc. No. 21 -97 (Apr. 11, 1997).

²³ 73 F.R. 40016 (Jun. 11, 2008).

²⁴ 72 F.R. 51908 (Sep. 11, 2007).

²⁵ Hershman, L, The U.S. New Car Assessment Program: Past, Present and Future, NHTSA, Paper 390.

²⁶ Matthew L. Wald, Tread Failures Lead to Recall Of 6.5 Million Firestone Tires, N.Y. Times (Aug. 10, 2000).

crash.²⁷ The Ford/Firestone case dominated the news during the summer and fall, with several major Congressional hearings and new federal legislation pushed by consumer groups. Within two months of being introduced, the Transportation Recall Enhancement, Accountability and Documentation, or “TREAD,” Act of 2000 became law.²⁸

Among many safety provisions, it required a new dynamic rollover test to be developed for consumer information, and it covered not only passenger cars but also SUVs and light trucks. The Secretary of Transportation also was instructed to conduct a rulemaking to determine how to best disseminate the test results to the public. This new law supported expansion of NCAP to include rollover and required the development of the first NCAP test not based on an existing federal motor vehicle safety standard.

The NCAP rollover resistance evaluation includes: (1) a measurement of the vehicle’s static stability factor (SSF) and, (2) performance evaluation in the fishhook driving maneuver. According to NHTSA, the rating based on SSF alone began with MY2001 vehicles.²⁹ This evaluation is based on the probability of a rollover per single vehicle crash as a function of SSF. The dynamic vehicle test (fishhook) was added to the rating system for MY2004.³⁰ This evaluation is based on two different curves relating probability of a rollover per single vehicle crash as a function of SSF. One curve is for vehicles that tip-up during the fishhook maneuver, and the other is for vehicles that do not tip-up during the maneuver. The final rule establishing the rollover standard was issued in 2007.³¹ This standard uses a slightly different test scenario known as the sine with dwell which is a dynamic handling test. The measures for performance in this standard are yaw rate and lateral displacement.

Consumer Information Enters the 21st Century

In 2004, NHTSA launched a new web page called Safercar.gov. This important step assisted consumers in searching for critical information about vehicle safety information in one place.

²⁷ Traffic Safety Facts 2016, National Highway Traffic Safety Administration, Report No.: DOT HS 812 554 (May 2018).

²⁸ Pub. L. 106-414 (2000), amending Sec 30117 of Title 49, USC.

²⁹ 66 F.R. 3388 (Jan. 12, 2001).

³⁰ 68 F.R. 59250 (Oct. 14, 2003).

³¹ 72 F.R. 17236 (Apr. 6, 2007).

Although putting consumer information about the crashworthiness of cars on NHTSA's website was an important development, it still wasn't enough. Ideally, consumers need safety information in the dealer showrooms when they are contrasting and comparing different makes and models before making a purchase decision. At that time, before the advent of smart phones, accessing the crash test results on the NHTSA website was difficult if not impossible at the point of sale but essential to making an informed choice. This changed with the enactment of yet another federal auto safety law pushed by Claybrook and Advocates for Highway and Auto Safety (Advocates), a nonprofit lobbying organization based in Washington, D.C.

In 2005, Congress passed a comprehensive surface transportation bill with federal funds for states to build and repair highways and bridges and support public transit services. The bill was called SAFETEA-LU or the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users.³² In addition to funding for the states, it included provisions advancing auto safety. Two significant provisions required: (1) NHTSA to issue rollover prevention as well as rollover protection safety standards; and, (2) NCAP information to be placed directly on the vehicle's window sticker listing the price of the vehicle.

Upgrading rollover protection was initially proposed by U.S. Senator John McCain (R-AZ) who chaired the Senate Commerce, Science, and Transportation Committee. Senator McCain had a long and distinguished history of supporting auto safety improvements and had originally been a sponsor and champion of the TREAD Act in 2000. Senator McCain's version of the auto safety title was not enacted and in a subsequent Congress he rotated off the Senate Commerce Committee as required by Republican Party rules. His replacement as Chair was Senator Ted Stevens (R-AK). The new Chair of the Subcommittee with jurisdiction over NHTSA was a conservative Senator from Mississippi, Senator Trent Lott (R-MS), who was formerly the Senate Republican Leader. Initially uninterested in working with consumer groups, he was persuaded to support SAFETEA-LU after meeting with Claybrook and Jackie Gillan, President of Advocates. Consumer organizations, families who had lost loved ones in rollover crashes and other public health and safety groups organized grassroots and rallied media support for the safety rulemakings to be required by the law. In an amazing legislative feat and show of leadership,

³² Pub. L. 109-59(2005).

Senator Lott was able to get the auto safety provisions in SAFETEA-LU passed by the U.S. Senate and enacted into law in just six months.

Another provision enacted in the SAFETEA-LU law resulted in a significant advance in consumer information. Senator Michael DeWine (R-OH) believed that consumer knowledge is essential to make the market work. He authored a provision requiring NHTSA to put the NCAP Star ratings on the vehicle price sticker (Monroney Label) that by law must be adhered to the window of every new car being sold. During the legislative debate on the bill, it was called “Stars on Cars”. The regulation became effective November 13, 2006, and the auto industry had to comply by September 1, 2007.³³ The window sticker label was a critical step in assuring that the buying public was informed at the point of sale before deciding which car to buy. It was cost effective, consumer-friendly, and did not require any new distribution system by manufacturers or dealers for dissemination of the NCAP test information.

Better Consumer Information with Better Crash Test Data

Under the Obama Administration, which began in 2009, a new federal safety standard for rear visibility was issued and additional improvements were adopted and proposed for the NCAP program. On July 29, 2011, NHTSA published a final decision notice in which it described NCAP improvements it was adopting, but these were not new tests to broaden the NCAP ratings.³⁴ These include:

- For the frontal crash program—modifying the frontal NCAP rating system to reflect updated test dummies, expanded injury criteria, and the inclusion of all body regions that are covered by FMVSS No. 208;
- For the side crash program—modifying the side NCAP rating system to reflect new side impact test dummies, new injury criteria, the inclusion of nearly all of the body regions that are covered by FMVSS No. 214, as well as a new side pole crash test using a small female crash test dummy;

³³ 71 F.R. 53572 (Sep. 12, 2006).

³⁴ 76 F.R. 45453 (July 29, 2011).

- A new overall vehicle score based on frontal crash, side crash, and rollover resistance test results; and,
- A new program that will provide consumers with information concerning the availability of advanced crash avoidance technologies that meet NHTSA's performance criteria and that have been shown to reduce crashes. However, these are still not factored into the NCAP rating.

In December 2015, the Obama Administration announced with great fanfare plans to significantly update the 5-Star NCAP ratings.³⁵ The proposal included rating a vehicle on three separate categories: crashworthiness, crash avoidance, and pedestrian safety. The crashworthiness rating would combine front and side impact crashworthiness as well as add additional tests and crash dummies to assess the performance of the vehicle. The new crash avoidance technology rating would be based on whether the vehicle was equipped with several developing crash avoidance technologies such as forward collision warning, crash imminent braking, lane departure warning (LDW) and blind spot detection (BSD) systems. Finally, the pedestrian safety rating would consist of both a pedestrian impact protection test, as well as the availability of pedestrian crash avoidance technology in the vehicle.

Also, in 2015, NHTSA began informing consumers if vehicles were equipped with automatic emergency braking (AEB) technology to help prevent or reduce the speed of impact in rear end crashes starting in MY2018.³⁶ However, AEB is not included in the NCAP rating and no safety standard was issued listing the performance requirements for an emergency braking test (and a petition by consumer groups for issuance of such a standard was denied).³⁷ In 2016, automakers committed to comply with a voluntary agreement by 2022. A “voluntary agreement,” instead of a FMVSS mandating AEB technology setting minimum requirements, was vigorously opposed by some leading consumer groups. They disagreed with the voluntary approach which was weak and unenforceable, urging again for the issuance of a mandatory minimum performance standard.

³⁵ 80 F.R. 78522 (Dec. 16, 2015).

³⁶ 80 F.R. 68604 (Nov. 5, 2015).

³⁷ 82 F.R. 8391 (Jan. 25, 2017).

While many of the revisions and upgrades to the NCAP program had merit, unfortunately these NHTSA proposals in 2015 were never adopted and still languish today under current DOT Secretary Elaine Chao. Since the commencement of the Trump Administration in January 2017, no further improvements have been made to NCAP, although as this report indicates, many are needed. In 2018, NHTSA held a meeting on updating NCAP to seek public input and sought additional comments to the federal docket.³⁸

Time for Action Now

The NCAP program not only lacks better information about safety systems, expanded crash tests and more accurate ATDs, but this crucial consumer information program also lacks sufficient funding and political leadership. These last two problems – inadequate funding and committed leadership - will continue to haunt and hinder any meaningful progress and improvements unless immediately addressed.

For example, from Fiscal Year (FY) 2011 through FY 2015, NCAP was funded at about \$10 million annually. Over the years there were minimal increases in funding from about \$13.7 million in FY 2016 to \$16 million in FY 2019 despite steady increases in new car and light truck sales. Last year, there were approximately 17.2 million new cars and light trucks sold in the United States.³⁹ For the FY 2020 federal budget the Trump Administration submitted to Congress, the Secretary of Transportation has incredibly proposed cutting NCAP funding in half - to only \$8 million annually. This represents a paltry 46 cents spent for every car and light truck sold in the United States for essential consumer information that could make a life or death difference for families.

It is important on this 40th Anniversary of NCAP to celebrate its creation and early achievements. However, a critical review and assessment of one of the most successful consumer information programs created by the federal government is merited and being released today. Unfortunately, the U.S. NCAP is destined to become irrelevant and inconsequential

³⁸ 83 F.R. 38201 (Aug. 3, 2018).

³⁹ www.statista.com, Light vehicle retail sales in the United States from 1978 to 2018 (in 1,000 units).

compared to other international NCAPs unless the public demands change and Congress legislatively directs actions by the agency and its leaders (See Appendix F).

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Appendix A: Detailed Comparison of the U.S. NCAP Tests with Euro NCAP Tests

Frontal Full Width Rigid Barrier Crash Test

In this test, a vehicle is crashed into a rigid barrier wall at a given speed. Test dummies are placed in the vehicle and instrumentation estimates the injuries sustained.

Euro NCAP – 31 miles per hour (mph) impact speed, test dummies included are small stature females in the front driver's seat and rear passenger's seat

US NCAP – 35 mph impact speed, test dummies included are an average stature male in the front driver's seat and a small stature female in the right front passenger's seat.

Frontal Offset Deformable Barrier Crash Test

Euro NCAP – In this test, a vehicle is crashes into a crushable barrier, simulating the front of another vehicle, mounted on a rigid wall. The front of the vehicle overlaps the crushable barrier by 40%. The test is conducted at a 40 mph impact speed. Test dummies included are average stature males in the front driver's and right front passenger's seats, and child dummies representing a 6 year-old and a 10 year-old are placed in child restraints (car seats) in the rear outboard seating positions.

US NCAP – No equivalent test.

Side Moving Deformable Barrier Crash Test

In this test, a simulated vehicle (moving deformable barrier, MDB) with a crushable barrier face to simulate the front of a vehicle, crashes into the side of the vehicle being tested at a specific speed.

Euro NCAP – 31 mph impact speed, test dummies included are an average stature male in the front driver's seat, and child dummies representing a 6 year-old and a 10 year-old are placed in child restraints (car seats) in the rear outboard seating positions.

US NCAP – 38 mph impact speed, test dummies included are an average stature male in the front driver's seat and a small stature female in the rear driver's side seat.

Side Pole Impact Crash Test

In this test, a vehicle crashes sideways into a pole at a specific speed.

Euro NCAP – 20 mph impact speed, test dummy included is an average stature male in the front driver’s seat.

US NCAP – 20 mph impact speed, test dummy included is a small stature female in the front driver’s seat.

Far Side Sled Test

Euro NCAP – In this test, a vehicle body is placed on a sled and accelerated in a way to replicate 1) the side moving deformable barrier crash test, and 2) the side pole impact crash test. An average stature male dummy is placed in the front driver’s seat. Injury measures are captured from the dummy. Excursion (movement) of the dummy across the vehicle is compared against the maximum intrusion of the far side of the vehicle as measured in the side moving deformable barrier and side pole impact crash tests. Note that this test is in an evaluation phase for 2019 and will be fully adopted in 2020, however manufacturers must perform the test to receive scores for the pole impact crash test.

US NCAP – No equivalent test.

Rear Whiplash Geometry Evaluation

Euro NCAP – The relative position of the head rest is examined to ensure that it can be positioned to prevent excessive head movement and provide effective support in a rear impact collision. The position is calculated relative to the head position of an average stature male

US NCAP – No equivalent test.

Rear Whiplash Sled Tests

Euro NCAP – In this test a mockup of the driver seating position using the subject vehicle set is placed on a sled. The sled is accelerated simulating low, medium, and high severity rear impact crashes. An average stature male dummy is used for the test to measure injury criteria.

US NCAP – No equivalent test.

Child Seat Vehicle Design and Fit

Euro NCAP – This assessment involves checking the vehicle for availability of appropriate technology for child restraint system (CRS, child seat) installation such as marking of tether locations, and isofix positions available. The assessment also examines various child restraint systems (child seats, CRS) for their ease of installation in different seating positions, using different methods of installation (belt versus isofix) in the subject vehicle.

US NCAP – No equivalent test.

Child Seat Frontal Offset Deformable Barrier Crash Test

Euro NCAP – This assessment makes use of the Frontal Offset Deformable Barrier Crash Test in which a dummies representing a 6 year old and a 10 year old are placed in appropriate child seats in the rear outboard seating positions during the test. The test examines injury measures to different body parts of the dummies as well as head excursion.

US NCAP – No equivalent test.

Child Seat Side Moving Deformable Barrier Crash Test

Euro NCAP – This assessment makes use of the Side Moving Deformable Barrier Crash Test in which a dummies representing a 6 year old and a 10 year old are placed in appropriate child seats in the rear outboard seating positions during the test. The test examines injury measures to different body parts of the.

US NCAP – No equivalent test.

Vulnerable Road Users Impact Protection Head / Upper Leg / Lower Leg Impact Tests

Euro NCAP – In these tests, dummy components representing a head, upper leg, and lower lag are impacted against multiple locations of the bumper and hood to examine injury measures for these body parts.

US NCAP – No equivalent test.

Rollover Resistance

Static Stability Factor

Euro NCAP – No equivalent test.

US NCAP – This assessment simply measures the track width of the vehicle and the height of the center of gravity and calculates the static stability factor as the track width divided by two times the height of the center of gravity.

Dynamic Handling

Euro NCAP – No equivalent test. Electronic stability control was part of the testing regime until 2016, was discontinued after ESC was made mandatory in 2014.

US NCAP – This assessment has the test vehicle perform a driving maneuver, called a fishhook, which simulated an evasive maneuver where the steering wheel is turned in one direction at a given rate and period of time, followed by a short dwell, and then a similar turning of the wheel in the other direction followed by a dwell at that angle. The vehicle is evaluated for whether it tips up during the maneuver and this information is used in conjunction with the static stability factor to estimate rollover resistance.

Forward Collision Warning / Automatic Emergency Braking

Euro NCAP – In these tests the ability of the vehicle's automatic emergency braking and/or forward collision warning systems to identify objects in the vehicle path under different scenarios is examined, to warn the driver of the impending collision and/or to automatically apply the brakes of the vehicle to mitigate or avoid the collision. Rating is based on the warning provided and/or the predicted impact speed reduction or the avoidance of the collision all together.

City – The subject vehicle approaches a stopped lead vehicle at speeds between 6 mph and 31 mph. These tests are conducted with the test vehicle and target vehicle aligned as well as in conditions with the vehicles offset to the left or the right by as much as 50% of vehicle width.

Interurban – The subject vehicle is examined as it approaches any of three scenarios; 1) a stopped lead vehicle, 2) a slower moving lead vehicle, and 3) a vehicle moving at the same speed that then decelerates. In the stopped lead vehicle scenarios, the subject vehicle is tested at speeds between 19 mph and 50 mph, with overlaps of up to 50%. In the slower

moving lead vehicle scenarios, the subject vehicle is tested at speeds between 19 mph and 50 mph approaching a target vehicle moving at 12 mph. These tests are also conducted at overlaps of up to 50%. In the lead vehicle braking scenarios, the vehicles are both travelling at 31 mph, and the lead vehicle brakes at either 0.2 g or 0.6 g, at a lead distance of 39 ft or 131 ft.

Pedestrian – The subject vehicle is examined as it approaches a variety of simulated pedestrians under different scenarios at speeds between 12 mph and 37 mph; 1) adult pedestrian running, crossing from the far side of the vehicle with an impact point at the center of the vehicle front; 2 and 3) adult pedestrian walking, crossing from the nearside of the vehicle with an impact point 25 percent or 75 percent offset from the vehicle centerline, 4) child pedestrian running, crossing from the nearside, obstructed by other vehicles, with a centerline impact point; and 5 and 6) an adult pedestrian walking, parallel to the vehicle path, in line with the centerline or 25% offset.

Bicyclist – The subject vehicle is examined as it approached a simulated bicyclist under different scenarios at speeds between 12 mph and 37 mph; 1) bicyclist crossing from the nearside, with an impact point at the centerline of the vehicle; and 2 and 3) bicyclist travelling, parallel to the vehicle path, in line with the centerline or 25% offset

US NCAP – No equivalent test.

Seatbelt Reminders

Euro NCAP – This assessment evaluates the availability, activation, notification (alerts type and location / volume / duration), and functionality of vehicle seatbelt reminders.

US NCAP – No equivalent test.

Speed Assistance Systems

Euro NCAP – This assessment evaluates whether the vehicle has a speed limit information function which relates the local speed limit to the drive. The assessment also examines the ability of the vehicle to warn the driver when they exceed the local speed limit, and the availability and functions of an automatic system for preventing a vehicle from exceeding the local speed limit.

US NCAP – No equivalent test.

Lane Support Systems

Lane Keeping Assist (LKA) / Emergency Lane Keeping (ELK) / Lane Departure Warning (LDW)

Euro NCAP – This testing evaluates the ability of the lane support systems to warn the driver, gently re-direct the vehicle, or forcefully re-direct the vehicle at the limit, when the vehicle is approaching a lane or road boundary (lane line or road edge) while travelling at 45 mph with lateral velocities between 0.5 mph and 1.5 mph. Emergency Lane Keeping systems are tested in lane / road departure scenarios with solid lane lines, dashed lane lines, and an unmarked road edge as well as in scenarios with oncoming traffic and passing traffic. Lane Keeping Assist systems are tested on road edges, dashed lines and solid lines. Lane Departure Warning systems are tested on dashed lines and solid lines. These tests are conducted with a range of lateral velocities.

US NCAP – No equivalent test.

Appendix B:



Real-world benefits of crash avoidance technologies

IIHS and HLDI study the effects of crash avoidance features by comparing rates of police-reported crashes and insurance claims for vehicles with and without the technologies. (May 2018)

Forward collision warning

- ▼ 27% Front-to-rear crashes
- ▼ 20% Front-to-rear crashes with injuries
- ▼ 9% Claim rates for damage to other vehicles
- ▼ 16% Claim rates for injuries to people in other vehicles

Forward collision warning plus autobrake

- ▼ 50% Front-to-rear crashes
- ▼ 56% Front-to-rear crashes with injuries
- ▼ 13% Claim rates for damage to other vehicles
- ▼ 23% Claim rates for injuries to people in other vehicles

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
- ▼ 8% Claim rates for injuries to people in other vehicles

Rear automatic braking

- ▼ 62% Backing crashes
- ▼ 12% Claim rates for damage to the insured vehicle
- ▼ 30% Claim rates for damage to other vehicles

Rearview cameras

- ▼ 17% Backing crashes

Rear cross-traffic alert

- ▼ 22% Backing crashes

Added costs

Lower crash rates are a clear benefit of these technologies, but some features can lead to higher repair costs in the crashes that do happen. That's because sensors and other components are often located on the vehicle's exterior. For example, in the case of forward collision warning without autobrake, the average payment per claim for damage to the insured vehicle goes up \$109 for vehicles equipped with the feature.

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Appendix C:

FAIRWARNING REPORTS

Star Safety Ratings, Long Helpful to Car Buyers, Now Languish in the Breakdown Lane

By [Eric Kulisch](#) on September 4, 2019

Grade inflation in school makes it difficult to distinguish who is actually achieving in the classroom. The federal government's vehicle safety rating system suffers the same problem.

Today, 98 percent of all vehicles tested receive four or five stars for crashworthiness. Consumer advocates and safety experts say it's time to raise the bar for the New Car Assessment Program, which hasn't been updated in nearly 10 years.

"There is no comparative value in the system anymore. It's the equivalent of handing out candy at Halloween: Everybody gets some," said Jason Levine, executive director of the nonprofit Center for Auto Safety based in Washington, D.C.

The rating system was created 40 years ago as a tool to help car buyers make informed purchasing decisions and encourage automakers to exceed minimum safety standards. The program, managed by the National Highway Traffic Safety Administration (NHTSA), rates cars and light-duty trucks on a scale from one to five stars for performance in crash and rollover tests. It's a market-based approach—automakers don't want bad publicity—that lets buyers quickly compare the safety of new vehicles. The score is printed on the window sales sticker and more details can be found on [NHTSA's website](#).

By all accounts, the program has been successful in getting manufacturers to offer safer vehicles and incorporate enhanced safety features. But critics argue that it has not kept pace with advances in safety technology. Features such as automatic emergency braking and forward collision and lane departure warnings are not included in the ratings. As a result, people are buying cars based on a decade-old measuring system and manufacturers aren't incentivized to reach further for safety.

Over the years, NHTSA made tests more stringent, added new evaluation criteria and improved how results were shared with consumers. The agency appeared close to updating the rating system in 2016, but appeared to halt the effort when the Trump administration took power.

In an email response to questions, NHTSA said that "over the years, numerous improvements have been initiated to the program. Currently, NHTSA is considering various approaches to enhancing NCAP so that it will continue to provide useful comparative vehicle safety information."

Sean Kane, president of Safety Research & Strategies, a research and advocacy group in Rehoboth, Mass., said “the...program would be better served if there were a regular evaluation to it every few years.”

Diminishing Value

When grades artificially skew higher in school because of easy assignments and lenient grading, students are typically less motivated to work hard and appear more high-achieving, while teachers look more effective than they are.

The same characteristics apply to automakers, who years ago figured out how to achieve a good safety score and simply apply the same template for each new model.

NHTSA spent nearly two years during the Obama administration trying to refine the program so that only truly exceptional vehicles received 4-and 5-star ratings. [The proposal](#) would have strengthened criteria for measuring crashworthiness, and added safety ratings for new crash avoidance and pedestrian protection features.

But the agency ran out of time getting approvals before the Trump administration took office and “couldn’t quite get it over the finish line,” Mark Rosekind, the NHTSA administrator at the time, told FairWarning.

Under President Trump, NHTSA shelved its proposal. In September 2018, it held a public meeting to gather stakeholder input but the [notice](#) signaled little interest in following the Obama-era recommendations. It mostly sided with industry concerns raised in 2015 over program and technology costs, and whether there was sufficient data showing any changes would provide meaningful benefits.

Nearly a year later, NHTSA has remained silent about next steps.

The agency has been widely attacked as a weak regulator. At a hearing in May, Rep. Frank Pallone (D-NJ), chairman of the House Energy and Commerce Committee, criticized NHTSA agency for letting the rating system stagnate.

“The very integrity and value of the 5-Star Safety Rating is undermined if the certification does not draw meaningful distinctions between the safety of different vehicles. It is also not meaningful if this safety certification fails to include crucial safety technologies already deployed on automobiles,” such as forward collision warning, lane departure warning and blind spot detection, he said.

Automaker Indifference

There is no apparent urgency at NHTSA to update the ratings system, with a White House that tends to side with business on nearly every issue and unwinds Obama-era policies with zeal, especially when the auto industry seems indifferent about reform.

Automakers generally have been lukewarm about the rating system because it challenges them to compete on the basis of an independent, unbiased safety assessment. Manufacturers that provide advanced safety features currently don’t receive any benefit in the rating system compared with rivals who withhold such systems from consumers. Companies that are out

front developing technology are happy to boast about it, but the rest are nervous about any change, according to Rosekind and Will Wallace, manager of safety policy at Consumer Reports. And many prefer maintaining NHTSA's current system of recommending certain crash avoidance technologies to consumers rather than testing and rating them.



A handful of manufacturers, notably Honda Motor Co., voiced general support for significant upgrades during the Obama administration, but most companies seem content with the status quo, according to official comments submitted by trade associations and individual firms.

The Association of Global Automakers, representing foreign brands in the U.S., last year offered qualified support for NHTSA's earlier proposal, while the Alliance of Automobile Manufacturers, a trade group for a dozen vehicle makers, said the recommendations were not ready to implement.

"It is important that any new additions to [the rating system] significantly increase real-world safety. If not, they will only increase vehicle cost without any commensurate real-world safety benefit," the Alliance said in comments filed with NHTSA. The program "should avoid forcing differentiation for differentiation's sake."

Auto Alliance spokesman Wade Newton said the group agreed with NHTSA's withdrawal of the 2016 proposed updates "since they lacked valid test procedures" and adequate proof of benefits.

The government affairs offices of Honda Motor Co, Toyota North America, Mazda USA, General Motors and Hyundai Motor Co either did not respond to requests for comment or referred questions to the two trade groups. Hyundai vehicles already perform at higher standards in third-party safety evaluations. spokeswoman Laura Bonavita added.

No Urgency

The ratings system isn't challenging enough for car shoppers to trust right now, Wallace said.

"When almost every car gets a four or five-star rating it makes it almost impossible for consumers to tell which vehicles actually provide a better-than-average level of safety, or a lower level of safety," he said. "And that's tremendously concerning to us because this is a program that has tremendous power when it is at its best.

"It was so successful it was emulated around the world," but now "has been allowed to languish. And that is such a shame, not only for consumers, but for everyone on our roads."

Wallace blamed leadership at NHTSA and its parent, the Department of Transportation, for not pursuing upgrades, noting that the staff dedicated a great deal of time developing an extensive proposal. And, he suggested, there are signs of a possible split among senior NHTSA officials about the value of the star ratings in an era when the private sector, through organizations such as the Insurance Institute for Highway Safety and Consumer Reports, already rate vehicles for safety.

Those groups can supplement NHTSA's work, but should not be a substitute for comprehensive, impartial evaluation conducted by the government, Wallace stressed.

Although it's normal for a new administration to take a second look at existing policies, Levine said the Trump team's new request for feedback "seems like a cynical ploy to ensure the process is bogged down in regulatory red tape for the purpose of locking things in place or to make sure nothing happens too quickly."

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Appendix D:

From “Pedestrian Safety,” Special Investigation Report, NTSB/SIR-18/03, PB2018-101632:

To the National Highway Traffic Safety Administration, *“Incorporate pedestrian safety systems, including pedestrian collision avoidance systems and other more-passive safety systems, into the New Car Assessment Program. (H-18-43)”*

From “The Use of Forward Collision Avoidance Systems to Prevent and Mitigate Rear-End Crashes,” Special Investigation Report, NTSB/SIR-15/01, PB2015-104098:

To the National Highway Traffic Safety Administration, *“Expand the New Car Assessment Program 5-star rating system to include a scale that rates the performance of forward collision avoidance systems. (H-15-6)”* and *“Once the rating scale, described in Safety Recommendation H-15-6, is established, include the ratings of forward collision avoidance systems on the vehicle Monroney labels. (H-15-7)”*

Appendix E:



To: President-elect Donald J. Trump Transition Team
From: Mitch Bainwol, President and CEO
Date: November 10, 2016
Subject: **The Automobile Sector -- Forging Public Policy for Even Safer, Cleaner and More Transformative Mobility**

INTRODUCTION

These are heady times for the auto industry and mobility in the U.S. New vehicle sales are strong, employment is growing, safety technologies are now making it possible to prevent crashes instead of just surviving them, research is ambitious and consequential, and technological innovations are re-defining mobility as we know it. We have a keen understanding that what we do – build vehicles that move America (and the world) – is critical to public safety, ensures there is a growing economy and also helps to better protect our environment. Now more than ever, sound public policy for the automotive industry is essential not only for our sector’s continued success but for this country’s economic growth.

Sound public policy provides certainty so businesses can plan; it mitigates chaos so that rules are clear and fair and equitably enforced; it relies on a commitment to established regulatory practices like rigorous cost/benefit analysis; it provides timely and harmonized government responses both within agencies and between agencies; and it recognizes the importance of vehicle affordability for consumers as well as the corresponding efficiency and safety benefit to the traveling public.

It’s in that spirit that we reach out to your Transition Team. This memorandum has two sections. The first outlines the **context** for our industry as we head into 2017. The second offers some policy **recommendations** for the Transition team to consider as you reflect on next year.

CONTEXT

GROWTH

2015 marked an unprecedented sixth year of sales growth and an all-time record for new vehicles sales (17.5 million). 2016 could - potentially - be the seventh year of increased sales. The combination of an aging fleet (average age of a car is now 11.5 years old), coupled with attractive

incentives from manufacturers, low interest rates and longer financing terms has generated the strength of this recovery. Yet we are a cyclical industry. Accordingly, we do not view growth as an entitlement. Sustainable growth requires the development of compelling product on our part, favorable economic conditions (including healthy disposable income, readily available and inexpensive financing) and a regulatory framework that is securely grounded in common sense at both the state and federal level.

PLANTS

Since 2008, four new manufacturing plants have been launched in the U.S. and there has been substantial, multi-billion-dollar reinvestment in existing plants. New plants are located in: Greensburg, IN (Honda), West Point, GA (Kia), Blue Springs, MS (Toyota), and Chattanooga, TN (Volkswagen). Also, Volvo is slated to open its new plant in South Carolina in 2018. More broadly, over the last decade (including 2005), six manufacturing plants opened in the U.S. while one plant opened in Canada and five plants opened in Mexico. Given our highly competitive industry, plant location choices reflect trade rules, sales patterns, port and infrastructure access, and cost structure.

PRODUCT

Americans view automobiles manufactured today as significantly improved relative to a decade ago, according to the Auto Index national tracking poll conducted monthly by the Alliance. Ratings (better vs. worse) for quality (79-12), technology (93-2), safety (85-7) and fuel economy (88-3) all are up profoundly. Especially in a low gas-price context, the types of vehicles that Americans buy continues to evolve, reflecting functional lifestyle needs. As you can see below, over the past fifteen years, CUVs (Crossovers) have picked up market share from each of the other segments, with traditional passenger cars now accounting for just over 40% of new vehicle purchases.

Year	2015	2010	2005	2000
Car	43.3	48.7	45.2	50.6
CUV	30.0	24.5	12.9	3.5
Pickup	14.2	13.9	18.8	18.3
SUV	7.2	6.9	14.5	17.2
Van	5.3	5.9	8.7	10.3

For more information about the automotive industry, please visit: www.autoalliance.org/



SAFETY

From the 1970's through 2014, fatalities on the road as a share of vehicle miles traveled (VMT) fell dramatically. Viewed through the lens of a longer vantage point - the half century dating from the passage of the National Traffic and Motor Vehicle Safety Act in 1966 through 2014 - fatalities as a share of miles travelled are down about 80 percent. Yet far too many individuals are losing their lives on our roadways (35,092 in 2015). As NHTSA notes, 94% of all crashes are attributable to driver choices and human error, including impaired driving, lack of seat belt use, speeding, and distraction. Vehicle defects are a factor in less than 1% of these fatalities and our industry is working to reduce that number even more. A bright spot is the rapidly emerging technologies that mitigate human error and help save lives by preventing crashes from happening.

Still, and unfortunately, in 2015 fatalities rose 7.2%. It will take additional time for the Department of Transportation and other stakeholders to determine why this occurred. Increased VMT explains part of the rise, but that still leaves a significant part resulting from other causes, including distraction on the part of both drivers and pedestrians and potentially higher bicycle and motorcycle fatalities. Our preliminary look at the data suggests the vehicle factor share is unchanged at under 1%.

ENVIRONMENTAL

Smog-forming pollutants have been virtually eliminated from passenger cars, down over 99% since the 1960s. We are now complying with policies designed to mitigate the last 1% of these pollutants. Meanwhile, cars are far more efficient than they were even a decade ago as automakers down-weight and deploy new technologies to reduce carbon emissions. The increases in fuel economy have occurred in recent years even as the combination of low gas prices and higher conventional engine efficiency has resulted in declining market share of alternative powertrain vehicles and, as noted, growing market share of light trucks versus cars.

	2005	2012	2013	2014	2015
Adjusted Fuel Economy (MPG)	19.9	23.7	24.3	24.3	24.7 (p)
Hybrids	205,828	427,676	498,054	452,507	378,402
Hybrid %	1.21%	2.96%	3.21%	2.75%	2.18%
Plug-in Hybrid	0	38,585	48,957	55,441	43,458
Plug-in Hybrid %	0.00%	0.27%	0.32%	0.34%	0.25%
Electric	0	13,941	47,595	64,772	70,823
Electric %	0.00%	0.10%	0.31%	0.39%	0.41%
Alt Total	205,82	480,20	594,61	572,72	492,68
Total	8	7	6	2	3
Percent All Volume	1.21%	3.33%	3.83%	3.48%	2.83%

Source: Wards Auto/ EPA Trends Report for Adjusted Fuel Economy



INNOVATION

We are in the midst of an incredibly dynamic time in the history of our industry. Change and disruption is rapid; new players are entering our sector; new business collaborations are being established; and new models of mobility are emerging.

The future holds vast and diverse opportunities. We know there will be more ride sharing entrants and programs and that the traditional models of vehicle ownership are evolving. We know that new cars will take over more and more of the driving duties, ultimately achieving full autonomy, but that a majority of the fleet will not be self-driving for more than a generation. We know that technology, while not perfect, offers the promise of reducing crashes, injuries and fatalities on American roadways. With wider deployment of crash avoidance technologies, we will achieve a range of other social objectives including reduced fuel consumption, lower carbon emissions and higher productivity rates. Autonomy is destined not only for automobiles but also for large trucks and buses. And long term, autonomy will present far-reaching implications for everything from urban land use to public transportation and infrastructure requirements.

Due to the rapid change that is occurring in the auto sector, our industry has proactively established an Automotive Information Sharing and Analysis Center (Auto-ISAC) to facilitate the exchange of important cyber threat information – and countermeasures – in real time. In addition, the Alliance and our members established the consumer data Privacy Principles that apply to the collection, use, and sharing of covered information in association with vehicle technology and services available on cars and light trucks sold or leased to individual consumers for personal use in the United States.

As current NHTSA Administrator Mark Rosekind often notes, the pace of technological change in safety has far outstripped the pace of regulatory action. That’s not an indictment of the agency. Rather, it is reflection of rapid global innovation, much of it in the U.S., fueled by marketplace competition to achieve safety, social, environmental and other outcomes never before imagined.

The current Administration deserves credit for working to promote the adoption of semi-autonomous and fully autonomous technologies. The Secretary and NHTSA Administrator both understand that the benefits to society are so profound that it is vital to take an approach that maximizes the deployment rate in order to maximize safety. And both recognize that the traditional regulatory approach is less than ideal.



RECOMMENDATIONS

As the Trump Administration prepares to take office in late January, we are pleased to offer the following recommendations to consider as you develop your agenda, especially for the first 100 days.

I Harmonize and Adjust Fuel Economy and GHG Emission Standards:

The Corporate Average Fuel Economy (CAFE) and Greenhouse Gas (GHG) Emission Standards that were adopted in 2012 by the EPA, NHTSA, and the California Air Resources Board (CARB) via a Joint Final Rule pose a substantial challenge to the auto sector due to the steeper compliance requirements for Model Years (MY) 2017-2025. As part of the Mid-Term Review process that kicked off this summer with release of the Draft Technical Assessment Report (TAR), the EPA, NHTSA, CARB and the auto sector are in the process of re-evaluating the assumptions that shaped those original standards. Automakers have outlined concerns that call into question the viability of the modeling used in the draft TAR. In short, we believe the TAR over-projects technology efficiencies and inadequately accounts for consumer acceptance and marketplace realities. These market factors are absolutely critical since automakers are ultimately judged by what consumers take out of showrooms across America, rather than what automakers put into those showrooms. The combination of low gas prices and the existing fuel efficiency gains from the early years of the program is undercutting consumer willingness to buy the vehicles with more expensive alternative powertrains that are necessary for the sector to comply with the more stringent standards in out-years.

When the EPA, NHTSA and CARB established the 2012 Joint Final Rule creating “One National Program,” one primary aspect was to “harmonize” the three sets of fuel economy regulations at the federal and state level as fully as possible to provide greater consistency and certainty for automakers as they develop their products for sale across the U.S. The Administration’s 2012 Regulatory Announcement highlighted the value of harmonization: *“Continuing the National Program **ensures** that auto manufacturers can build a single fleet of U.S. vehicles that satisfy requirements of **both** federal programs as well as California’s program.”*

But significant inconsistencies continue to exist.

Since 2012, it has become increasingly clear that many automakers may be in compliance with the EPA program, yet subject to fines in the NHTSA program. This regulatory friction is already occurring, driving up vehicle costs, and will become even more counterproductive as the regulatory requirements become more stringent in future Model Years. Potentially billions of dollars in fines under the NHTSA CAFE program are anticipated.

We recommend that the White House lead efforts with EPA, NHTSA, CARB and the automakers on finding a pathway forward regarding the standards for 2022 MY and beyond prior to publishing the NPRM and preliminary determination.



We also recommend that the Trump Administration support the administrative and legislative reforms necessary to achieve harmonization. This includes approving the petition that the Auto Alliance filed with EPA and NHTSA on June 20, 2016 regarding certain harmonization gaps that exist that can be addressed administratively.

II Include Zero Emission Vehicle (ZEV) Mandate Cost in Mid-Term Review:

Under a waiver granted by EPA, California’s ZEV requirement (followed by nine other states), forces GHG-reducing solutions (heavy electrification) into the market rather than allowing the “technology-agnostic” approach that EPA and NHTSA relied upon in the One National Program. This additive ZEV requirement grows to over 15% of vehicle sales by 2025 in the ten states that together account for roughly one-third of all light-duty vehicle sales in the United States. The benefits of the ZEV program are factored into the Draft Technical Assessment Report, but the costs of the ZEV program are ignored.

And while EPA argues that substantial electrification is not required for compliance with the federal program, that point is academic if it is separately required for the ten relevant states.

We recommend that the cost of the ZEV mandate be factored into the Mid-Term Review due to the much more expensive compliance pathway that will increase costs for consumers nationally.

In addition, the 9 states that have adopted the California ZEV requirements have not provided comparable and needed incentives for consumers to be willing to purchase the highly electrified vehicles in their markets. This is leading to dramatically different consumer acceptance of electrified products in the Northeast states compared to California. The Administration should engage as appropriate to help address these ZEV issues – especially to help avoid the creation of a patchwork of requirements that will frustrate the overall intent of the “One National Program”.

III Regulatory and Organizational Reforms are Critical:

The number of government regulators (state and federal) who are interested in or currently oversee the automobile sector (U.S. DOT, NHTSA, FCC, FTC, DHS, NTIA, U.S. Department of Commerce, CFPB, EPA and California ARB) continues to grow. A robust examination of the combined impact of such uncoordinated regulatory oversight on the auto industry and the American consumer is warranted. As car prices rise, it becomes vital to look at the full cost of regulatory initiatives. Well-meaning regulatory action risks increasing compliance costs to the point that additional safety and fuel-efficiency technologies put new vehicles out of financial reach of the average new car purchaser.



To maximize affordability for all Americans, it therefore makes sense to assess a range of ideas that can lead to even more thoughtful regulatory approaches, including:

- **Comprehensive Regulatory Review.** Undertake a comprehensive review of all regulations (final and proposed), interpretations of regulations, guidance, information disseminations, information collections, that were promulgated or issued since September 1, 2016 to ensure that these are consistent with the policy objectives of the new administration.
- **Ensure that the EPA does not issue any Proposed Determination on whether the Model Year 2022-2025 Greenhouse Gas Light Duty Vehicle standards are appropriate under section 202(a) of the Clean Air Act.**
- **Establish a New OMB Requirement for “Whole Car Cost Analysis.”** To ensure that the overall health and vitality of the auto sector is not jeopardized by the cumulative costs of new vehicle regulations/policies, agency proposals for new car requirements should be accompanied by a *Whole Car Cost Impact Statement* that aggregates compliance expenses.
- **Impose a “Shot Clock” for Agency Responses to Industry Submissions/Petitions.** To encourage prompt responses to requests for regulatory actions, and prevent federal agencies and departments from sitting on such waivers and petitions that may help spur additional innovation, the timelines established in statute must be made meaningful and binding.
- **Revise OMB Guidance for Federal Agencies and Departments.** OMB ought to establish clear thresholds regarding the use of non-regulatory guidance to ensure that quasi-regulatory efforts do not circumvent the traditional rulemaking process.
- **Establish a Presidential Advisory Committee to Coordinate Auto Sector Regulators.** Such an advisory committee would help reduce regulatory friction and confusion among federal agencies and departments and could potentially result in recommendations for a new paradigm for vehicle regulation. The committee also could identify opportunities to streamline and improve the efficiency of multiple federal and state agencies by eliminating duplication of effort and more efficiently allocating responsibilities by agency area of expertise.

IV Autonomous Vehicles:

We will be filing soon a detailed response to the recent Administration proposal regarding autonomous vehicles. Our technical experts are busy at work evaluating that proposal and formulating our reaction. We will share it with you upon its submission. But the test of policy at



a conceptual level should be: how do we save the most lives by promoting the rapid deployment of these technologies while also maximizing public safety and building public support for their adoption?

SUMMARY

The future of mobility is bright and offers the long-term promise of great manufacturing jobs and mobility that increases national productivity while generating significantly improved safety and environmental outcomes. We live at a moment where technology and change are swamping the regulatory capacity to manage our emerging reality. Reform is imperative.

The question at the end of the day is what kind of reform? There will be those who argue against change and for a traditional regulatory paradigm that in effect slows down the march of technology. And there may be those who argue that public policy should stay out of the way. Neither of these choices is our view. We believe that to maximize consumer acceptance of new mobility patterns and opportunities, the public and private sectors must work in a more coordinated and cooperative fashion. It is in that spirit, and with a commitment to keeping cars safe, clean and affordable for Americans, that we offer these recommendations and our pledge to work with you to achieve the great social outcomes that are within grasp.



Appendix F:

New Legislation to Update the U.S. New Car Assessment Program

The U.S. New Car Assessment Program (NCAP) is an invaluable tool in helping to ensure Americans have the information they need in order to purchase safe vehicles that will protect them, their families and those who share the road with them. The program, celebrating its 40th anniversary, is administered by the National Highway Traffic Safety Administration (NHTSA) and provides essential safety information to consumers when purchasing a new vehicle. In addition, the program can serve as an important incentive for automakers to place the latest safety technologies into their vehicles as well as encourage them to exceed current standards. However, the NCAP must be updated in order to guarantee the effectiveness of the program as it has fallen woefully behind international counterparts in robust and comprehensive ratings of vehicle safety. While NHTSA has proposed to generally upgrade NCAP in recent years, the agency has issued no new tests for eight years. This legislation is necessary now.

A summary of critical provisions of a bill to update NCAP is below:

Title: Stars on Cars Act of 2019

Rulemaking: Directs NHTSA to complete rulemaking within two years of enactment to improve NCAP. The update shall include the following upgrades:

Advanced Driver Assistance Systems: Require that currently available technologies that have already been proven to have substantial safety benefits are included in the NCAP ratings to further facilitate their widespread dissemination into new vehicles. Research conducted by the Insurance Institute for Highway Safety (IIHS) has demonstrated that current advanced driver assistance systems (ADAS) such as Automatic Emergency Braking (AEB), Lane Departure Warning (LDW), Blind Spot Detection (BSD) and Rear Automatic Braking have safety benefits by reducing crashes. The National Transportation Safety Board (NTSB) has recommended that forward collision avoidance systems such as AEB be included in the NCAP ratings.

Crash Testing:

- Direct NHTSA to adopt, as appropriate, updated dummies in crash tests conducted as part of NCAP to ensure that the tests are accurately capturing the injuries and risk of injury observed in today's vehicles. Additionally, direct NHTSA to use, as appropriate, dummies representing different age groups placed in the rear seats of vehicles during crash testing to better assess the performance of vehicles in protecting occupants in the rear seats of vehicles.

- Require NHTSA to develop testing methods and injury and performance criteria for use in NCAP to ensure that the failure of seatbacks in rear impact crashes do not increase injury risk for rear seat occupants while at the same time offering optimal protection for front seat occupants.

- Require NCAP to include crash tests, similar to those already conducted by Euro NCAP, which address additional crash modes beyond current U.S. NCAP requirements, including additional tests for adult and child occupant protection.

Vulnerable Road User Safety: Require that safety ratings include whether the vehicle is equipped with pedestrian crash avoidance systems and their relative performance, and is designed to reduce injuries to pedestrians, bicyclists, children and other vulnerable road users particularly those resulting from head and leg impacts against a vehicle’s stiff hood, windshield or bumper. The NTSB recommended such action in a 2018 special investigation report on pedestrian safety.

“Silver Rating”: Require NHTSA to include a rating using modified injury criteria to address the specific injury patterns suffered by older occupants. Results of these tests would be used to develop a separate rating specific to older occupants. Also require NHTSA to develop an anthropomorphic test device (ATD, crash test “dummy”) representative of older occupants for use in safety testing.

Consumer Information: Direct NHTSA to improve the ease of use of NCAP public website so consumers can better access vehicle ratings.

Public Input: Require NHTSA to hold public meetings in Washington, D.C. and selected other cities biennially to allow stakeholders to provide input on needed updates to NCAP.

Roadmap: In order to keep pace with rapidly evolving vehicle safety technology and to provide clarity to all stakeholders, require NHTSA to publish a five-year roadmap detailing plans to update the program.



September 12, 2017

The Honorable John Thune, Chairman
The Honorable Bill Nelson, Ranking Member
Senate Committee on Commerce, Science, and Transportation
Washington, DC 20510

Dear Chairman Thune and Ranking Member Nelson:

Thank you for convening tomorrow's important hearing, "Transportation Innovation: Automated Trucks and our Nation's Highways." We are pleased that the Committee is considering the role of autonomous commercial motor vehicles (ACMVs) and urge you to adopt a strong regulatory framework for their development and deployment. We respectfully request that this letter be included in the hearing record.

Advocates for Highway and Auto Safety (Advocates) supports the development of automated vehicle technology because it has the potential to significantly reduce crashes, including those involving large trucks and buses. Advancing proven technological solutions is especially critical given that truck crashes have skyrocketed in recent years. In 2015, 4,067 people were killed in crashes involving large trucks. This is an increase of more than 4 percent from the previous year and a 20 percent increase from 2009. Additionally, in 2015, 116,000 people were injured in crashes involving large trucks. This is the highest number of injuries since 2004. Since 2009 there has been a 57 percent increase in the number of people injured in large truck crashes. Moreover, in fatal two-vehicle crashes between a large truck and a passenger motor vehicle, 97 percent of the fatalities were occupants of the passenger vehicle. It is clear that this is a serious and growing public health problem that merits urgent attention.

While Advocates sees great potential for fully autonomous vehicles, including CMVs, to be the catalyst for meaningful and lasting reductions in deaths and injuries, in the interim there are many effective technologies that could be implemented immediately. In 2015, Advocates filed a petition with the National Highway Traffic Safety Administration (NHTSA) seeking the issuance of a rule to require forward collision avoidance and mitigation braking systems (F-CAM), also known as automatic emergency braking (AEB), on trucks and buses with a gross vehicle weight rating (GVWR) of 10,000 pounds or more. The agency granted the petition in October of that year but, nearly two years later, no further regulatory action has been taken despite studies showing the potential to significantly reduce crashes, deaths and injuries. The agency should be required to expeditiously issue this rule.

Additionally, Advocates has consistently supported the use of speed limiting devices for CMVs because high speed crashes involving CMVs are far more deadly than those that occur at lower speeds. As such, Advocates filed comments with the Federal Motor Carrier Safety Administration (FMCSA) and NHTSA urging that the devices, already installed on most CMVs, be turned on and set at a safe speed. These technologies are readily available and could be saving lives now if they were standard on every truck. Again, this is another truck safety rule that is needlessly languishing at the DOT. Both AEB and speed limiter technologies are already required as mandatory equipment on commercial vehicles in Europe. In fact, speed limiting technology has been required in the European Union for over two decades and AEB since 2012. The European Union is far ahead in providing a safer operating environment for CMVs, while the U.S. lags behind as deaths in truck-involved crashes skyrocket.

The emergence of experimental ACMVs and their interactions for the foreseeable future with conventional motor vehicles demand an enhanced level of federal and state oversight to ensure public safety. It is imperative that CMVs be regulated. If not, the development and deployment of ACMVs will be subject to the ineffective and unenforceable voluntary guidelines developed by NHTSA for new vehicles. Moreover, the FMCSA has not even issued voluntary guidelines for the operating rules to govern the safety of ACMVs once on the road. The lack of proper oversight clearly will have a negative impact on public safety. Some experts predict that automated technology will be placed in commercial vehicles before light passenger vehicles. The potential for an 80,000 pound truck using unregulated and inadequately tested technology on public roads is a very real and dangerous scenario if these vehicles are only subject to voluntary guidelines. In addition, automated passenger carrying commercial motor vehicles that have the potential to carry as many as 53 passengers will need additional comprehensive safeguards that will be unique to this mode of travel.

In order to minimize major threats to the public and ensure that ACMVs are developed and deployed safely, they must be subject to the following essential provisions:

- Each manufacturer of an ACMV must be required to submit a detailed safety assessment report that details the safety performance of automated driving systems and automated vehicles. Manufacturers should be required to promptly report to NHTSA all fatal, injury and property damage only crashes involving ACMVs.
- ACMVs that do not comply with Federal Motor Vehicle Safety Standards (FMVSS) should not be sold and they should not be subject to exemptions. Sales of CMVs in the United States do not nearly equal passenger vehicle sales and therefore exempting large numbers of CMVs from FMVSS is unnecessary for the development of ACMVs and will result in a potentially significant and unnecessary threat to public safety.
- NHTSA must require that manufacturers of ACMVs meet a “functional safety standard” to guarantee the safety of ACMVs. This is a well-known process by which a product is tested to ensure that, as a whole, it will function safely and will prevent or mitigate defects or misuse which could lead to unsafe conditions.
- Any safety defect involving the ACMV must be remedied before the ACMV is permitted to return to operation. The potential for defects to infect an entire fleet is heightened with AV technology. Therefore, manufacturers should be required to promptly determine if a defect affects an entire fleet. Those defects that are fleet-wide should result in an immediate suspension of operation of the entire fleet until the defect is remedied.
- ACMVs must be required to meet a minimum cybersecurity standard that should be issued by the Secretary within 3 years of enactment of the legislation.
- The Secretary should be required to establish a database for ACMVs that includes such information as the vehicle’s identification number; manufacturer, make, model and trim information; the level of automation of each automated driving system with which the vehicle is equipped; the operational design domain of each automated driving system with which the vehicle is equipped; and the federal motor vehicle safety standard or standards, if any, from which the vehicle has been exempted.
- In the near term, rulemakings should be considered for elements of ACMVs that may require performance standards including human machine interface, sensors and actuators and the need for software and cybersecurity standards. Standards for ACMVs should be required to be issued by specific deadlines set by Congress and before there is large scale deployment.

- Manufacturers of ACMVs should be required to have in place a privacy plan before an ACMV is sold.
- For the foreseeable future, regardless of their level of automation, ACMVs must have an operator with a valid commercial driver's license in the vehicle at all times. Drivers will need to be alert to monitor not only the standard operations of the truck but also the automated system. Therefore, the Secretary must issue a standard for driver engagement. In addition, critical safety regulations administered by FMCSA such as those that apply to driver hours-of-service, licensing requirements, entry level training and medical qualifications must not be weakened.
- Motor carriers using ACMVs should be required to apply for additional operating authority.
- Drivers operating an ACMV must have an additional endorsement on their CDL to ensure they have been properly trained to monitor and understand the operating design domain of the vehicle and, if need be, to operate an ACMV. This training should include a minimum number of hours of the behind-the-wheel training.
- FMCSA must consider the additional measures that will be needed to ensure that ACMVs respond to state and local law enforcement authorities and requirements, and what measures must be taken to properly evaluate an ACMV during roadside inspections. In particular, the safety impacts on passenger vehicle traffic of several large ACMVs platooning on roads and highways should be assessed.
- NHTSA should be given imminent hazard authority to protect against potentially widespread catastrophic defects with ACMVs, and criminal penalties to ensure manufacturers do not willfully and knowingly put defective ACMVs into the marketplace.
- NHTSA and FMCSA must be given additional resources, funding and personnel, in order to meet demands being placed on the agency due to the advent of AV technology.

Without these necessary safety protections, truck drivers and those with whom they share the road are at risk. Advocates has always been a champion for technology and the advent of AV technology is no different. However, allowing technology to be deployed without adequate testing, oversight, and safety standards is a direct threat to the motoring public which is exacerbated by the sheer size and weights of large commercial motor vehicles. We look forward to working with the Committee to address these important issues and advance legislation that provides for the safe development and deployment of lifesaving technologies.

Sincerely,

Jacqueline Gillan
President

Catherine Chase
Vice President of Governmental Affairs