

**U.S. House of Representatives**

**Committee on Energy & Commerce**

**Subcommittee on Innovation, Data, and Commerce**

**Hearing on “Economic Danger Zone: How America Competes to Win the Future Versus  
China”**

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*Testimony of Jeff Farrah, Executive Director of the Autonomous Vehicle Industry  
Association*

### *Summary of Testimony*

Today, the United States is leading the world in the development and deployment of autonomous vehicles (“AVs”). By removing opportunities for human error, AVs are positioned to help significantly reduce roadway crashes and deaths at a time when both are at near record highs. The adoption of AVs will also expand transportation access to those who are unable to drive—like elderly individuals or individuals experiencing physical challenges—and will increase job access for millions of mobility- or transportation-challenged individuals, letting them participate in the economy in ways they could not before.

Autonomous vehicles are an American invention, with American AV developers pioneering the technology and American entrepreneurs investing in and building innovative AV companies across the country. However, American leadership in the AV industry is not guaranteed. Across the globe, other nations are seeking to take the lead in AV development by building out regulatory frameworks for widespread AV deployments and providing government support for AV developers as they put their vehicles on the road. The Chinese government, in particular, has prioritized and supported AV development through legislative and regulatory actions for years, and this support is helping to produce autonomous vehicle companies.

Losing ground on the deployment of this technology risks cutting the United States out of the safety, accessibility, economic, and job-creating benefits of a prosperous AV industry. The United States can maintain its lead in AV technology by creating a national policy framework that prioritizes American leadership and has Congress, the U.S. Department of Transportation, and the private sector acting in partnership to support the deployment of AVs and ensure that the safety, economic, mobility, and efficiency benefits of AVs can be felt not only in the states where AVs are already on the road, but nationwide.

*Testimony of Jeff Farrah, Executive Director of the Autonomous Vehicle Industry Association*

**I. Introduction**

Chairman Bilirakis, Ranking Member Schakowsky, distinguished members of the Subcommittee, it is my honor to testify before you today. My name is Jeff Farrah, and I am privileged to lead the Autonomous Vehicle Industry Association as its Executive Director. Our industry appreciates the strong engagement of members of this committee on autonomous vehicle policy.

The Autonomous Vehicle Industry Association (“AVIA”) is the unified voice of the autonomous vehicle (“AV”) industry<sup>1</sup> and we represent the world’s leading technology, trucking, ridesharing, automotive, and transportation companies. The cross-section of companies demonstrates the widespread interest in developing AV technology across industries. Our mission is to bring the tremendous safety and mobility benefits of AVs—otherwise known as SAE Levels 4- and 5-capable vehicles—to consumers in a safe, responsible, and expeditious manner.<sup>2</sup>

The automation of driving has been an aspiration for decades, and for years many questioned *when* autonomous vehicles would be on America’s roads. Today, we can proudly answer *they are here now*, with applications ranging from autonomous ride-hailing and trucking to delivery vehicles and shuttles, operating in states as diverse as Arizona, Arkansas, California,

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<sup>1</sup> Our members include: Apple, Aurora, Cavue, Cruise, Embark, Ford, Gatik, Kodiak, Lyft, May Mobility, Motional, Navya, Nuro, TuSimple, Uber, Volkswagen Group of America, Volvo, Waabi, Waymo, and Zoox. See *Our Mission and Members*, AVIA, <https://theavindustry.org/about/mission>.

<sup>2</sup> SAE’s J3016 standards have been adopted industry wide. Level 2 systems (often called advanced driver assistance systems or “ADAS”) are available on vehicles today and are capable of “partial driving automation,” requiring human supervision at all times. Level 3 vehicles have “conditional driving automation,” where the vehicle requires human interaction only in specific situations. Only Level 3, 4, and 5 vehicles are equipped with automated driving systems (“ADS”). See *Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles – J3016\_202104*, SAE International, [https://www.sae.org/standards/content/j3016\\_202104/](https://www.sae.org/standards/content/j3016_202104/) (last visited Jan. 30, 2023).

Florida, Michigan, Texas, and others. In these states, vehicles equipped with an “automated driving system,” or “ADS,” are making driving decisions, navigating roads, carrying passengers, and hauling freight all without the need for ongoing human input.

It is critical to distinguish autonomous vehicles from vehicles equipped with technology that helps licensed humans drive better. This “driver-assistance technology”—which we see in tens of millions of cars and trucks all around us—is important and helpful, but it is not *autonomous* driving. Rather, the term “autonomous vehicle,” or “AV,” indicates that the vehicle is capable of driving on its own, without relying on or having any expectation that a human will take back control. With an AV, the vehicle performs *all* aspects of the driving task on a sustained basis. This is the technology that is being developed by AVIA’s members, and it will transform the way people and goods move in the world.

The ongoing deployment of AVs is beginning to show us how the adoption of autonomous vehicles will benefit the public in many ways. Of paramount importance is the ability of AVs to make us safer. AVs do not speed, they do not text, and they do not drive drunk or fatigued. Sadly, human drivers do all those things, contributing to a 16-year high in road deaths in 2021, when over 42,000 Americans died on our roads, an 11% increase over the year before.<sup>3</sup> The National Highway Traffic Safety Administration’s (“NHTSA”) early estimates for the first three quarters of 2022 fortunately signal a slight decline in road deaths—a .2% decrease as compared to the same time in 2021—for the first time since 2020, but those same numbers indicate increases in deaths among

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<sup>3</sup> NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP’T OF TRANSP., DOT HS 813 298, EARLY ESTIMATES OF MOTOR VEHICLE TRAFFIC FATALITIES AND FATALITY RATE BY SUB-CATEGORIES IN 2021, 1 (2022), <https://www.nhtsa.gov/press-releases/early-estimate-2021-traffic-fatalities>.

cyclists, motorcyclists, and pedestrians.<sup>4</sup> The 2022 numbers also show a 12% increase in deaths on rural roads and a 10% increase in fatalities from crashes involving at least one large truck.<sup>5</sup>

One fact has been confirmed and re-confirmed several times over: human behavior is overwhelmingly the most common factor in fatal accidents on our roads. A recent study by NHTSA found that over 55% of all people injured or killed in a roadway incident tested positive for drugs or alcohol.<sup>6</sup> Drivers are also frequently distracted by electronics; at any given time, almost 3% of all drivers are looking at or using their handheld device.<sup>7</sup> Though it is intuitive to begin with, studies have also found that drivers manipulating cell phones are two to six times more at risk of a crash.<sup>8</sup> Several categories of behavior-related fatalities have increased in the past few years, including police-reported alcohol-involved crashes and deaths of unrestrained passengers.<sup>9</sup>

AVs are positioned to combat the trend of unsafe driving that has persisted for years on U.S. roads. AVs have unprecedented visibility of the world and lanes around them as a result of the multiple technologies they employ—like LiDAR, radar, and cameras—that all work together to inform the ADS, which is the brain that drives the vehicle. The combination of these systems leads to quicker decisions with many more inputs compared to a human driver’s capabilities. By combining multiple sensors, AVs also have a 360-degree field of vision which can detect, track, and react to objects and people even when they are hidden from human perception due to vehicles,

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<sup>4</sup> NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP’T OF TRANSP., DOT HS 813 406, EARLY ESTIMATE OF MOTOR VEHICLE TRAFFIC FATALITIES FOR THE FIRST 9 MONTHS (JANUARY-SEPTEMBER) OF 2022, 1 (2022), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813406>.

<sup>5</sup> *Id.*

<sup>6</sup> NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP’T OF TRANSP., DOT HS 813 399, ALCOHOL AND DRUG PREVALENCE AMONG SERIOUSLY OR FATALLY INJURED ROAD USERS, 2 (2022), [https://rosap.ntl.bts.gov/view/dot/65623/dot\\_65623\\_DS1.pdf](https://rosap.ntl.bts.gov/view/dot/65623/dot_65623_DS1.pdf).

<sup>7</sup> NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP’T OF TRANSP., DOT HS 813 184, DRIVER ELECTRONIC DEVICE USE IN 2020, 1 (2021), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813184.pdf>.

<sup>8</sup> *Distracted driving*, IIHS, <https://www.iihs.org/topics/distracted-driving> (last visited Jan. 30, 2023).

<sup>9</sup> NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP’T OF TRANSP., DOT HS 813 298, EARLY ESTIMATES OF MOTOR VEHICLE TRAFFIC FATALITIES AND FATALITY RATE BY SUB-CATEGORIES IN 2021, 1 (2022), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813298>.

buildings, and other obstructions. I was recently outside Dallas, Texas riding in autonomous trucks, and it is amazing to witness these vehicles navigate oncoming freeway traffic that a human could never see.

The adoption of AVs will also bring new mobility benefits to those who are unable to drive—like elderly individuals and individuals experiencing physical challenges—by providing greater access to transportation. By expanding transportation access, AVs can also increase job access for millions of mobility or transportation-challenged individuals, allowing them to participate in the economy in ways they could not before. Additionally, AVs can create new job opportunities for individuals with a wide range of educational backgrounds and experiences. Further, by bringing goods directly to consumers and optimizing the transportation of freight, AVs can ease the ongoing supply chain crisis. They can also deliver environmental benefits, as smoother driving reduces emissions and fuel consumption.

## **II. American Leadership on Autonomous Vehicles is Needed**

Today, the United States is the global leader in the AV industry, with a robust ecosystem of American companies working on all aspects and applications of the technology. However, the United States must not assume it will win the global AV race and sustain its leadership position in a market potentially worth multiple trillions of dollars.<sup>10</sup> Rather, to ensure we will continue to lead on AV development and deployment in the future, we must get three things right: technology development; capital investment; and public policy.

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<sup>10</sup> SONIA ABHAY, ALLIED MARKET RESEARCH, AUTONOMOUS VEHICLE MARKET BY LEVEL OF AUTOMATION (LEVEL 1, LEVEL 2, LEVEL 3, LEVEL 4, AND LEVEL 5), APPLICATION (CIVIL, DEFENSE, TRANSPORTATION & LOGISTICS, AND CONSTRUCTION), DRIVE TYPE (SEMI-AUTONOMOUS AND FULLY AUTONOMOUS), AND VEHICLE TYPE (PASSENGER CAR AND COMMERCIAL VEHICLE): GLOBAL OPPORTUNITY ANALYSIS AND INDUSTRY FORECAST, 2021-2030 (2022), <https://www.alliedmarketresearch.com/autonomous-vehicle-market>; TECONOMY PARTNERS, FOREFRONT: SECURING PITTSBURGH'S BREAK-OUT POSITION IN AUTONOMOUS MOBILE SYSTEMS ES-1-2 (2021), <https://ridc.org/wp-content/uploads/2021/10/PGH-Autonomy-Report-Executive-Summary.pdf>.

The United States is leading in the first two categories. AVs are an American invention. Many of the leading voices in AV development today participated in Defense Advanced Research Projects Agency (“DARPA”)-sponsored challenges in the early 2000s. These pioneers used their technical prowess to become entrepreneurs, building dynamic companies across the United States—leading to an explosion in AV development over the last decade. American AV companies have developed the most advanced ADS to date, and billions have been invested in innovative AV companies, ranging from dogged startups to more established players with experience scaling in the transportation sector.

But the unfortunate truth is that the United States is at severe risk of falling behind the rest of the world on AV public policy, which could deny Americans the technology’s lifesaving, mobility, and efficiency benefits, while also harming the United States’ global economic competitiveness.

China looms as a major potential competitor to the United States for leadership in the AV industry. As discussed in detail below, the Chinese government has prioritized and supported AV development through legislative and regulatory actions since at least 2015, when the Made in China 2025 strategic initiative identified AVs as a key area of focus.<sup>11</sup> As China looks to the mass commercialization of AVs, a growing number of local governments are authorizing AV operation and driverless ride-hailing services. All of this government-backed support is helping to produce autonomous vehicle companies. Let me be clear: our industry is not asking that the United States approach AVs in the same way as the Chinese government. But we must recognize that the Chinese

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<sup>11</sup> Anjani Trivedi, *China Sets the Rules of the Road*, WASH. POST (Oct. 12, 2022, 6:31 PM), [https://www.washingtonpost.com/business/china-sets-the-rules-of-the-road/2022/10/11/db25bdda-49b0-11ed-8153-96ee97b218d2\\_story.html](https://www.washingtonpost.com/business/china-sets-the-rules-of-the-road/2022/10/11/db25bdda-49b0-11ed-8153-96ee97b218d2_story.html).

government takes AV development seriously and is determined to be a world leader in this transformational technology, as China is in several other technologies.

China's focus on advancement in this space should be alarming, as no American policymaker should want to see a world where China dominates the AV market. This scenario presents immense national security challenges and would also mean the United States would not see much of the job creation from a prosperous AV industry.

This international competition is happening at an inflection point for the American AV industry, as the technology is now being commercialized and the benefits of AVs are beginning to accrue. Now is the time for policymakers to establish a national policy framework that prioritizes American leadership and has Congress, the U.S. Department of Transportation, and the private sector acting in partnership. While federal efforts to establish such a framework have stalled in the last several years, twenty-two (22) states have recognized the benefits of AVs by expressly approving AV deployment on their roads. A state-by-state approach is certainly suboptimal, but it has become a necessary path forward for the AV industry to deploy our life-saving technology in the absence of federal action. Below I lay out in detail policy recommendations that would form such a federal framework. Our industry has greatly appreciated the leadership of members of this Committee on bipartisan AV legislation in the past and looks forward to working with you again this Congress as legislation moves and agencies take action. Such actions would send a strong message that our country is determined to be the global leader on the next great technological change in the world.

Make no mistake: the United States can lead the way on autonomous vehicles. But we must clear the path to safe commercialization and do so with urgency. Our country has been the global innovation leader for decades, but we cannot assume that we will continue to lead on AVs in the

absence of federal action. The United States must commit itself to AV leadership to ensure that the safety, economic, mobility, and efficiency benefits of AVs can be felt not only in the states where AVs are already on the road, but nationwide.

### **III. Competition on AV Leadership from Abroad**

America's leadership role is integral to securing the economic growth, job creation, and many safety and societal benefits offered by AVs. It is important that policymakers understand the considerable foreign competition, including from China, Europe, and Japan, that is faced by the United States.

**China.** China's government has invested heavily in the development of autonomous vehicles in recent years as part of its strategy to overtake and replace foreign market leaders, leading to projections that China's share of the autonomous vehicle market will be worth approximately 50% of the market's overall estimated value by 2025.<sup>12</sup> Reflecting China's investment in AVs, the Chinese government issued a joint strategy in 2020 prioritizing AV development and establishing goals for the large-scale production of AVs by 2025, calling for at least 20% of all new vehicles sales to have SAE Level 4 capabilities by 2030.<sup>13</sup> In 2022, China's Ministry of Transportation released rules in an effort to commercialize driverless mobility.<sup>14</sup> Meanwhile, eight major cities in China currently allow testing of driverless ride-hailing services, and multiple AV companies have obtained permits in these cities to operate autonomous taxis.<sup>15</sup> One company, AutoX, backed by e-commerce giant Alibaba, announced the launch of autonomous

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<sup>12</sup> See Anjani Trivedi, *China Sets the Rules of the Road*, WASH. POST (Oct. 12, 2022, 6:31 PM), [https://www.washingtonpost.com/business/china-sets-the-rules-of-the-road/2022/10/11/db25bdda-49b0-11ed-8153-96ee97b218d2\\_story.html](https://www.washingtonpost.com/business/china-sets-the-rules-of-the-road/2022/10/11/db25bdda-49b0-11ed-8153-96ee97b218d2_story.html).

<sup>13</sup> Takashi Kawakami & Naoshige Shimizu, *China's self-driving car push hits legal and cost roadblocks*, NIKKEI ASIA (Jan. 19, 2023), <https://asia.nikkei.com/Business/Automobiles/China-s-self-driving-car-push-hits-legal-and-cost-roadblocks>.

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

taxis on public roads across an area three times the size of Manhattan within Shenzhen in January 2021.<sup>16</sup> Apollo Go, backed by China’s leading search engine, Baidu, began publicly testing its robotaxis in Shanghai in September 2021.<sup>17</sup> According to Baidu, one million rides have already been completed since it rolled out the service, and it plans to expand into dozens of other Chinese cities by 2030.<sup>18</sup> Most recently, Baidu expanded its driverless ride-hailing services to public roads in Beijing in April 2022, where another China-based AV company, Pony.ai, also deploys driverless robotaxis.<sup>19</sup> Many other Chinese companies are investing in AV technology and testing, including Huawei, WeRide.ai, Didi Chuxing, and Momenta. Further, these companies are attracting investment from other countries around the world. The Chinese AV industry has seen some fluctuation as well, with total investments in 2022 at around \$3 billion, a figure that was significantly smaller compared to 2021 investments.<sup>20</sup>

***European Union (“EU”).*** In August 2022, the European Commission issued the first EU-wide safety regulations for the automated driving systems of “fully automated” vehicles, enabling EU-wide approvals for commercial deployment of vehicles with these systems.<sup>21</sup> This marked the first multinational safety regulation for fully automated vehicles and provided added certainty to the AV industry but also a significant competitive advantage for the region.

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<sup>16</sup> Rita Liao, *China’s Robotaxis Charged Ahead in 2021*, TECHCRUNCH (Jan. 14, 2022, 8:20 AM), <https://techcrunch.com/2022/01/14/2021-robotaxi-china/>.

<sup>17</sup> Rebecca Bellan, *Chinese Tech Giant Baidu Begins Publicly Testing Apollo Go Robotaxis in Shanghai*, TECHCRUNCH (Sept. 14, 2021, 1:24 AM), <https://techcrunch.com/2021/09/13/chinese-tech-giant-baidu-begins-publicly-testing-apollo-go-robotaxis-in-shanghai/>.

<sup>18</sup> *Robotaxis are taking over China’s roads. Here’s how they stack up to the old-fashioned version*, CBS NEWS (Aug. 18, 2022), <https://www.cbsnews.com/news/china-robotaxis-self-driving-cabs-taking-over-cbs-test-ride/>.

<sup>19</sup> Rebecca Bella, *Baidu, Pony.AI Win First Driverless Robotaxi Permits in China*, TECHCRUNCH (Apr. 27, 2022, 11:21 PM), <https://techcrunch.com/2022/04/27/baidu-pony-ai-win-first-driverless-robotaxi-permits-in-china/>.

<sup>20</sup> *Id.*

<sup>21</sup> Commission Implementing Regulation 2022/1426 of Aug. 5 2022, Laying Down Rules for the Application of Regulation (EU) 2019/2144 of the European Parliament and of the Council as Regards Uniform Procedures and Technical Specifications for the Type-Approval of the Automated Driving System (ADS) of Fully Automated Vehicles, 2022 O.J. (L 221).

**Germany.** In February 2022, the German federal government adopted a domestic regulation for the operation of motor vehicles with automated and autonomous driving functions, which completes the national legal framework for autonomous driving.<sup>22</sup> Reflective of the German government’s support for AVs, companies like Mobileye are already testing vehicles in German cities such as Munich.<sup>23</sup>

**France.** In September 2022, the French government enacted its regulatory framework for the approval, testing, and commercial operation of “fully automated” systems on public roadways across the country.<sup>24</sup>

**United Kingdom (“UK”).** In August 2022, the UK government announced its intention to establish a full legislative and regulatory framework by 2025 to enable the safe, commercial operation of AVs on UK roads.<sup>25</sup> The country has invested £200 million into British AV startups, and AV testing is already underway across the country with backing from the UK government, universities, technology companies, and research institutions.

**Japan.** Japan plans to incorporate SAE Level 4 autonomous driving into its traffic law in April of this year.<sup>26</sup> This is the latest step in Japan’s demonstrated support for AVs, following

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<sup>22</sup> German Fed. Ministry for Digital Affairs and Transport, *Federal Cabinet Passes Regulation on Autonomous Driving* (February 23, 2022), <https://bmdv.bund.de/SharedDocs/DE/Pressemitteilungen/2022/008-wissing-verordnung-zum-autonomen-fahren.html>.

<sup>23</sup> Kyle Hyatt, *Intel’s Mobileye Goes for an Autonomous Spin Around Munich*, CNET: ROADSHOW (Dec. 15, 2020, 5:00 AM), <https://www.cnet.com/roadshow/news/mobileye-self-driving-munich-demonstration/>.

<sup>24</sup> Décret 2021-873 du 29, 2021 portant application de l’ordonnance n° 2021-443 du 14 avril 2021 relative au régime de responsabilité pénale applicable en cas de circulation d’un véhicule à délégation de conduite et à ses conditions d’utilisation [decree 2021-873 of June 29, 2021 implementing Ordinance No. 2021-443 of 14, April 2021 on the responsibility regime applicable in case of circulation of a vehicle equipped with an automated driving system and its conditions of use], [https://www.ecologie.gouv.fr/sites/default/files/DGITM-communication-decret-arretes\\_septembre\\_2022-EN.pdf](https://www.ecologie.gouv.fr/sites/default/files/DGITM-communication-decret-arretes_septembre_2022-EN.pdf).

<sup>25</sup> Ryan Morrison, *UK Government 2025 Driverless Cars Target “Ambitious and Achievable,”* TECH MONITOR (August 19, 2022), <https://techmonitor.ai/leadership/governance/driverless-cars-uk-government-autonomous-vehicles>.

<sup>26</sup> Graham Hope, *Japan to Greenlight Self-Driving Vehicles in 2023*, IOT WORLD TODAY (November 3, 2022), <https://www.iotworldtoday.com/transportation-logistics/japan-to-greenlight-self-driving-vehicles-in-2023>.

Japan's enactment of a Road Transport Vehicle law in 2020 recognizing AVs and establishing a related inspection regime and permit system.<sup>27</sup>

#### **IV. The United States Risks Losing Out on the Economic Benefits of AVs**

The United States risks ceding vast economic benefits if it falls behind countries like China in the race to AV deployment. In the United States, the AV industry has created new jobs and brought new investment, tax revenue, resources, and human capital to states across the country, including California, Alabama, Arizona, Arkansas, Kansas, Nevada, New Mexico, Oklahoma, Pennsylvania, Michigan, Florida, Washington, Colorado, and Texas. These benefits are already being felt at local levels, with a study performed for the Pittsburgh-based Regional Industrial Development Corporation finding that in the Pittsburgh region alone, the AV industry has created 6,300 new jobs.<sup>28</sup> In California, the introduction of AV trucking is anticipated to create 2,400 jobs and increase the state's real GDP and welfare by at least \$6 billion a year.<sup>29</sup> By 2050, the value of public and consumer benefits of AV deployment, including reduced congestion, avoided accidents, and saved time, could add up to \$796 billion annually.<sup>30</sup> The further development of the AV industry can help grow the U.S. economy and support the economic competitiveness of American businesses, allowing them to capitalize on the strength and breadth of American innovation in the

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<sup>27</sup> Kazuhiro Ogawa, *Japan Revamps Laws to put Self-driving Cars on Roads*, NIKKEI ASIA (Mar. 9, 2019), <https://asia.nikkei.com/Politics/Japan-revamps-laws-to-put-self-driving-cars-on-roads>.

<sup>28</sup> TECONOMY PARTNERS, *FOREFRONT: SECURING PITTSBURGH'S BREAK-OUT POSITION IN AUTONOMOUS MOBILE SYSTEMS ES-1-2* (2021), <https://ridc.org/wp-content/uploads/2021/10/PGH-Autonomy-Report-Executive-Summary.pdf>.

<sup>29</sup> *Autonomous long-haul trucking stands to grow the Golden State's economy while creating jobs and raising wages without mass driver layoffs*, SILICON VALLEY LEADERSHIP GROUP (Apr. 13, 2022), <https://www.svlg.org/study-shows-autonomous-trucking-will-grow-californias-economy/>.

<sup>30</sup> *SECURING AMERICA'S FUTURE ENERGY, AMERICA'S WORKFORCE AND THE SELF-DRIVING FUTURE*, SECURING AMERICA'S FUTURE ENERGY 9 (June 2018), [https://avworkforce.secureenergy.org/wp-content/uploads/2018/06/SAFE\\_AV\\_Policy\\_Brief.pdf](https://avworkforce.secureenergy.org/wp-content/uploads/2018/06/SAFE_AV_Policy_Brief.pdf).

industry. Simply put, policies that support the deployment of AVs are policies that support the growth of the U.S. economy.<sup>31</sup>

#### A. Job Expansion in the AV Industry

Across the United States, the AV industry is creating jobs and providing opportunities for workers with a wide array of expertise and educational backgrounds, including many jobs that do not require a college degree. AV developers and manufacturers are hiring auto technicians, fleet managers, safety operations specialists, sensor calibrators, transportation planners, engineers, and many others to serve the growing needs of their vehicle fleets. As the industry continues to expand, delivery workers, and grocery store employees will be involved in selecting, packing, and delivering goods to consumers, among other jobs and roles that will emerge. The deployment of AVs can expand access to affordable delivery while also creating over three million new jobs by 2035, as retailers and delivery providers expand their services, according to a study conducted by Steer.<sup>32</sup>

Today, the AV industry is investing in partnerships to create the jobs of tomorrow. These investments not only move AV technology forward, but also prepare the American workforce to compete globally with our adversaries. For example, AVIA member Nuro has developed a program with De Anza Community College that will offer a new career pathway to prepare the next generation of autonomous fleet technicians.<sup>33</sup> The initiative, which will include more locations in the near future, includes a free tuition option, access to paid internships and part time

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<sup>31</sup> Jack Caporal, William O’Neil, and Sean Arrieta-Kenna, *Bridging the Divide: Autonomous Vehicles and the Automobile Industry*, CSIS (Apr. 14, 2021), <https://www.csis.org/analysis/bridging-divide-autonomous-vehicles-and-automobile-industry>.

<sup>32</sup> STEER, ECONOMIC IMPACTS OF AUTONOMOUS DELIVERY SERVICES IN THE U.S. xi (2020), [https://www.steergroup.com/sites/default/files/2020-09/200910\\_%20Nuro\\_Final\\_Report\\_Public.pdf](https://www.steergroup.com/sites/default/files/2020-09/200910_%20Nuro_Final_Report_Public.pdf).

<sup>33</sup> *Autonomous and Electric Vehicle Technician Pathway*, DE ANZA COLLEGE, <https://www.deanza.edu/autotech/av#:~:text=A%20New%20Career%20Pathway%20With,nation%20%E2%80%94%20for%20De%20Anza%20students> (last visited Jan. 30, 2023).

work, and preference for full time jobs with and benefits upon graduation. Similarly, AVIA member Aurora has partnered with Pittsburgh Technical College to create and launch a new associate degree program that trains autonomous service engineer technicians.<sup>34</sup>

### *B. Consumer Savings*

AVs are positioned to reduce both the general costs of transportation and the costs of consumer goods. With respect to transportation costs—which amount to the second-largest expense for most households—AVs could reduce average household costs by as much as \$5,600 per year when consumers rely on shared fleets of AVs.<sup>35</sup> When used for consumer deliveries, for example, AVs have the potential to dramatically reduce costs to consumers, with some pilots costing only \$5.95 per grocery delivery, compared to added costs of between \$10 and \$20 charged by existing delivery services.<sup>36</sup> The wider deployment of AVs for consumer deliveries and personal transportation would be particularly impactful in food deserts, rural communities, and other areas that do not have significant, accessible public transit options.

AV trucking is also positioned to substantially decrease the cost of goods while fundamentally improving interstate commerce by changing the manner and speed in which goods move in our country, all while making roads safer for everyone. Our country faces a shortage of nearly 78,000 truck drivers, and that figure is projected to almost double by 2031.<sup>37</sup> Given the

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<sup>34</sup> *Pittsburgh Technical College Launches Robotics and Autonomous Engineering Technology Program*, PITTSBURGH TECHNICAL COLLEGE, [https://www.pghtech.org/news-and-publications/PTC\\_Robotics](https://www.pghtech.org/news-and-publications/PTC_Robotics) (last visited Jan. 30, 2023).

<sup>35</sup> SAFE, *FOSTERING ECONOMIC OPPORTUNITY THROUGH AUTONOMOUS VEHICLE TECHNOLOGY* (July 2020) <https://safe2020.wpenginepowered.com/wp-content/uploads/2020/07/Fostering-Economic-Opportunity-through-Autonomous-Vehicle-Technology.pdf>.

<sup>36</sup> STEER, *ECONOMIC IMPACTS OF AUTONOMOUS DELIVERY SERVICES IN THE U.S.*, xi (2020), [https://www.steergroup.com/sites/default/files/2020-09/200910\\_%20Nuro\\_Final\\_Report\\_Public.pdf](https://www.steergroup.com/sites/default/files/2020-09/200910_%20Nuro_Final_Report_Public.pdf).

<sup>37</sup> *Driver Shortage Update 2022*, AMERICAN TRUCKING ASSOCIATION (Oct. 25, 2022), [https://ata.msgfocus.com/files/amf\\_highroad\\_solution/project\\_2358/ATA\\_Driver\\_Shortage\\_Report\\_2022\\_Executive\\_Summary.October22.pdf](https://ata.msgfocus.com/files/amf_highroad_solution/project_2358/ATA_Driver_Shortage_Report_2022_Executive_Summary.October22.pdf).

timeline for AV truck deployment, autonomous trucking is not likely to cause significant displacement of jobs in the trucking industry,<sup>38</sup> but it can serve as one tool to reduce strains on the supply chain caused, in part, by the longstanding truck driver shortage. Trucking is essential to the movement of goods in the United States; 65% percent of U.S. consumable goods are brought to market by trucks. Implementation of full autonomy in the trucking sector stands to decrease operating costs by about 45%—resulting in savings between \$85 billion and \$125 billion.<sup>39</sup> Additionally, a study funded by the U.S. Department of Transportation and the Federal Highway Administration indicated that adoption of AV trucking will increase total U.S. employment by 26,400 to 35,100 jobs per year on average and raise annual earnings for all U.S. workers by between \$203 and \$267 per worker per year.<sup>40</sup> The benefits to our nation’s economy, workers, and supply chains make AV trucking well positioned to complement the broader array of economic benefits that AV deployment will bring.

Preserving American leadership in the AV industry is key to ensuring the economic benefits of AV deployment reach American companies, workers, and consumers. A supportive national AV policy framework that promotes widespread AV deployment and commercialization will help secure that leadership against foreign competitors and unlock greater opportunities for American companies to test and deploy AVs safely.

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<sup>38</sup> See SECURING AMERICA’S FUTURE ENERGY, AMERICA’S WORKFORCE AND THE SELF-DRIVING FUTURE REALIZING PRODUCTIVITY GAINS AND SPURRING ECONOMIC GROWTH (June 2018), [https://avworkforce.secureenergy.org/wp-content/uploads/2018/06/Americas-Workforce-and-the-Self-Driving-Future\\_Realizing-Productivity-Gains-and-Spurring-Economic-Growth.pdf](https://avworkforce.secureenergy.org/wp-content/uploads/2018/06/Americas-Workforce-and-the-Self-Driving-Future_Realizing-Productivity-Gains-and-Spurring-Economic-Growth.pdf).

<sup>39</sup> Aisha Chottani, Greg Hastings, John Murnane, and Florian Neuhaus, *Distraction or disruption? Autonomous trucks gain ground in US logistics*, MCKINSEY & CO. (Dec. 10, 2018), <https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/distraction-or-disruption-autonomous-trucks-gain-ground-in-us-logistics>.

<sup>40</sup> ROBERT WASCHIK ET AL., JOHN A. VOLPE NAT’L TRANSP. SYS. CTR., FHWA-JPO-21-847, MACROECONOMIC IMPACTS OF AUTOMATED DRIVING SYSTEMS IN LONG-HAUL TRUCKING, 1 (2021), <https://rosap.ntl.bts.gov/view/dot/54596>.

## V. Creating a National Framework for AVs

To protect American leadership in the AV industry and maximize the benefits of AV technology, the AV industry and policymakers need to work together to establish a national framework for the safe and swift deployment of AVs in all forms. This should include actions by both Congress and the U.S. Department of Transportation to create legal and regulatory conditions that can help the AV industry thrive and bring the benefits of AVs to all Americans.

### A. Federal AV Legislation

To maintain and strengthen American leadership in the AV industry, Congress should enact federal legislation that outlines the necessary statutory and regulatory elements that are critical to the industry's success. To best support the further development of the AV industry, federal AV legislation should:

- **Preserve Existing Federal Roles with Respect to Vehicle Regulation.** The wide deployment of AVs should not change the existing federal role in regulating the design, construction, and performance of motor vehicles, as administered by NHTSA, nor the traditional federal role in the operation, licensing, inspection, repair, and maintenance of commercial vehicles (“CMV”) transporting property or passengers in interstate commerce, as administered by the Federal Motor Carrier Safety Administration (“FMCSA”). A comprehensive regulatory approach would also provide states with sufficient guidance to ensure AV regulations are uniform across the country for both commercial and passenger vehicles.
- **Reform the Exemption Process.** Companies granted exemptions from Federal Motor Vehicle Safety Standards (“FMVSS”) for novel design vehicles currently face a statutory cap of 2,500 vehicles per company per year. This restrictive model prevents industry from

scaling. Federal legislation should reform, streamline, and expand the vehicle exemption process to increase the number vehicles that can be produced under an exemption and lengthen the window in which the vehicles can be produced.<sup>41</sup> When reforming exemptions, Congress should also expand eligibility for the FAST Act’s testing and evaluation exemption to level the playing field among all stakeholders in the AV and ADS development ecosystem.<sup>42</sup>

- **Direct NHTSA to Complete Rulemakings.** Federal legislation should direct NHTSA to complete rulemakings to modernize the FMVSS to support the deployment of AV technology.
- **Codify Existing Interpretations.** To continue to provide certainty to the AV industry, federal legislation should codify existing NHTSA and FMCSA interpretations that support the deployment of AVs, including:
  - NHTSA’s interpretation that the disabling of a vehicle’s manual controls during autonomous operation does not run afoul of the “make inoperative provision” of the Motor Vehicle Safety Act (49 U.S.C. § 30122); and
  - FMCSA’s interpretation that the Federal Motor Carrier Safety Regulations (“FMCSRs”) do not require a human driver to operate or be present in a commercial motor vehicle operated by a SAE Level 4 or Level 5 ADS.

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<sup>41</sup> Expanding the cap on vehicle production under exemptions was proposed in past drafts of AV legislation. *See* BILL CANIS CONG. RSCH. SERV., R45985, ISSUES IN AUTONOMOUS VEHICLE TESTING AND DEPLOYMENT 17-18 (2021), <https://sgp.fas.org/crs/misc/R45985.pdf>.

<sup>42</sup> The FAST Act exemption, codified at 49 U.S.C. § 30112(b)(10), allows the deployment of non-FMVSS-compliant vehicles for testing purposes, but only by manufacturers who were producing FMVSS-compliant vehicles prior to the date the FAST Act was enacted in 2015. Due to this, AV developers founded after 2015 or who have not previously produced FMVSS-compliant vehicles are unable to utilize the exemption.

- **Expand Access to Mobility.** First, federal legislation should ensure that no government policy, legislation, or regulation would require individuals to obtain a license to be a passenger in an autonomous vehicle. Second, to better understand the promise of AV technology, legislation could direct studies on the economic, access, and equity impacts of AVs to better understand the technology’s promise.

*B. AV Regulation and Policy*

As federal AV legislation progresses, the Administration and the U.S. Department of Transportation can take a number of steps to help preserve American leadership in the AV industry. This includes:

- **Swiftly Update Regulations.** The U.S. Department of Transportation should swiftly update regulations to support AV deployment, starting with the implementation of existing proposed rules (*e.g.*, the rule on telltales, indicators, and warnings in ADS-equipped vehicles or the rule on crash avoidance testing for new ADS vehicle designs, both of which are currently in the prerule stage) and expanding to new enabling rules that support the deployment of ADS-equipped vehicles, including those with novel designs.
- **Establish a National Demonstration and Deployment Program.** To accelerate the path for novel design vehicles, the Administration should support, and the U.S. Department of Transportation should establish a national demonstration and deployment program for AV developers, a concept that has been proposed by NHTSA in recent years. This program would help evaluate the commercialization of AVs, including those that do not conform to all FMVSS. This program should be a streamlined, flexible supplement to traditional routes to deployment, such as the existing exemption processes and self-certification.

- **Complete the Final Rule on Safe Integration of ADS in Commercial Motor Vehicles.** FMCSA should swiftly complete a rule or series of rules that encourages AV truck developers to safely expand operations and commercialization and codifies the existing interpretation that the FMCSRs do not require a human driver to operate or be present in a commercial motor vehicle being operated by a SAE Level 4 or Level 5 ADS.
- **Pursue International Engagement.** The Administration and the U.S. Department of Transportation should preserve foreign market access and U.S. leadership in the AV industry by remaining actively engaged with other governments and international bodies about AV policymaking.

## **V. Conclusion**

Congress is well positioned to help preserve America's AV leadership through legislation that creates a national framework for the deployment and commercialization of AVs. Such a framework will help bring the safety and economic benefits of AVs to all Americans. I thank the Subcommittee for its leadership on these important issues. The Autonomous Vehicle Industry Association looks forward to serving as a resource concerning both technical and policy questions and working with you to make safe autonomous vehicles a reality for Americans nationwide.