August 1, 2024

Dr. Robert C. Hampshire, PhD
Principal Deputy Assistant Secretary for Research and Technology and
Chief Science Officer
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

RE: Opportunities and Challenges of Artificial Intelligence (AI) in Transportation [Docket No. DOT-OST-2024-0049]

Dear Dr. Hampshire:

The Alliance for Automotive Innovation ("Auto Innovators") is pleased to submit comments to the U.S. Department of Transportation's Advanced Research Projects Agency – Infrastructure ("ARPA-I") in response to its Request for Information on the potential applications of artificial intelligence in transportation. Auto Innovators appreciates that ARPA-I is seeking input from stakeholders on the impacts of artificial intelligence on various aspects of transportation and mobility per the direction of the *Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence* Executive Order.

Auto Innovators represents the manufacturers that produce most of the cars and light trucks sold in the U.S., original equipment suppliers, battery makers, technology companies, and other value chain partners within the automotive ecosystem. Representing approximately 5 percent of the country's GDP, responsible for supporting nearly 10 million jobs, and driving $1 trillion in annual economic activity, the automotive industry is the nation's largest manufacturing sector.

Auto Innovators is bullish on the profound benefits that artificial intelligence can bring to transportation generally and roadway safety specifically. While there are risks associated with the use of any technology, we remain confident that risks related to the use of artificial intelligence in transportation can be successfully mitigated and reduced. There are several existing automotive safety benefits that stem from artificial intelligence technologies. These safety benefits, and others, will become more robust and transformative over time. Such benefits have the power to help address the unnecessary and tragic loss of lives on our nation's roadways.

Auto Innovators has identified three use case examples where artificial intelligence can be transformative: infrastructure system improvement, vulnerable road user safety, and transportation equity. Auto Innovators also has three recommendations on ARPA-I's potential role with the deployment of artificial intelligence technologies.

Use Case Example 1: Improvement in Infrastructure Systems

ARPA-I can utilize artificial intelligence applications to improve the nation's surface transportation infrastructure, which would support the deployment of advanced driver assistance systems and conditionally and fully automated vehicles. Artificial intelligence can process and translate data from infrastructure-based sensors and vehicle operating environments to assist with design, construction, maintenance, and operation processes for infrastructure systems. Smarter information and better sensing can enable federal operating administrations and state transportation authorities to monitor infrastructure asset performance, a key component to preparing roadway infrastructure for advanced vehicle technologies. All road users, regardless of vehicle technology or automation level, will benefit from consistent and well-maintained lane markings, signage, and traffic control devices. Artificial intelligence can use computer vision and deep learning to process images for lane, sign, and device detection and classification in real-time. Such applications can help improve overall roadway safety.

Use Case Example 2: Safety for Vulnerable Road Users

In addition to infrastructure monitoring to help facilitate the deployment of autonomous vehicles, artificial intelligence applications can assist with vulnerable road user ("VRU") safety. Earlier this year, the Federal Highway Administration published a proposal for using digital twin technology to create "a real-time digital representation of the road environment, incorporating vehicle and VRU trajectory data, roadway geometry, and crosswalk configurations."[1] Camera or LiDAR sensors embedded in physical infrastructure could be used to accurately detect the position of vehicles and VRUs to extract trajectory information, while artificial intelligence-based distance prediction models can use historical data to predict trajectories to mitigate risk of a crash. Simulation results can feed into the safety application that interfaces with the physical twin to provide messages to drivers, VRUs, and/or roadway message boards in an effort to avoid approaching an incident. This is another example of how artificial intelligence applications can better roadway safety, and ARPA-I should conduct further research on using digital twins to protect all road users, work to standardize digital twin output, and ensure that any research results are shared with automotive companies.

Use Case Example 3: Increasing Transportation Equity

Auto Innovators also urges ARPA-I to consider the role that advanced vehicle technologies can play in advancing transportation equity and supporting underserved communities. Such technologies have the potential to provide equitable solutions to transportation challenges and to deliver resources and benefits equitably to persons with disabilities, people of color, those who live in rural areas, and those who are otherwise adversely affected by persistent poverty or inequality. Autonomous vehicles also have the potential to provide additional mobility options to people with disabilities, contributing to quality-of-life improvements that increase independence and provide greater access to health care and employment opportunities. Auto Innovators encourages ARPA-I to continue to support research into advanced

---

[1] Irfan, Muhammad Sami. "Proactive Safety for Vulnerable Road Users Leveraging Digital Twin Technology," *Public Roads Magazine*, FHWA. Winter 2024, Vol. 87, No. 4. Link: https://highways.dot.gov/public-roads/winter-2024/02.

vehicle technologies-as-infrastructure to improve the safe, secure, and equitable movement of people and goods.

Potential Role Example 1: Harmonization of Global Standards

While artificial intelligence presents significant opportunities for transportation, Auto Innovators recognizes that there are some challenges that may limit the technology's impact on the transportation sector in the United States. The failure to harmonize U.S. regulation with existing regulations in other countries, as well as the lack of a standardized lexicon describing artificial intelligence technologies, processes, and risk management systems, can stifle innovation and make implementation difficult. ARPA-I should work with the U.S. Department of Commerce to advance responsible global standards for artificial intelligence development and use. Early guidance and standards supported by ARPA-I would be valuable tools to assist policymakers in creating regulations that are pragmatic and supported by empirical data.

Potential Role Example 2: Hold Competitions on Artificial Intelligence

ARPA-I is in a unique position to lead research projects that could be carried out in partnership with the private sector, national and international standardization bodies, and research institutions. ARPA-I can emulate the Defense Advanced Research Projects Agency and other organizations that have held competitions related to artificial intelligence, which have contributed to U.S. technological leadership. As global competition increases, these types of efforts are even more important and valuable. Auto Innovators encourages ARPA-I to continue these competitions and expand to other areas of artificial intelligence.

Potential Role Example 3: Allocate Sufficient Federal Funding

We also maintain that federal funding to develop and support a robust supply chain that minimizes cybersecurity risks in the artificial intelligence space would also be beneficial to maintain U.S. leadership and mitigate threats to U.S. companies and drivers. Increased federal funding to expand high speed mobile data coverage to remote areas of the country would also ensure that advanced vehicle systems operate safely and reliably.

Auto Innovators welcomes the opportunity to provide input on how artificial intelligence applications have the potential to transform the transportation sector. We look forward to working with ARPA-I on using such applications to advance the U.S. Department of Transportation's strategic goals of Safety, Economic Strength and Competitiveness, Equity, Climate and Sustainability, and Transformation.

Sincerely,

Tara Hairston
Senior Director, Technology Policy