CONSORTIUM FOR CONSTITUENTS WITH DISABILITIES

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Submitted via *regulations.gov*

Timothy A. Klein
Director, Technology Policy and Outreach,
Office of the Assistant Secretary for Research and Technology
U.S. Department of Transportation

Re: Request for Information, Opportunities and Challenges of Artificial Intelligence (AI) in Transportation; DOT–OST–2024–0049

Dear Director Klein:

The undersigned members of the Consortium for Constituents with Disabilities (CCD) Transportation Task Force write to respond to the U.S. Department of Transportation (DOT) Request for Information (RFI), "Opportunities and Challenges of Artificial Intelligence in Transportation" published on May 3, 2024. CCD is the largest coalition of national organizations working together to advocate for federal public policy that ensures the self-determination, independence, empowerment, integration, and inclusion of children and adults with disabilities in all aspects of society, free from racism, ableism, sexism, and xenophobia, as well as LGBTQ+ based discrimination and religious intolerance.

We appreciate the opportunity to highlight the possibilities of how artificial intelligence (AI) can advance accessible transportation and the movement of people with disabilities. However, without purposeful and thoughtful consideration, the research and development (R&D) and deployment of AI can result in further discrimination against people with disabilities if deployed in a manner that focuses on transportation or movement solely for people without disabilities. Inaccessible transportation is a significant barrier for people with disabilities. Notably, fully accessible transportation is not limited solely to physical accessibility for people with mobility disabilities, but encompasses cross-disability accessibility needs.

People with disabilities have systematically been excluded from transportation options and a significant population of people with all types of disabilities live in areas where limited modes of transportation are offered in general. In addition, inaccessible sidewalks, curb cuts, intersections, and public rights-of-way compound accessibility barriers with transit systems. But AI can be deployed to increase accessible transportation and movement options. As AI is deployed to further safety, access, equity, and resilience in the transportation sector, people with disabilities must be fully included and considered and integrated in all decisions involving design, construction, operation, and maintenance of infrastructure systems. AI has the potential to

reshape how people with disabilities and underserved communities interact with the transportation network.

The Advanced Research Projects Agency – Infrastructure (ARPA-I) was established "to support the development of science and technology solutions that overcomes long-term challenges and advances the state of the art United States transportation infrastructure."[1] ARPA-I offers a once-in-a-generation opportunity to improve our nation's transportation infrastructure, both its physical and digital elements, and supports DOT's strategic goals of safety, economic strength and global competitiveness, equity, climate and sustainability, and transformation. ARPA-I has a single overarching goal and focus: to fund external innovative advanced R&D programs that develop new technologies, systems, and capabilities to improve transportation infrastructure in the U.S. To meet this single overarching goal and the aims of ARPA-I, R&D must specifically focus on fully accessible transportation and infrastructure for individuals with disabilities to improve safe, secure, and efficient movement.

DOT should consider how AI can advance the accessibility of all modes of transportation, including public rights-of-way, for people with disabilities. There are many possibilities for the improvement of accessible transportation. AI is already opening doors for access to many services for people with disabilities. But like anything else, the intent to use it for accessibility purposes must be recognized. Even grants that are not solely focused on accessibility must consider the needs of the disability community and integrate them in their R&D. To promote safety, access, equity, and resilience in the transportation infrastructure, serving people with disabilities must be prioritized and recognized to meet these goals.

Question 1: Current AI Applications in Transportation

1. What are the relevant current or near-term applications of AI in transportation?

Data Collection on Accessible Complete Streets

AI is being used to map curb cuts, sidewalks, intersections, and other public rights-of-way. However, it should be deployed more broadly for other cities and areas. There is insufficient data on complete streets, meaning fully accessible sidewalks that connect pedestrians to all walkways. Without complete streets, pedestrians with disabilities may be forced to use a main thoroughfare, increasing safety risks as well as potentially increasing distance and travel time, to complete a trip. A complete street may include more than just the accessible sidewalks, research should also include a review of the availability of accessible public transportation stops, crosswalk islands, curb ramps, and more. Just the lack of complete streets in a locality means that people with disabilities, such as wheelchair users, pedestrians with intellectual and developmental disabilities, pedestrians with sensory disabilities, and other vulnerable road users (VRUs) must use the main thoroughfare and are at a higher risk of injury. In August 2023, the U.S. Access Board

[1] Pub. L. 117-58, section 25012, November 15, 2021; 49 U.S.C. 119.

issued a final rule for accessible public rights-of-way.[2] During R&D of any pedestrian routes; accessible pedestrian signals; crosswalks; transit stops; and other buildings, facilities, and structures, ARPA-I should use the Access Board's standards as the minimum baseline to conduct research on how other types of infrastructure or technology can improve accessible and safe transportation for people with disabilities.

DOT should also use R&D to develop a pedestrian and accessible routes database that helps transit agencies, cities, and states understand the accessibility of sidewalks and other pedestrian routes to transit stops and facilities. Many people with disabilities do not use transit or use it less when the route from their home to a transit stop or from the transit stop to their destination is inaccessible. Better data collection about how sidewalk availability and quality affect people with disabilities could optimize planning, design, operations, construction, and maintenance of public rights-of-way. It could also provide sufficient data to build a reliable and resilient transit system. Notably, low-cost innovations and technologies that help localities track the condition of public rights-of-way will improve the quality of this data and resiliency.

Wayfinding

Public transportation systems are becoming more creative in the way they provide services to their communities. This includes wayfinding technology. However, R&D should also continue to be invested in communication technology on transit vehicles and mobile apps that provide fully accessible interfaces for delivering real-time transit vehicles information, including arrivals, departures, and upcoming stops for riders with sensory disabilities. Inaccessible transit tracking technology results in people with disabilities having less access to schedule changes and delays. In addition, people with disabilities often must rely on a driver, fellow passengers, or counting stops or turns to know when their stop is coming up. Better in-vehicle communications (such as clear and consistent audio and visual announcements) coupled with more accessible real-time information would help riders with disabilities independently and successfully use public transportation.

Innovation should advance highly accurate wayfinding technologies that improve independent mobility through transit facilities for people with sensory, development or intellectual, or physical disabilities. Some transit facilities are piloting advanced wayfinding systems, and these technologies could be helpful nationwide for improving navigation. However, it is equally important to continue to research and invest in non-technological means of wayfinding for riders who do not use smart phones, mobile technologies, or when their smart phone does not have power, a cellular signal, or in an emergency. Research should be undertaken to see how new and emerging innovative options impact general travel methods of people with disabilities. These

[2] Architectural and Transportation Barriers Compliance Board (Access Board), Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way, Final Rule (Aug. 8, 2023), *available at* https://www.federalregister.gov/documents/2023/08/08/2023-16149/accessibility-guidelines-for-pedestrian-facilities-in-the-public-right-of-way.

new methods must also assess all implications for passengers with disabilities and how they impact community living.

Question 2: Opportunities of AI in Transportation

2. What are the future potential opportunities in transportation that AI can facilitate?

Safety of Public Rights-of-Way

To meet DOT's vision of zero fatalities and serious injuries across all modes of transportation, R&D must specifically consider the safety of people with mobility disabilities and assistive device users. DOT's Complete Streets program has a mission to ensure safe use of roadways for all users, including all ages and abilities.[3] R&D can be used to promote safety through the collection of data on fatalities involving VRUs, especially people with disabilities. For example, the fatality rate for wheelchair user pedestrians is 36 percent higher than the general pedestrian population.[4] R&D should specifically consider the safety risks of pedestrians as they interact with forms of transportation to consider why pedestrians with disabilities experience higher fatality rates. The R&D should not only consider the why, but also look at how the safety of public rights-of-way impact pedestrians with different types of disabilities, e.g., wheelchair users, someone with intellectual or developmental disabilities, or pedestrians with multiple disabilities.

Many factors can significantly impact the rate of accidents and fatalities involving VRUs, including:

- the accessibility, design, and infrastructure of the public rights-of-way, including accessible and complete sidewalks, intersections, and medians;
- curb ramps;
- the presence of accessible pedestrian signals; and
- visibility of wheelchair users and other people with disabilities on the crosswalk and sidewalk.

Research has found that wheelchair users have a significantly higher fatality rate because of existing pedestrian infrastructure. The design and infrastructure of the pedestrian walkways, intersections, cross walks, island medians, and roadways may be a major factor, but research should be done to understand the impact of other factors in the fuller pictures. After such research is conducted, AI could be used to further the safety of pedestrians with disabilities.

[3] U.S. Department of Transportation, Complete Streets, available at https://www.transportation.gov/mission/health/complete-streets.

[4] Kraemer JD, Benton CS, Disparities in road crash mortality among pedestrians using wheelchairs in the USA: results of a capture–recapture analysis, BMJ Open (2015), *available at* https://bmjopen.bmj.com/content/bmjopen/5/11/e008396.full.pdf.

Access to Public Transportation

Data should also be collected and maintained on the usability of public transportation and taxi and rideshare services. AI may be used to determine whether accessibility features are out of order for transit stops or vehicles in real-time. For example, R&D can create widespread AI systems that provide real-time information on elevator outages. R&D can also map routes to transportation systems, such as buses or rail networks. This would not only expand the research on complete streets, but also research the feasibility of communities accessing the system itself based on the length of the walk, quality of the public rights-of-way, possible expansion of the system's areas, and more. Research on the usability of public transportation should also include how people can access transit. For example, real-time information is sometimes only communicated through smart phones apps.[5] Individuals living in low-income communities are less likely to have smart phones. In addition, access to transportation should not be limited to those who have smart phones with apps. This R&D would advance transit access for people with disabilities and all members of the community.

Advanced Driver Assistance Systems (ADAS) and Automated Driving Systems (ADS)

Currently, ADAS and ADS do not adequately consider people with disabilities and, at times, exclude their needs completely. With the development of ADAS and ADS, sensors, and AI, ARPA-I R&D must specifically include the safety of people with disabilities. For example, when developing automatic emergency braking systems, companies fail to include simulations to detect pedestrians who use mobility assistive devices.[6] Sometimes, sensors, driving and braking systems, and AI are only engineered to recognize an ambulatory person. Failure to use simulations for pedestrians who use mobility assistive devices will continue to result in safety concerns and potential injuries and fatalities. R&D projects should research and consider the safety of pedestrians who use mobility devices and service animal handlers and how sensors, driving assistance systems, automatic braking systems, and AI can detect non-ambulatory pedestrians and service animals.

Paratransit

To increase the reliability, efficiency, and efficacy of paratransit services and the overall experience for riders and drivers, as well as call and dispatch center personnel and providers,

[5] Any website or smart phone app researched and developed should meet the final rule issued by the Department of Justice. *See* U.S. Department of Justice, Final Rule, Nondiscrimination on the Basis of Disability; Accessibility of Web Information and Services of State and Local Government Entities, RIN 1190-AA79 (April 24, 2024), *available at* https://ogletree.com/insights-resources/blog-posts/doj-final-rule-on-website-accessibility-for-state-and-local-governments-portends-significant-changes-for-private-sector-websites/.

[6] *See* U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA), Federal Motor Vehicle Safety Standards: Automatic Emergency Braking Systems for Light Vehicles, Notice of Proposed Rulemaking (which is proposing to only use test scenarios test the legs of the pedestrian to articulate walking, running, and stationary pedestrians), *available at* https://www.federalregister.gov/documents/2023/06/13/2023-11863/federal-motor-vehicle-safety-standards-automatic-emergency-braking-systems-for-light-vehicles.

DOT should conduct R&D to incorporate continuous dynamic optimization technology in such services. Riders with disabilities do not have an equitable transit experience if they must call a day or more in advance, are given extended time windows for pick-ups and drop-offs, or the paratransit is unreliable in other ways, such as not showing up at all. DOT should research and innovate the use of software and AI that allow riders to maximize their transportation needs through the use of planned stops en route to improve options for transportation that holistically meets all of an individual rider's needs, including accountability checks and rider follow-ups regarding the inefficacy of the service.

DOT should also research and innovate AI that improves paratransit options across jurisdictional service boundaries. Often, when a paratransit user must cross jurisdictional service boundaries, they face potential transportation barriers. They may need to disembark from one transit service, proceed a certain distance, then reboard another transit service. Other times, passengers can be stranded when the multiple paratransit providers do not have a system to communicate with each other. The R&D focused on AI communication should not be limited to providing updates with smart phone applications. It is important that research be conducted to provide necessary communication services beyond smart phone notifications if the person does not have a smart phone. R&D in the use of AI for communication between the passenger and multiple paratransit providers can mitigate the impact on riders as they attempt to move freely across jurisdictional boundaries.

On-Demand Transportation Services and WAVs

R&D should also include AI systems for the provision of on-demand transportation, including paratransit providers that are now offering this service. However, on-demand services may include unreliable or inadequate vehicles, including a lack of wheelchair accessible options, that do not meet the needs of the community. AI could not only improve the reliability of the systems, but also provide important information on how many wheelchair access vehicles (WAVs) are needed for particular neighborhoods. AI could be deployed to monitor the need for WAVs by tracking the number of requests, the time of day of these requests, wait times for WAVs, and common routes. With this technology, transportation providers would have better data to determine how many WAVs may be needed. Data can also be used to determine whether mobility device users can reliably and independently access on-demand services.

Question 3: Challenges of AI in Transportation

3. What are the current or future challenges of AI in transportation, including risks presented by the use of AI in transportation and potential barriers to its responsible adoption?

Rural Communities

DOT must ensure that rural communities are not excluded, or limited, in AI research and development and deployment. People who live in rural communities have higher rates of

disabilities.[7] In addition, due to the geographical isolation and limited modes of transportation options and further limitations within those options, such as an adequate number of vehicles and drivers being available when needed, these communities inevitably face higher transportation access barriers. Critical data is needed on the location, availability, and cost of transportation options to determine whether all communities have equal access. Because of the need for accessible transportation, people with disabilities may be forced to live only in certain areas or remain isolated. This furthers transportation inequity. Research should be conducted to analyze where public transit exists and the geographical restrictions of travel. In addition, many rural communities are internet deserts. If transportation options, e.g., rideshare services, can only be deployed with smart phones with internet access, they will again be excluded from such services. Other options for those without internet or smart phones must be considered. If R&D only focuses on major metropolitan areas or fails to be deployed to examine transportation infrastructure in rural and underserved communities, R&D and the use of AI could ultimately discriminate against people with disabilities.

Integration of People with Disabilities Into the Community

Not only must R&D consider the accessibility needs of people with disabilities, but it should also look at how it impacts the integration of people with disabilities into the community. The lack of public transportation and disjointed public rights-of-way could keep people with disabilities isolated in certain geographic areas. If AI is only used to look at the accessibility of the transportation systems, it has the possibility of creating accessibility barriers in other ways. For example, if the R&D determines commercial vehicle, marine, rail and aviation freight and logistics systems must be constructed or modified, the implementation of any changes must not result in community segregation. The deployment of AI should carefully and purposefully consider the impact on the integration of people with disabilities into the community, including their needs for independent living.

Community Resource Constraints

The use of AI in infrastructure is largely dependent on the development and deployment of cost-effective electronic and computerized systems. Many communities across the country have not implemented even basic infrastructure improvements due to the cost of retrofitting signals, vehicles, intersections, public rights-of-way, and other public infrastructure. Many smaller and low-income communities struggle to find even the twenty percent match for many federal grants. As AI solutions are developed, it is vitally important that the cost and ease of implementation be considered, so that all communities can benefit from ARPA-I's research and development activities. In addition, it should be noted that research into technologies that can be scaled at lower costs to consumers and individual travelers will have greater and more immediate effect for the entire disability community. As an example, it is much more reasonable to expect individuals to spend $2-12 for daily public transportation than $20-50 for on-demand

[7] U.S. Census Bureau, Disability Rates Higher in Rural Areas Than Urban Areas (Jun. 26, 2023), *available at* https://www.census.gov/library/stories/2023/06/disability-rates-higher-in-rural-areas-than-urban-areas.html.

private transportation services. Yet the lack of available affordable transportation services often affects how people with disabilities can work and move in their communities and contributes to the so-called "disability tax," the substantial excess costs that result from accommodating a person's disability.

Question 4: Autonomous Mobility Ecosystems

4. What are the opportunities, challenges, and risks of AI related to autonomous mobility ecosystems, including software-defined AI enhancements?

AVs & Wheelchair Accessible Autonomous Vehicles

Accessible autonomous vehicles (AVs) offer a unique opportunity as a transportation option for people with disabilities. AVs are important as people with disabilities may not be able to drive due to their disability, such as Blind persons or individuals with epilepsy. AVs offer new freedoms and opportunities for independent living. As AI evolves, so will AVs. This opens a door to a whole new option in transportation for individuals who traditionally cannot drive or who do not have access to a personal vehicle. Furthermore, presumably, because AI is not unpredictably impacted by its surroundings, a pedestrian is more likely to know how AVs will react in certain circumstances. This greater level of certainty will allow a pedestrian with a disability to know how to respond to the vehicle. In addition, currently, AV rideshare services can only be accessed using a smart phone application. This limits the population that has access to AVs as individuals may not have a smart phone, especially lower income individuals. R&D should be conducted on how to deploy AVs without the use of a smart phone application.

However, there also remains an overwhelming need for funding and research on accessible AVs, especially on mobility device securement. People with disabilities are less likely to own private vehicles due to the high cost of after-market modifications for WAVs or the lack of invention yet of the appropriate technology. Without access to private transportation, people with disabilities rely more heavily on public transit or other modes of transportation. Almost all AV rideshare companies' vehicles are not wheelchair accessible. For mobility device users to independently use an AV, the vehicle must have a mobility device securement system that the rider can use without assistance. AI may more expeditiously advance research towards securement systems and can be part of a complete solution that provides automated assistance to riders for securement, information, and wayfinding. ARPA-I should greatly expand research to develop the safest securement system for all types of mobility devices, including, but not limited to, manual wheelchairs, power wheelchairs, and scooters. Only with an independent mobility device securement system can AVs meet the potential of providing a safe transportation option for mobility device users. Research should be focused not simply on finding a single solution, but on making these solutions as simple, cost-effective, and scalable as possible. In addition, this R&D can translate to securement systems for other modes of transportation like aircraft, trains, and buses.

Use of AVs in Rural Communities

The deployment of AVs in rural areas should also be explored. Transportation options may already be limited in rural areas. The expansion of the use of AVs in these communities could alleviate transportation barriers. The use of AI to map rural areas, including roads that may have fewer markers and navigational cues and the consideration of how accessible AVs can be used as another mode of transportation in rural communities can increase transportation equity. Research for rural communities must consider the fact that some rural communities are within internet deserts and may not be able to access necessary online services if that is the only method to request an AV. If AVs can only be deployed with smart phones with internet access, people with disabilities will again be excluded from such services. Other options for those without internet or a smart phone must be considered. AI could be a solution for rural communities that cannot access the internet or do not have smart phones.

Question 5: Other Considerations in the Development of AI for Transportation

5. Comment on any other considerations relevant to the development, challenges, and opportunities of AI in transportation that have not been included in the questions above.

As R&D projects are selected, the safety, access, equity, privacy,[8] and resilience in the transportation sector for people with disabilities must be considered and prioritized. Failure to recognize the needs of the disability community would be contrary to the purpose of ARPA-I. As discussed, AI has the possibility of advancing transportation equity. The focus on the needs of people with disabilities and underserved communities can ensure that the goal of ARPA-I is achieved and people have safer, more reliable, and equitable transportation access.

Sincerely,

Access Ready Inc.
American Council of the Blind
American Foundation for the Blind
Autistic Women & Nonbinary Network
Epilepsy Foundation
Muscular Dystrophy Association
National Association of Councils on Developmental Disabilities
National Disability Rights Network (NDRN)
Paralyzed Veterans of America
United Spinal Association

[8] Per the Biden-Harris Administration's Blueprint for AI Rights, regarding data privacy, "You should be protected from abusive data practices via built-in protections and you should have agency over how data about you is used." The White House, Blueprint for an AI Bill of Rights, Making Automated Systems Work for the American People, *available at* https://www.whitehouse.gov/ostp/ai-bill-of-rights/#privacy.