

Autonomous Vehicles: Driving Employment for People with Disabilities Information-Gathering Session

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Overview

The U.S. Department of Labor's (DOL) Office of Disability Employment Policy (ODEP) is the only non-regulatory federal agency that promotes policies and coordinates with employers and all levels of government to increase workplace success for people with disabilities. ODEP seeks to develop and influence policies and practices that increase the number and quality of employment opportunities for people with disabilities. In that spirit, ODEP works to address related barriers to employment, such as transportation, housing, accessible technology, and healthcare.

ODEP's policy efforts in support of commuting to work draw upon extensive collaboration with the U.S. Department of Transportation (DOT) and other federal departments and agencies. This collaboration has critically supported ODEP's approach toward enhancing activities to improve accessible transportation options for all Americans, including people with disabilities, to increase employment opportunities.

According to the U.S. Department of Labor's Bureau of Labor Statistics, in 2017 Americans with disabilities aged 16 and older had an unemployment rate of 9.2 percent, compared to 4.2 percent for people without disabilities. That same year, 18.7 percent of Americans with disabilities were employed, in contrast to 65.7 percent of those without disabilities. These employment disparities stem from several factors, including significant barriers for accessing transportation to work.

When surveyed, people with disabilities report a lack of access to transportation as a major barrier to participating in the labor force, as reported by the National Council on Disability (NCD) in [Self-Driving Cars: Mapping Access to a Technology Revolution](#). New forms of transportation technology, including autonomous vehicles (AVs), show significant potential to expand workforce participation for people with disabilities, older Americans, and other transportation-disadvantaged groups. This technology can help to reduce longstanding disparities in transportation access to commute to work and participate actively in one's community. Achieving the promise of AVs to promote greater employment access requires that these vehicles be made fully accessible for people with disabilities.

On October 26, 2018, ODEP and DOT co-hosted an information-gathering session to learn about recommendations from organizations advocating for the disability community and older Americans to shape AV policy. Representatives from more than 30 groups attended and presented their ideas for ensuring AV accessibility that can lead to improved employment access for Americans with disabilities.

Meeting Highlights and Key Takeaways

Meeting Highlights:

To begin the information-gathering session, leaders from DOL and DOT contextualized the conversation by discussing the employment situation for Americans with disabilities and linking the disparity between this group and rates for people without disabilities to a lack of access to transportation. This session introduction highlighted the need to improve transportation access for the disability community, including the deployment of accessible AVs, to facilitate the inclusion of people with disabilities in the labor force. Each agency shared their current initiatives that relate to AVs and people with disabilities. The agencies also highlighted ongoing collaboration among DOL and DOT to address the workforce impact of AVs.

The group was then presented with foundational knowledge about AVs to provide a basic understanding of the issues and kindle sharing of thoughts and ideas by stakeholders, as well as statements concerning how the AV market may develop, including these estimations:

- AVs have the potential to be deployed in a fleet model that is similar to how transportation network companies (e.g. Uber, Lyft, Via) operate. The future of transportation has the potential to be a blend of connected, autonomous, electric and shared. Due to these potential trends AVs personal ownership is highly unlikely.
- SAE International's six levels of driving automation range from no automation (Level 0) to full automation (Level 5). Both highly automated vehicles (Level 4) and fully automated vehicles (Level 5) will provide the most transportation access to people with disabilities who cannot drive.
- Early AV deployments will take place in only a few cities, and will have geo-fenced service areas (i.e. Level 4 AVs will only transport riders to destinations within their operational design domains).
- In 2019, AV service areas will include communities in the San Francisco Bay area in California and the Phoenix metro area in Arizona. This geographic footprint will most likely expand over the next few years as AVs become more ubiquitous and the technology advances.

Henry Claypool then facilitated the sharing of thoughts and ideas from stakeholders on these topics:

- AVs and the Rural-Urban Divide (issues/concerns specific to the equitable deployment of AVs in urban, suburban, and rural areas)

- AV Accessibility for People with Physical/Mobility Disabilities (issues/concerns specific to Americans with physical/mobility disabilities, including those who use wheelchairs, walkers, or crutches, and those of short stature, as well as accessibility features needed)
- AV Accessibility for People with Sensory Disabilities (issues/concerns specific to Americans with sensory disabilities, including those who are blind or who have low vision, and those who are deaf or hard of hearing, and accessibility features needed)
- AV Accessibility for People with Cognitive Disabilities (issues/concerns specific to Americans with cognitive disabilities, such as people with traumatic brain injury, people on the autism spectrum, and people with other intellectual and developmental disabilities, such as Down Syndrome, as well as the accessibility features needed)
- Policy that Ensures AV Accessibility and Drives Employment for Americans with Disabilities (the ways in which the Federal Government can enhance policy and practices to improve employment for Americans with disabilities by leveraging AV technology).

Key Themes:

During the two-hour information-gathering session, these key themes emerged:

1. [AVs' Potential to Improve Lives](#)
2. [Recommendations for Accessible AVs](#)
3. [Collaboration in the Development of AVs](#)
4. [Mobility as a Service](#)
5. [Subsidies for AVs](#)
6. [Coordination During AV Deployment](#)
7. [AVs in Rural Areas](#)
8. [AV Safety and Training](#)

AVs' Potential to Improve Lives

Participants asserted that a lack of transportation presents a significant barrier to employment access for people with disabilities. Sheryl Gross-Glaser [Community Transportation Association of America (CTAA)] noted that the current transportation system in the U.S. is a two- or three-class system in which many people cannot access transportation because of income or location. Carol Tyson [Disability Rights Education & Defense Fund (DREDF)] also stressed that the lack of fully accessible vehicles creates a two-tier society for people with disabilities; indicating that

if these vehicles are not accessible to all, some people would be forced to rely on an often limited supply of wheelchair accessible vehicles, and potentially inequitable services. This would create two separate tiers of users or vehicles—one tier of people who have full access, and one tier of people who do not. Kent Keyser [United Spinal Association (USA)] highlighted that improving access to transportation to work for people with disabilities will result in economic growth. He also emphasized that it would yield improved overall health and wellness of people with disabilities because employment is a social determinant of health.

Many participants referenced the potential of AVs to improve the lives of people with disabilities. Clark Rachfal [National Industries for the Blind (NIB)] stated that AVs could shorten the commute time of people with disabilities by increasing their transportation options; this would result in greater control of personal time and options for where people choose to work (i.e. greater self-determination).

Recommendations for Accessible AVs

Many participants provided suggestions for improving AV accessibility. Tyson [DREDF] highlighted the major need for wheelchair lifts, ramps, and securement systems. Tyson also stressed ensuring equitable and accessible infrastructure, such as curb cuts and accessible sidewalks and bus stops. Other participants also shared that any future DOT regulations for AV should include specific requirements to ensure the safety of wheelchair users traveling in accessible vehicles. Tyson noted that DREDF has created a [Fully Accessible Autonomous Vehicle Checklist](#) that can be used to ensure that AVs are accessible to people with disabilities.

In addition, Leif Brierley [Perkins School for the Blind (PSB)] announced that the Technology Taskforce of the Consortium for Citizens with Disabilities (CCD) is developing policy recommendations for advancing the accessibility of AVs. He also stated that the task force plans to address issues related to technology guidelines and licensing. Keyser [USA] suggested that in addition to checklists and recommendations AV companies should consider hiring engineers with disabilities to enhance product development and ensure technology accessibility.

Participants also discussed the accessibility needs of people with cognitive disabilities, including intellectual disability, and stressed the essential need to ensure ease of use. Fredric Schroeder [National Rehabilitation Association (NRA)] emphasized the need for an accessible and supportive user interface at the foundation of the technology. Reid Caplan [Autistic Self Advocacy Network (ASAN)] discussed how adaptable software would benefit people on the autism spectrum and people with intellectual disabilities. He also shared the idea of an interface for each AV that is customizable for particular disabilities and preferences. Nicole LeBlanc [Autism Society (AS)] suggested incorporating plain language on how to use and operate AVs. Kim Musheno [AS] stressed including audio/visual cueing for people on the autism spectrum and people with intellectual disabilities.

Melanie Brunson [Blinded Veterans Association (BVA)] shared that the tendency for new technology to feel daunting and intimidating for many users makes it essential that developers evaluate technical knowledge requirements for all AV services. She recommended keeping AV usage simple and for future AV users to have reasonable expectations. She also noted that people can have multiple disabilities; thus, a vehicle that is accessible for a person with one specific disability may not be accessible for a person with multiple disabilities.

Heather Sachs [National Down Syndrome Congress (NDSC)] emphasized that Universal Design for Learning (UDL) should be incorporated into AV technology to allow for multiple means of engagement and assessment. She noted that adoption of UDL would be especially beneficial for the intellectual and developmental disability (IDD) communities because it would allow the user to make choices differentiated by their abilities and wants. She shared that the development of training and licensing should also integrate UDL concepts.

Collaboration in the Development of AVs

Throughout the information-gathering session, participants prioritized stakeholder groups working together. Tyson [DREDF] highlighted the need to build connections and collaborations between DOT and the disability community. Tyson also suggested convening meetings to connect stakeholder groups and industry representatives. Ana Torres-Davis [NCD] agreed that manufacturers, software engineers, and testers need to collaborate with the disability stakeholder community to provide input at all stages. Claire Stanley [American Council of the Blind (ACB)] stressed the need for collaboration between accessibility technology companies and AV companies, including companies that develop accessible wayfinding applications commonly used by the blind and low vision community. She also emphasized that accessibility features should be built into products from inception rather than as an afterthought or add-on for manufacturers.

Torres-Davis [NCD] indicated that it is important that stakeholders are connected to AV companies. They both felt it would be helpful to have a pipeline of testers with disabilities whom AV developers can engage to provide usability feedback.

Mobility as a Service

Jana Lynott (AARP) highlighted Mobility as a Service (MaaS) and the need for seamless connections among varied transportation modes, including infrastructure, access, and public transportation. She emphasized the need to think about the system as a whole, and she recommended bringing transportation resources together as a hub to connect AV companies with other transit providers. Lynott also shared that AARP is funding MaaS pilots to build systems that can seamlessly connect underserved populations with transportation services. AARP's first pilot project in this area is taking place in Columbia, South Carolina. Tyson [DREDF] suggested encouraging cities and states to adopt community benefit agreements with equity principles, including mandates for a percentage of accessible AVs in fleets.

Finch Fulton, Deputy Assistant Secretary for Transportation Policy [DOT] also shared that Columbus, Ohio is working on a smart city initiative focused on universal MaaS (<https://smart.columbus.gov/>).

Subsidies for AVs

The information-gathering session spotlighted providing subsidies to bring AV rides within financial reach for people with disabilities. Tyson [DREDF] suggested subsidizing AVs in rural areas where low income presents a common barrier to transportation for people with disabilities. Musheno [AS] also emphasized the need for direct subsidies for many people with disabilities to utilize AVs. Stanley [ACB] recommended subsidies or funding for technology (i.e., smart devices) to access many types of transportation options.

Collaboration to Facilitate Equitable AV Deployment

Gross-Glaser [CTAA] shared that AV development requires greater collaboration between public and private transportation modes. Lynott [AARP] suggested AV manufacturers and providers work together with community service organizations. Tyson [DREDF] concurred with a need for collaboration and data-sharing in the AV space, including among transit agencies and state transportation departments.

AVs in Rural Areas

Participants also shared concerns about access to transportation in rural areas, especially for people with disabilities. Stanley [ACB] stated that people who live in rural areas have far fewer transportation options and even fewer accessible transportation alternatives. Carol Wright (Easterseals [ES]) noted that AVs could have a significant impact in rural areas because of their simple landscape (e.g. limited building structures, traffic signals and road signs). She also shared the concern about the lack of related infrastructure; many rural areas still lack reliable broadband connections that AVs and their users would need to operate.

Gross-Glaser [CTAA] expressed a concern that rural areas provide much less opportunity for businesses to profit. She suggested that AV companies may need to integrate incentives to deploy fleets in these areas. Gross-Glaser noted that AV companies could center their business models for rural areas around rural co-ops with locally-based providers (similar to the current model used for broadband access).

AV Safety and Training

Many participants expressed the need for training on how to safely operate AVs. Brunson [BVA] indicated that one of the biggest obstacles to AV deployment is public trust around safety. She shared that the public may have concerns about allowing people who are blind to operate AVs independently. In addition, Melanie noted that GPS systems are not always reliable due to the fact that they are sometimes unable to provide accurate location information. For example, GPS inaccuracy can present challenges when a

passenger needs to locate their ride or when they are traveling to a campus that has a single address associated with many buildings. This lack of reliable location information can result in significant safety impacts for people with disabilities. Many participants indicated that GPS/mapping technology needs significant improvements for the community to use AVs successfully.

Carol Tyson [DREDF] also stressed the importance of safety, and recommended that the Standards Committee of the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) expand its scope to focus on AVs. This committee could investigate and make safety recommendations regarding seating arrangements, crashworthiness, and the protection of service animals. Their recommendations could also call for AV safety regulations that could mandate the inclusion of vehicle safety tests for wheelchair users.

Fulton [DOT] announced that DOT is exploring the use of remote operators for AVs that can operate or override vehicles in the event of emergencies or in cases where an individual requires assistance in the vehicle. This "live" person could potentially assist with a broad range of services needed by the user.

Many participants also emphasized that consumer training presents a critical factor in the success and safety of AVs. Musheno [AS] stressed the need to train service providers on how to use AV technology. Stanley [ACB] shared the idea of AV companies developing relationships with Vocational Rehabilitation centers to train prospective AV users on how to use the technology. Caplan [ASAN] concurred with the need for training programs, and also indicated a need to examine any qualifications needed for users to operate AVs. Brierley [PSB] highlighted the issue of whether individuals will need a license to operate an AV. He expressed concerns that licensing requirements could automatically disqualify many people with disabilities from accessing and benefitting from AVs.

Next Steps

DOT's Accessible Transportation Technologies Research Initiative

ODEP continues to collaborate with DOT's Accessible Transportation Technologies Research Initiative (ATTRI) to support and inform DOT's AV policy efforts. ODEP is also working with other DOL agencies, including the Employment and Training Administration, the Bureau of Labor Statistics, the Chief Evaluation Office, and the Office of the Assistant Secretary for Policy, to examine the potential impacts of AVs on the American workforce. These collaborations are key to ODEP's efforts to bridge transportation gaps that will allow Americans with disabilities to enter the workforce, and to share information with DOT to advance inclusive AV policy.

Online Dialogues

As encouraged by AV stakeholders, ODEP and DOT will continue to engage the public, the AV industry, advocates, researchers, and policymakers in our efforts to advance policy development around AVs and employment access for people with disabilities. ODEP aims to organize future events with stakeholder groups to share thoughts and ideas for ensuring an equitable deployment of AVs. AV stakeholder organizations can also participate in ODEP's online AV community at TransportationInnovation.IdeaScale.com.

Additional Information-Gathering Sessions

ODEP aims to organize future additional information-gathering sessions for key AV stakeholder groups, such as researchers and provider associations.

Appendix (Participant List)

First Name	Last Name	Organization
Leif	Brierley	Perkins School for the Blind/Powers Law
Melanie	Brunson	Blinded Veterans Association
Reid	Caplan	Autistic Self Advocacy Network
David	Capozzi	U.S. Access Board
Joan	Durocher	National Council on Disability
Beth	Esposito	U.S. Department of Justice
Finch	Fulton	U.S. Department of Transportation
Doug	Goist	National Industries for the Blind
Sheryl	Gross-Glaser	Community Transportation Association of America
Philip	Kahn-Pauli	RespectAbility
Kent	Keyser	United Spinal Association
Nicole	LeBlanc	Autism Society of America
Jana	Lynott	AARP Public Policy Institute
Sarah	Malaier	American Foundation for the Blind
Regina	Morgan	U.S. Department of Transportation
Kim	Musheno	Autism Society of America
Steve	Owens	Epilepsy Foundation
Clark	Rachfal	National Industries for the Blind
Michael	Reardon	U.S. Department of Labor
Scott	Robertson	U.S. Department of Labor
Heather	Sachs	National Down Syndrome Congress
Fredric	Schroeder	National Rehabilitation Association
Jennifer	Sheehy	U.S. Department of Labor
Kenneth	Shiotani	National Disability Rights Network
Juliet	Shoultz	U.S. Access Board
Alexandra	Smith	Autism Speaks
Claire	Stanley	American Council of the Blind
Lindsey	Teel	U.S. Department of Labor
Ana	Torres-Davis	National Council on Disability
Carol	Tyson	Disability Rights Education & Defense Fund
Heidi	Wangelin	RespectAbility
Carol	Wright	Easterseals, Inc.
Mark	Zelden	U.S. Department of Labor