

AUTONOMOUS VEHICLES: Connected Vehicles Bring Promise of Mobility — and Jobs — to Two Million People With Disabilities

Introduction

Riddle: What lifts people out of long-term poverty; pours previously untapped pools of workers into the workforce, thereby stimulating the economy; and grants independence to two million people with disabilities in the United States?

Answer: Self-driving vehicles.

You might have thought the answer was Superman. It's something close. Of course, implementing that ideal will take many years, and reality will likely disappoint. But even the disparity between dreaming and doing cannot diminish the real good that will happen when the Connected and Autonomous Vehicle ("CAV") industry takes on the problem of accessibility.

The Problem

In the United States alone, "[m]itigating transportation related obstacles for individuals with disabilities would enable new employment opportunities for approximately 2 million individuals with disabilities."¹ That is because six of the 57 million people within the United States who have a disability struggle to "get[] the transportation they need."² Autonomous vehicles present the promise of mobility for those six million and access to new jobs for 1/3 of that population. In other words, it's good for the people and it's good for the economy.

Unemployment is twice as high among those with disabilities in large part because they "don't have access to transportation to get to jobs," according to Michael Reardon, a supervisory policy advisor for the U.S. Department of Labor's Office of Disability Employment Policy.³ Cities like Chicago, D.C., and New York have long dealt with accessibility issues embedded in their metro systems, but two-thirds of counties within the U.S. do not even have public transportation in the first place.⁴

¹ <https://rudermanfoundation.org/the-ruderman-white-paper-self-driving-cars-the-impact-on-people-with-disabilities/>. The report also notes that autonomous vehicles accessible to the disabled community could also "save \$19 billion annually in healthcare expenditures from missed medical appointments."

² *Id.*

³ <https://www.ncsl.org/blog/2019/12/10/how-autonomous-vehicles-can-affect-people-with-disabilities.aspx>

⁴ *Id.*

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“People with disabilities’ participation in the workforce is about a third of the level of the non-disabled population,” Reardon states. “Every time a person can’t get to a job, that’s an opportunity cost that’s wasted, a potential taxpayer turned into a tax recipient — the opportunity to change from a life of poverty and dependence to a life of productivity and financial independence.”⁵

Until now, the problem has proved intractable. Although the Americans with Disabilities Act requires public transit agencies to offer transportation services to all people with handicaps, this “paratransit” transportation costs three to four times the cost of mass transit.⁶ This has caused some communities to restrict the geographic availability of paratransit or request that its citizens with disabilities use mass transit anyway. (Some communities rely increasingly on rideshare services to transport people with disabilities, prompting outcries over several resulting challenges.⁷) As a result, millions of Americans with disabilities cannot find gainful employment for the simple fact they cannot travel to a place of employment.

The Solution

Reardon’s suggested solution will require a partnership between local community governments, lawmakers, disability advocates, designers, and manufacturers: “Ensure that a sufficient number of [self-driving] vehicles are built using universal design and fully accessible.” Accessibility in autonomous vehicles extends to both the physical space — allowing for equipment such as scooters and wheelchairs and companion animals — and its software, such as “accessible digital interfaces for all disabilities.”⁸

The Transportation Institute and other labs at Texas A&M are among those testing the way to an accessible future: “[S]imultaneous advances in machine learning and artificial intelligence can enable [autonomous] vehicles to understand spoken instructions, observe nearby surroundings and communicate with people. Together, these technologies can provide independent mobility with practical assistance that is specialized for each user’s abilities and needs. A lot of the necessary technology already exists, at least in preliminary forms.”

Texas A&M has a self-driving shuttle that gave rides to 124 people by October 2017. The shuttle relies on protocols and algorithms that detect disabilities, and the shuttle communicates with its riders

⁵ *Id.*

⁶ <http://theconversation.com/are-self-driving-cars-the-future-of-mobility-for-disabled-people-84037>

⁷ <https://www.nbcwashington.com/investigations/stranded-blind-passengers-say-some-ride-share-drivers-still-refuse-to-pick-them-up/2229348/>

⁸ *Id.*

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through words, sounds, and an electronic display.⁹ The Transportation Institute envisions “a fully integrated system” for users with disabilities:

- [The users] can connect to the dispatching system and create profiles that include information on their disabilities and communications preferences as well as any particular frequent destinations for trips (like a home address or a doctor’s office).
- Then, when a rider requests a shuttle, the system would dispatch a vehicle that has any particular equipment the rider needs, like a wheelchair ramp or extra room, for instance, to allow a service dog to travel.
- When the shuttle arrives to pick up the rider, it could scan the area with lasers, cameras and radar to create a 3-D map of the area, merging those data with traffic and geographic information from various online sources Based on all of those data, it would determine an appropriate boarding spot, identifying curb cuts that let wheelchairs and walkers pass easily as well as noting potential obstacles, like trash cans out for collection. The vehicle could even send a message to the rider’s smartphone to indicate where it’s waiting, and use facial recognition to identify the correct rider before allowing the person to ride.
- During boarding, the ride and when the rider reached the destination, the vehicle could communicate any relevant information – such as estimated arrival time or details about detours – by interacting with the rider as appropriate and listening to the responses, or by displaying text on a screen and accepting typed input. That would allow the rider and the shuttle to interact no matter what the passenger’s abilities or limitations might be.¹⁰

This nascent technology might very well enable a large segment of the disabled population to join or re-join the workforce. This could lift those individuals out of poverty and markedly improve their independence, as well as boost the economy by sizably increasing the workforce.

The National Center for Mobility Management, however, cautions that *autonomous* should not be equated with *accessible*. In designing and manufacturing autonomous vehicles, attention must be paid to “vehicle type, the accessibility of those vehicles, public or private ownership/control, user cost, and perhaps most importantly, how humans inside and outside of the vehicle will interact with it. The promise of fully accessible [autonomous vehicles] that respond to the needs of older adults and people with disabilities will be realized only if full attention is given to all of these other characteristics before design/infrastructure decisions become baked into communities’ designs.”¹¹

This is where the “connected” in the “Connected and Autonomous Vehicle” language becomes paramount. “Connected” describes vehicles that “use any of a number of different communication technologies to communicate with the driver [or passenger], other cars on the road (vehicle-to-vehicle

⁹ <http://theconversation.com/are-self-driving-cars-the-future-of-mobility-for-disabled-people-84037>

¹⁰ <http://theconversation.com/are-self-driving-cars-the-future-of-mobility-for-disabled-people-84037>

¹¹ https://nationalcenterformobilitymanagement.org/wp-content/uploads/2018/08/AVs_PwD_OA_Final_sm.pdf

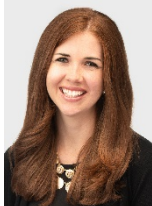
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[V2V]), roadside infrastructure (vehicle-to-infrastructure [V2I]), and the ‘Cloud’ [V2C].”¹² Here, communicating with passengers and accommodating passenger disabilities will enable autonomous vehicles to safely and effectively transport members of the disabled community to jobs that were previously inaccessible.

According to the National Center for Mobility Management, a network of truly connected and autonomous vehicles accessible to disabled communities “can only be accomplished through inclusive planning efforts to include older adults and people with disabilities themselves during the development phase, and collaboration across all modes that will be impacted by AVs.”¹³

The potential of CAV technology to lift two million people with disabilities out of poverty, bolstering the U.S. workforce and economy, requires “the disability community to organize, learn more about the technology, and enhance its advocacy efforts . . . [and] the technology developers to become better educated on the need and value of designing their vehicles with the disability community in mind.”¹⁴

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¹² <http://transportation.libanswers.com/faq/266767>; see also https://www.its.dot.gov/cv_basics/cv_basics_what.htm

¹³ https://nationalcenterformobilitymanagement.org/wp-content/uploads/2018/08/AVs_PwD_OA_Final_sm.pdf

¹⁴ <https://rudermanfoundation.org/the-ruderman-white-paper-self-driving-cars-the-impact-on-people-with-disabilities/>