

Enhanced Mobility from Connected and Automated Vehicles

By Philip Barnes and Brett Swan, October 2018

Connected and automated vehicles (CAVs) can enhance independent mobility options for the elderly and people with disabilities. To ensure these Delawareans are not left behind, both figuratively and literally, elected officials, auto manufacturers, and tech companies should consider accessibility at all stages of CAV development, production, implementation, and regulation.

Changing Demographics

Delaware's elderly community is growing as people live longer and more and more retirees look to establish themselves in the state. The number of Delawareans 65 and older was approximately 150,000 in 2015 and is expected to nearly double by mid-century.¹

Approximately 23% of Delawareans lived with some form of a disability in 2016. Of this population, 13% have issues with physical mobility, 11% have cognitive disabilities, 5% struggle with independent living, and 4% have vision restrictions.² These two populations—the elderly and individuals with disabilities—have unique mobility challenges and needs.³

The Opportunities

Individuals with independent mobility issues face several barriers to equitable transportation. These barriers include a lack of accessible public transportation, financial constraints, and sometimes inconvenient and inconsistent paratransit services.⁴ Consequently, many individuals face exclusion from social life, employment, and education opportunity.⁵



Automated shuttles, shared-use automated vehicles (Uber, Lyft), and privately owned CAVs can offer innovative solutions to first-mile last-mile problems, social isolation, and unemployment by increasing access to mobility.

CAVs can lower the travel barrier that prevents individuals with mobility issues from enjoying steady employment. On-demand mobility services, as opposed to preplanned paratransit, can increase an individual's independence, social inclusion, and civic engagement. CAVs can also assist people with disabilities in making their regularly scheduled medical appointments. Nationally, individuals with disabilities miss more than 11 million medical appointments annually due to a lack of transportation.⁶

Accessibility Features

To meet the mobility needs of people with disabilities, CAVs should utilize several accessibility features. For example, refreshable braille and auditory systems should inform passengers with visually impairments about important travel information. For passengers

with hearing impairments, important travel information should be displayed on interactive screens. To assist passengers with intellectual and developmental disabilities, as well as users who are generally uncomfortable with technology, all user interface systems should be designed with minimal complexity. Waymo, Google's CAV subsidiary, is already implementing and testing some of these accessibility features in their vehicles.⁷ CAV systems may also notify passengers of potential infrastructure barriers upon arrival at their destination and ensure drop-off at an accessible location.

Wheelchair accessibility and security must also be considered. Regional transit and paratransit providers such as DART First State need to ensure that a trained attendant is on board at all times to assist passengers with embarking, securing themselves during travel, and alighting at their destination.

Policy Recommendations

Paratransit ridership and costs are continuously growing. In the fiscal year 2018, the average cost of a DART-operated paratransit trip in Delaware was over \$55, with costs in Sussex County exceeding \$60 per trip.⁸ To ensure the program is cost-effective and adequately meets rider needs, paratransit service managers should explore CAV-related opportunities.

The State of Delaware and DART should explore partnerships with private on-demand ride-sharing companies like Uber and Lyft that can provide Americans with Disabilities Act (ADA) compliant mobility services. This could be accomplished by expanding the existing Senior Citizen Affordable Taxi (SCAT) program to

ridesharing providers who are likely to be early adopters of CAV technology. Equally, healthcare providers should look to establish partnerships with ride-sharing services. In early 2018, Uber launched UberHealth—a special program designed to offer Uber rides for patients and caregivers. In some locations, trips that start or end at a healthcare provider can be discounted.⁹

Transit providers will need to evaluate and adopt new procurement standards and practices for vehicle purchases that account for connected and automated vehicles. The state already ensures that DART's fleet is fully compliant with ADA, but bus, shuttle, and vehicle purchases in the future will need to incorporate ADA, the accessibility features mentioned in the preceding section, and CAV technology. Early Delaware Department of Transportation (DeDOT) or DART pilot projects involving CAV deployment should incorporate all of these options so the state can learn about and work through procurement challenges.

To ensure the needs of people with disabilities are met, DeDOT should advocate that funding proposal requests involving CAV research and development should demonstrate a commitment to incorporating accessibility in the project scope.

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¹ Delaware Department of Health and Social Services, 2018

² Center for Disease Control and Prevention, 2018

³ Rosenbloom, 2009

⁴ Claypool, Bin-Nun, & Gerlach, 2017

⁵ Henderson & Golden, 2015

⁶ Claypool, Bin-Nun, & Gerlach, 2017

⁷ Halsey III, 2017

⁸ Personal communication with DART staff

⁹ Ingold, 2018

Photo Credit: DeDOT and DART

For the full work cited visit: www.sppa.udel.edu/ipa/serving-delaware/transportation/cav