Federal Accessibility Standards for Fully Autonomous Vehicles

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Summary

Self-driving technology is uniquely positioned to benefit people who cannot drive, including people with travel-limiting disabilities and many older adults. However, the lack of federal policy guiding the development of this technology has led to piecemeal recommendations that largely fail to guarantee accessible use in both public and private implementation scenarios. To leverage the full potential of self-driving technology, the Department of Transportation (DOT) should adopt accessibility standards to support autonomous transportation for people with disabilities and older adults. The Biden-Harris Administration has an important opportunity to reimagine accessible transit, capitalize on ongoing federal research programs such as the Inclusive Design Challenge, and extend the benefits of self-driving technology to those who need it most. If enacted, these recommendations will lead to increased independence, workforce participation, and mobility in the future of transportation.

Challenge and Opportunity

Fully autonomous vehicles (FAVs) are poised to dramatically increase independence and mobility among the nearly 26 million Americans who experience travel-limiting disabilities[1] and the estimated 600,000 older adults who stop driving every year in the United States.[2] However, despite the potential benefits and wide-reaching impact of FAVs, current policies guiding their development fail to support accessible interactions in public transportation networks utilizing FAV technology. While longstanding legislation[3] does much to ensure that human bus and shuttle drivers provide accessible boarding and transit experiences to people with mobility, sensory, and cognitive disabilities, an analogous regulatory approach for FAVs is currently lacking. Aggravating this problem — and extending it to privately-owned FAV scenarios — are recent state laws that require driver licensure in autonomous vehicles regardless of the extent of vehicle automation. Since 2016, eighteen states and the District of Columbia have passed laws requiring operators of autonomous vehicles to have a valid driver's license.[4] In ten of these states, an autonomous vehicle operator is required to have a traditional driver's license even in a *fully* autonomous vehicle, in which driving is not even possible. While these efforts are intended to provide safeguards during semi-autonomous vehicle deployment, they also severely limit practical and much-needed testing and research with fully autonomous vehicles among those who do not possess a driver's license (i.e., many people with disabilities and older adults). Should

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[1] "Travel Patterns of American Adults with Disabilities," Bureau of Transportation Statistics, United States Department of Transportation, January 12, 2021, https://www.bts.gov/travel-patterns-with-disabilities.

[2] David J. Foley, Harley M. Heimovitz, Jack M. Guralnik, and Dwight B. Brock, "Driving Life Expectancy of Persons Aged 70 Years and Older in the United States," *American Journal of Public Health*, 92, no. 8 (August 2002): 1284–1289.

[3] E.g., The Americans with Disabilities Act of 1990

[4] All of these states and D.C. require at least one operator to have a driver's license during testing or deployment of autonomous vehicles. Ten of them - Connecticut, the District of Columbia, Illinois, Iowa, Michigan, New Hampshire, New York, Ohio, Utah, and Vermont – further require driver licensure regardless of the level of vehicle automation.

the current trajectory continue, both public and private FAV deployment scenarios will effectively preclude autonomous vehicle use by those who would benefit most from this new class of transportation.

The DOT has done well to incentivize accessibility research through programs like the ongoing Inclusive Design Challenge (IDC). However, there is a disconnect between emerging research and policy that would effectively implement the results. This proposal calls on the DOT and the National Highway Traffic Safety Administration (NHTSA) to utilize their existing authority as the regulatory bodies for FAV manufacturing and development to undertake rulemaking based on results from the IDC and related research. The resulting standards for autonomous vehicle accessibility would position the Administration to enact proactive, user-driven, and evidence-based policy.

People with disabilities and older adults are excited about the potential of FAVs to transform their lives. At the same time, they are skeptical about being adequately considered in the design of this technology. Prioritizing this proposal will not only result in increased mobility and independence among these demographics but also pave the way for user acceptance by promoting policy driven by user research. Results from the following plan of action represent cost effective and proactive steps that will yield long-term economic growth, as older adults are the fastest growing workforce population in the country and people with disabilities have long been limited by widespread journey-to-work problems.

Plan of Action

Accessible FAV Public Transportation. The federal government has regulatory authority over FAV design and manufacturing but has yet to implement rulemaking in terms of accessibility. The DOT and NHTSA are well-positioned to establish standards for accessible FAV public transportation networks. These standards should be, in part, based on:

1. Existing requirements for public transportation accessibility in the Americans with Disabilities Act of 1990;
2. Interface requirements included in the NHTSA's (2016) Vehicle Performance Guidance for Automated Vehicles; and
3. Results from emerging disability research (e.g., findings from the Inclusive Design Challenge).

Americans with Disabilities Act: Requirements for operator training have been critical to the success of the ADA in facilitating accessible public transportation. Bus and shuttle drivers are trained to provide people with disabilities with adequate information (e.g., stop announcements and route information), handle private disability information respectfully and courteously, and assist in boarding and exiting processes. These requirements will not automatically translate to

the AI "drivers" in fully autonomous busses and shuttles because the technological requirements for providing an accessible experience in the absence of a human driver are inherently different. This situation necessitates new standards to ensure that needs are being met. Not only will the algorithms fundamental to the AI need to be adequately trained, but the ways in which information is exchanged for successful boarding, transit, and exiting will rely on technology not covered by the ADA. While the overarching accessibility goals outlined by the ADA for traditional vehicles should be maintained (i.e., accessible information, appropriate handling of that information, and assistance in boarding and exiting), the technological means by which these goals are achieved in FAVs requires new standards. Thankfully, existing research and policy work (e.g., the Vehicle Performance Guidance for Automated Vehicles discussed in the subsequent section) can aid in the development of appropriate standards for accessible FAV technology.

VPGAV: The NHTSA's 2016 Vehicle Performance Guidance for Automated Vehicles (VPGAV) was first issued to accompany the Obama Administration's Federal Automated Vehicles Policy. Although the VPGAV was ultimately replaced by the subsequent administration, it included several enforceable points that should be reinstated as new standards for accessibility. A "human machine interface to fully accommodate people with disabilities (e.g., through visual, auditory, and haptic displays)" is critical to ensuring that information is provided in accessible formats. An "accessible, clear, meaningful data privacy and security notice/agreement" would do much to ensure that sensitive disability information is handled respectfully and courteously by autonomous bus and shuttle AIs. And in the event of human-assisted FAVs, where attendants assist in passenger boarding and exiting, "manufacturers and other entities should develop, document, and maintain employee, dealer, distributor, and consumer education and training programs." When taken together, these standards would enable an accessible FAV transit experience from vehicle boarding to exiting.

Emerging Research: The need for FAVs to interface effectively with users' existing mobile devices is a critical element to FAV accessibility revealed by ongoing Inclusive Design Challenge work and the U.S. Access Board's Autonomous Vehicle Live Webinar Series. People with disabilities increasingly rely on their smartphones' native accessibility features to access information and navigate safely and effectively. For instance, over 80% of people who are blind and visually impaired have adopted touchscreen-based smart devices for daily use. While a proposed standard derived from the VPGAV includes requiring a human machine interface (HMI) in FAVs to accommodate people with disabilities, emerging research suggests that this HMI should also be able to pair with and utilize a user's existing smart device as an additional control mechanism.

FAV Operator's Licenses. One concept that has emerged from ongoing disability research related to privately operable FAVs is the prospect of operator's licenses available to people with disabilities and older adults who no longer drive. The DOT should issue a permitting process for FAV Operator's Licenses that does not rely on traditional sensory and motor requirements customary to driver's tests. A nationally available FAV Operator's License would both respond effectively to states that require licensure for testing and deployment of FAVs, and also enable conversations surrounding the use of self-driving technology by children,

people with cognitive processing impairments or neurological disorders (e.g., people with dementia), and people who are otherwise ineligible for driver's licenses in certain states. By leading on this issue, the DOT would expand FAV access to those who need it most and position itself to undertake essential rulemaking for FAV use that has yet to be determined.

While the DOT has regulatory authority to enact these recommendations, it is worth noting that the initiatives proposed here also have legislative support. The bipartisan SELF DRIVE Act, which passed unanimously in the House in 2017 (H.R. 3388) and was reintroduced as H.R. 8350 in September of 2020:

1. Preempts states from enacting laws regarding the design of highly automated vehicles; and
2. Establishes the DOT's Highly Automated Vehicle Advisory Council to guide mobility access for the disabled, elderly, and underserved populations.

This proposal would urge the DOT, through the Highly Automated Vehicle Advisory Council (as laid out in the SELF DRIVE Act) or with its existing purview, to mandate that both public and private FAV transportation be legal and accessible to people with disabilities and older adults in every state.

Conclusion

Should fully autonomous vehicles succeed in expanding independence, mobility, and workforce participation among people with disabilities and older adults in the United States, the federal government must guarantee that FAVs are accessible and legally available to these populations. The recommendations presented here seek to extend access to this new class of transportation to non-drivers, while also strengthening the much-needed research-to-policy pipeline in the FAV domain. By capitalizing on current research investment in FAV accessibility to inform new policy solutions that also engage existing standards for traditional transportation, this proposal presents a cost-effective way to realize the transformative potential of automated vehicles in both private and public implementation scenarios.

Frequently Asked Questions

Will autonomous vehicles actually be safe if someone who can't drive is at the wheel?

Fully autonomous vehicles, often referred to as Level 5 autonomous vehicles, are distinct from other self-driving cars in that they do not have steering wheels, pedals, or other control mechanisms. Once these vehicles are on the roads in large numbers, they are predicted to save 30,000 lives in the United States each year by eliminating accidents owing to operator error. Recent evidence suggests that these vehicles will be safer than "human-in-the-loop" semi-autonomous vehicles by removing takeover time and human error.

How far away are we from having fully autonomous vehicles in the United States? What's the urgency?

You may be surprised to learn that autonomous vehicles are already active across the United States. Nineteen states are currently involved in autonomous vehicle testing and there are nearly fifty autonomous shuttle services running in municipalities across the country.

Driver's license requirements are handled by states; how would the federal government get involved?

While it is true that states handle the majority of rules related to how licenses are issued and utilized, there is precedent for national licensure programs. The Department of Homeland Security's REAL ID Program, for example, regulates what information must be included on state IDs (including driver's licenses) and how these IDs are used.

About the Authors
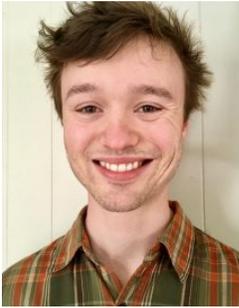
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