EXPERTS TALK

Impact of Autonomous Vehicles on Urban Transit with Josh Sikich

Autonomous Vehicles Expected to Play Role in Giving Better Transit Options to Citizens at Lower Cost to Public Agencies

Connecting more people to more jobs, services and communities is the goal of autonomous vehicles. Preparation for future autonomous fleets will help improve access and boost services for citizens who, in the past, have had more limited travel options. Key opportunities also lie in lower-density areas where innovation could pave the way to improved transportation options for people at lower costs to public agencies.

Josh Sikich, AICP, serves as a transportation technology program manager in our transportation technology practice. His professional background includes managing the Central Ohio Transit Authority Transit System Redesign project, which was COTA's first system-wide transformation, connecting more than 100,000 additional residents and 110,000 more jobs to frequent, reliable bus transit service. As a result, in 2018 COTA was named the best transit agency in North America among its peers by the American Public Transportation Association.

Josh has master's degrees in civil engineering and city and regional planning from The Ohio State University. Contact **Josh Sikich** for more information on the impact of autonomous vehicles on urban transit.

Q. Transportation appears to be changing rapidly. How will autonomous vehicle technologies impact mass transit?

A. Government agencies need to prepare for the future, and scenario planning that uses available information to create a range of viable futures is one way to do that. To assess AVs' future impacts, agencies can review data regarding past technology adoption rates, public perception surveys, new mobility options, economic indicators, the safety of new technologies and demographic trends, to name a few.

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AV technologies will have a variety of impacts on transit based on population and employment density, similar to how transit characteristics vary today. Urban passenger rail will continue to form the backbone of large, vibrant cities. The same could be said about highly-used bus routes that currently carry lots of people along densely-populated corridors. When you need to transport large numbers of people in a constrained space, existing bus and rail work very well, especially where right-of-way is dedicated to transit. AV technologies could increase access to these key transit corridors through seamless first- and last-mile connectivity. For example, vehicles could be timed perfectly to arrive and depart a station in coordination with the train, as well as in line with the surrounding smart ecosystem of connected traffic signals, in order to expand the positive impact of primary transit routes.

On the other hand, buses that currently travel in outlying neighborhoods or in small cities can be cumbersome to users. Right now, traditional bus service leaves much to be desired in these lower-density areas. We have key opportunities to deploy innovative practices that would deliver better transportation options to citizens at a lower cost to public agencies. AV technologies could allow shared vehicles to pick up and drop off at people's front doors before forming a "train" (known as a platoon) of closely-spaced vehicles traveling along shared roadways. Vehicles could autonomously group together and separate in ways that coordinate safe, fast and efficient traffic flow for all travelers' individual destinations in ways that are impossible today.

Q. What is the current status of overall technical capabilities in regard to using AVs in urban transit?

A. While the past decade has seen numerous autonomous vehicle companies formed and millions of miles of self-driving testing around the country, there are several issues that need to be resolved before AV technology becomes fully mature. Software and sensing technologies are improving rapidly, but our studies for Colorado and Florida Departments of Transportation are concluding that AV adoption will not be widespread until well after the year 2030 and beyond.

However, there is a lot of excitement for a new transportation experience with autonomous microshuttles. These vehicles are being tested in places such as Lincoln, Nebraska; Jacksonville, Florida; and Columbus, Ohio. Microshuttles are currently limited in their speeds and slower than traditional buses, but could provide cost effective service as an urban circulator in downtown areas. Pilot deployments allow real-world testing of this new transit technology and provide the opportunity to get the public's feedback on the most effective routes and schedules. As the technology continues to evolve, we can expect that autonomous transit will mature in the coming years and decades.

Q. By incorporating AVs into our transit systems, how will they improve safety and accessibility?

A. A key driver of AV technology is the possibility that it will save lives. Tens of thousands of people in the United States die on our roads every year. Motor vehicle crashes are the leading cause of death among teenagers. It's a public health crisis repeated year after year. According to the National Highway Traffic Safety Administration, more than 90 percent of crashes involve human-related errors such as driving too fast and misjudging other drivers' behaviors, as well as distraction, fatigue and alcohol impairment. As technology improves and AVs become safer than human drivers, the number of deaths on our roads is expected to be reduced drastically.

However, current data from the Federal Transit Administration National Transit Database indicates mass transit is an extremely safe mode of travel with far less than 1% of annual surface transportation fatalities being related to transit. When it comes to transit, accessibility could be the key driver of new technologies. Millions of people cannot drive in the United States due to physical disability, mental impairment or age. Transit agencies do the best they can to serve these individuals, but there are exciting future options for more mobility. When AVs become mainstream, everyone will have the ability to travel quickly and comfortably. Access to transportation will increase dramatically for those who historically have been disadvantaged in their travel options.

Q. Many people access transit by a variety of other modes. How will bicyclists and pedestrians be impacted by AVs?

A. Everyone begins and ends every trip as a pedestrian in some way. AVs are expected to further improve the safety of pedestrians and bicyclists. For example, rearview cameras reduce backing crashes by approximately 17%. Lane departure warnings reduce injury crashes by approximately 21%. As vehicle sensor and software technology achieves reliable 360-degree detection and crash avoidance, safety benefits for all road users will continue to grow over time.

Public policy will play a key role in the future development of streets. Transportation officials should support policies that provide ample space for pedestrians and bicyclists in our future cities. The popular animated movie, "WALL-E," points to a dystopian future in which no one ever leaves their seats and humanity loses its passion. We don't want that! Large, dense cities may decide to adopt a pedestrian-first mode hierarchy in order to design for people first and foremost. Other cities may choose to adopt AV policies that prioritize elderly and disabled individuals to ensure that everyone has access to AVs. Public policies that create performance-based measures can allow the massive safety and mobility benefits of AVs to flourish.

Q. What can transit agencies do now to prepare for emerging technologies?

A. A good first step is to create a roadmap for the future that emphasizes the ability to adapt to change and consider the broad range of automated technological applications. New technologies can be used today that can increase safety and on-time performance, for instance. Communication tools for riders are becoming more widespread and sophisticated, offering service quality that was unmatched in the past. For example, when I led the transit system redesign at COTA, geo-fenced information communicated route changes specific to the needs of individual travelers. Public agencies will benefit by leaning into the changing transportation landscape. A future-proofing roadmap facilitates the process for an agency to integrate its mission, goals and performance measures into its capital program, and foster an environment where new disruptive technologies and business models that advance the public good can be incorporated into the transit network.

Inspiration & Advice

Q. What inspired you to focus your career on developing transportation technology programs related to AVs and mass transit?

A. I grew up a short walk from a commuter rail station in the South Suburbs of Chicago and my family has enjoyed using transit for decades. One of my earliest elementary-school reports was on Lincoln Highway, the first road across America, which happened to travel through my neighborhood. Others may find it mundane, but I've always found transportation fascinating!

Transportation especially interests me as it relates to mass transit, bicycling, walking and overall impacts on adjacent urban and rural communities. Just as seat belts began to save lives decades ago, advanced driver assistance systems are beginning to show life-saving benefits in new vehicles today. We are in an exciting era where new technologies offer the possibility to think about a day, at some point in my lifetime, where almost no one dies from a car crash.

Q. What advice would you offer to new professionals in the transportation industry who will be applying these emerging technologies out in the field?

A. New professionals should master the basics of how transportation works and ask lots of questions to their colleagues. How did our transportation evolve to what it is now? How are new disruptive transportation business models funded and why? As we incorporate emerging AV technologies, we want to use them as a means to improve people's lives. New professionals today will lead the policy- and decision-making in the decades to come. They should embrace change and think creatively in order to create a safe and equitable transportation future for all to enjoy.

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