

How AVs are transforming public transportation



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Contents

- 3 Bridging first- and last-mile gaps**
- 4 Helping public transit to recover**
- 7 Reducing costs and improving safety**
- 11 Connecting with existing public transit infrastructure**
- 12 Increased equity and long termism**
- 15 Why one service provider means better organization**
- 16 The future of AVs**

Spotlights

- 5 California**
- 9 Michigan**
- 13 Florida**

Bridging first- and last-mile gaps

In 2016, Contra Costa Transportation Authority (CCTA), in the East Bay Area of California, imported the first autonomous vehicle (AV) into the United States. Tim Haile joined the authority as Deputy Director in 2017 and went on to become Executive Director in 2020.

“I played a part around the testing and the ongoing implementation of shared autonomous vehicles,” he explains. “We own and operate one of the largest AV test beds in the country called GoMentum Station.”

Yet, in order to test AVs on public roads, CCTA had to first initiate specific legislation for their operation.

“I feel like we were the agency that instigated the Department of Motor Vehicles (DMV) and the National Highway Traffic Safety Administration to come up with a regulatory framework,” Haile says. “Fast forward six years, and now the DMV has a process to get permits for level three AVs and they’re starting to look at level four.”

As part of this innovative lead, in September the authority signed a partnership with May Mobility to provide a fleet of seven AVs to improve access to healthcare in the City of Martinez, with the aim of reducing medical appointment cancelations and absences due to a lack of convenient, accessible transportation.



Not only will this provide on-demand transportation for staff, patients and others but Haile sees the potential of AVs to fill other gaps in public transit. This is particularly the case for the region's planned network of shared mobility hubs along Interstate Highway 680, which effectively cuts across the county's 19 cities and 1.2 million people.

Although there are five transit operators in the county, including bus, ferry and Bay Area Rapid Transit [BART], around 95 percent of people in Contra Costa drive. This represents an opportunity for shared autonomous mobility to close the first- and last-mile gap and be the solution for microtransit.

"Shared AVs have the ability to go into those neighborhoods where transit really can't go, collect people and bring them to nodes where you've got high capacity fixed-route transit," Haile says. "A big proportion of our local trips are under two miles, so how do we get people out of their cars? The answer is shared autonomous mobility."

Helping public transit to recover

Statistics from the American Public Transportation Association (APTA) released in 2022 and 2023 paint a bleak picture for the country's public transit system. Although ridership has reached 70 percent of pre-Covid levels, agencies are facing operating budget shortfalls.

"Shared AVs have the ability to go into those neighborhoods where transit really can't go."

Tim Haile

Executive Director, CCTA



Daisy Wall

Senior Director of Government Business at May Mobility

Fifty-one percent of APTA members responding to a survey say they are facing a "fiscal cliff" in the next five years and for the largest agencies, with operating budgets greater than \$200 million, the percentage is higher, at 71 percent with an expected budget shortfall of between 10 and 30 percent.

The association reports that four out of five agencies are already cutting services due to worker shortages, problems in retaining staff, increasing costs from global inflation and the associated growing wage demands.

"Once you cut a service, the question is: what happens to the people that were relying on that service?" says Daisy Wall, Senior Director of Government Business at May Mobility, a leader in the development and deployment of autonomous vehicle technology. "Autonomous mobility can help support today's current public transit while also creating new modes so communities have a more resilient and healthier transportation ecosystem."

[Continued page 7 >](#)



Contra Costa Transportation Authority (CCTA), California

Tim Haile recounts the time when his office, the Contra Costa Transportation Authority (CCTA), received a call from the county hospital informing his department of a growing rate of missed medical appointments by patients. Many patients complained of a lack of transportation, unreliable services, or drivers not turning up to collect patients.

“They asked us what we could do, and that’s when we decided on an autonomous mobility project that is wheelchair-accessible,” the Executive Director explains. “That’s how we came to May Mobility as they had the right technology for the problem we had.”

In addition to stops at local medical facilities in the City of Martinez, there are plans for the deployment to include pick-up and drop-off points that enhance transit connectivity and link with local areas of interest. This includes a shared



Tim Haile

Executive Director
of Contra Costa
Transportation
Authority (CCTA)



mobility hub in the downtown area at the Amtrak station. In early 2024, seven human-supervised May Mobility vehicles – three of which will be wheelchair-accessible – will operate and integrate with the existing transportation network.

In partnership with Via, the global leader in TransitTech, riders will be able to book an on-demand AV and, through artificial intelligence technology, passengers will be matched with other riders with similar destinations, grouping them into AV shared trips.

Contra Costa County is not the only region in the US facing an aging population. 15 percent of the country is over the age of 65 and this is expected to double by the year 2035.

“We need to continue to maintain their quality of life to give them the mobility that they need to be happy, healthy and to continue life,” says Haile. “Shared mobility hubs with AVs will be a gateway to seamless connected travel.”

After a recent county-wide travel behavior survey, Haile was able to find out that 95 percent of people are using cars but of that 95 percent, 60 percent are looking for alternatives.

To entice people further away from cars, in the Spring of 2024, the county will launch a new app to help better enable seamless connected travel by providing each user with detailed transit options.

“Those 60 percent that are ready to change now, we call them Champions of Change,” says Haile. “We’re hoping that will allow us not only to design a system around those people and meet their needs, but then create the trial behavior that we need to hopefully attract others into this modernized transportation system.”

“Shared mobility hubs with AVs will be a gateway to seamless connected travel.”

Tim Haile

Executive Director, CCTA

Rather than being seen as add ons, AVs can become part of the mobility landscape and supplement those areas where public transit is not as optimized as a city would like, or where there are gaps.

“AVs offer a new mode of transportation that public transit agencies can add to their ecosystem,” adds Wall. “AVs as a first- and last-mile option are great ways to drive more ridership to fixed-route services.”

Tina Williams, Director of Policy and Stakeholder Engagement at the Intelligent Transportation Society of America (ITS America), believes that AVs can not only bridge the gap between the first- and last-mile connection with mobility hubs but, more importantly, can share data to improve services.

“AVs can share data with public transit agencies which can lead to more efficient and more responsive transit systems,” she says. “The more data being shared then the faster AVs can be deployed.”

Reducing costs and improving safety

The National Highway Traffic Safety Administration estimates that there were 42,795 traffic fatalities across the country last year. Although fatalities in 27 states, the District of Columbia and Puerto Rico are projected to decrease in 2022 as compared to 2021, 23 states are expected to see an increase.

An expansion in the use of AVs can not only boost public transit ridership but also play an important role in reducing road traffic accidents.

“Human drivers are pretty good but there are still a lot of accidents” says Corey Clothier, Founder and former Director of Stantec GenerationAV, a company that enables the deployment of AVs. “We’ve become a bit numb to it. If we can reduce the number of accidents, that’s fantastic. The faster we get this technology out there it will have a major impact on safety. The fewer personal vehicles on the road, the less congestion, the less stress, the fewer headaches and accidents.”



Tina Williams

Director of Policy and Stakeholder Engagement at the Intelligent Transportation Society of America (ITS America)



Corey Clothier

Founder and former Director of Stantec GenerationAV

This means increased safety not only for the driver but also passengers, pedestrians and other vehicles.

Similarly, the financial cost of personal vehicle ownership is rising – not just for families but for cities and companies, from operating and ongoing maintenance costs to the provision of parking. AVs are a possible route out of this.

Joe Iacobucci is the New Mobility Leader from Sam Schwartz, an engineering, planning, and consulting firm. The company helps support AV microtransit

to provide the greatest benefit to public transit agencies and extend the reach of transit to create a multimodal environment. He believes the average annual cost of vehicle ownership to be approximately \$10,000, which is a burden for many families.

“This is especially so for those most vulnerable that live in regions where there isn’t good public transit,” he says. “The ability for AVs to provide a platform service in a more integrated transportation system will unlock some of the burden for a lot of families.”

He adds that AVs can fill big holes in public transit such as late-night services, which many public transit agencies find difficult to provide.

Kevin Desmond, Principal and National Director for Transit and Rail at Sam Schwartz, says that this will mean the business case for automated transit will continue to grow – in particular for very low ridership loads where the price point for fixed-route transit doesn’t exist.

“There are so many areas of a city that are really not possible or feasible to serve,” he says. “Whether they be transit deserts or a city simply doesn’t have the density to support transit that is remote from the center and remote from main lines. That’s where AVs can come in and start opening up a city’s territory – in theory, in a much more cost-effective way.”

AVs can also play a part in transforming communities and cities to become healthier and friendlier places.

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Kevin Desmond

Principal and National Director for Transit and Rail, Sam Schwartz



**Kevin
Desmond**

Principal and National
Director for Transit
and Rail at Sam
Schwartz

Iacobucci from Sam Schwartz focuses on the cost of parking needed for personal vehicles. Whether they be college campuses, airports, medical centers, or government-owned car parking spaces. The cost of parking varies from city to city with some estimates being tens of thousands of dollars to hundreds of thousands of dollars, which in the long term is not sustainable.

“The cost of structured parking is roughly \$25,000 to build and thousands of dollars per space to maintain per year,” he says. “The opportunity cost of providing a robust transit service is much more the attractive option and also lowers costs.”

The deployment of AV use cases can stimulate a microtransit ecosystem and attract buy-in from other stakeholders. In Detroit, even just the talk of a May Mobility deployment of an AV shuttle service to older residents and individuals with disabilities attracted the attention of Delta Dental. The American network of dental insurance companies later

[Continued page 11 >](#)



City of Detroit, Michigan

By the Fall of 2024, two zones of Detroit will see AV shuttle services deployed serving older residents and people with disabilities.

The shuttle service will be led by the Michigan Mobility Collaborative (MMC), a public-private partnership which includes car manufacturers, Verizon, Deloitte, the Transportation Research Institute and MCity, from the University of Michigan. Via will provide the program's AI-based booking and routing algorithms.

Greg McGuire, Managing Director at MCity, hopes for the initial one-year trial to be carried further.

“Our role is to help the City of Detroit publicly demonstrate the performance and safety of a vendor - in this case May Mobility - and conduct the MCity Safety Assessment Program,” he says. “It’s a public way to show these systems have the competency that we need before they’re out on public roads. We steer the technology and its evolution so it’s used in good ways.”



Greg McGuire
Managing Director
at MCity



The pilot follows 18 months of intense research and development, including prior community engagement and investigation into which areas would be best for deployment.

Tim Slusser, Chief of Mobility Innovation at the City of Detroit, will be looking for the potential of the trial in other areas. His office is responsible for helping to identify the right new technologies that exist in the marketplace and that can have a positive impact.

“This trial will give the City of Detroit first-hand experience and the information we need to evaluate how these types of services could be integrated into existing services and complement those,” he explains.

The city has one of the largest land masses as a major metropolitan city, creating a population density challenge in serving residents with public transit.

“Greater than 80 percent of our transportation happens by car,” he says. “We do have a robust bus system but we were hit hard by Covid that then threw pricing into a spiral,” he says. “You can solve that by not necessarily building a bigger bus network but to identify solutions, like AVs, to get more people to the existing routes more effectively and efficiently.”

“We are extremely supportive of innovation and technology here in the City of Detroit,” he adds. “We know that is our heritage. We know that is in our DNA and we want to continue to foster those solutions.”



Tim Slusser

Chief of Mobility
Innovation at the City
of Detroit

committed money that will help launch the shuttles in 2024.

“To promote healthy outcomes, dental organizations and other healthcare institutions know that in order to promote healthy outcomes, they want seniors to make their dental appointments because the greatest barrier to healthcare is the lack of public transportation,” explains Wall. “AVs can help tie in better health outcomes.”

Wall adds that as AV deployments are launched, interest grows from adjacent businesses, communities, universities, hospitals, airports and real estate developers as they all want to become a part of it.

“That’s what really excites us; the growth of autonomy hubs where public private partnerships start to really form and flower, and from there you get that community buy-in,” she says.

Connecting with existing public transit infrastructure

In Miami-Dade, since 2020, the county-run GO Connect shuttles have been successfully connecting nearby transit users to and from Metrorail, transit stations and other destinations. Since its launch, the service has surpassed 150,000 rides in four areas and is due to be expanded to eight.

Recently rebranded as MetroConnect, the on-demand service – in partnership with Via and

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Kevin Desmond

Principal and National Director for Transit and Rail, Sam Schwartz

using its own TransitTech platform – will enable rides to be shared, on-demand, and accessible to the public.

“We introduced the [Metro Connect] program as a first- and last-mile option and to augment access to transit,” explains Carlos Cruz-Casas, Chief Innovation Officer at the Department of Transportation and Public Works for Miami-Dade County. “Whether it’s the first or last mile, we need to be there for our community and provide a service.”

In December, 10 May Mobility AVs will be introduced into the on-demand microtransit options through the MetroConnect service. This is alongside a new program of six corridors to be rolled out from November which, in part, will include gold standard Bus Rapid Transit (BRT).

“My goal is to have a better understanding and push the technology to support the development of on-demand transit through AVs,” says Cruz-Casas, who also leads the Office of Innovation and Mobility Services. “But at the same time, leverage the technology for current management of freight at the curb and to explore passenger loading and curb spaces.”

Cruz-Casas sees his role as to bring mobility innovation to the county and not just new technology. He believes that mobility innovation is more about addressing the problem from a different approach and point of view.

“AV technology is being led by the private sector but there is an option for us to bring that know-how and expertise into how we want to transform mobility more broadly,” he adds.

According to Wall from May Mobility, the most exciting aspect of the partnership is becoming part of the MetroConnect service and realizing a vision of having one transit agency, incorporating a fixed-route bus, paratransit, Bus Rapid Transit and on-demand services, including AVs.

“It’s like a family of services that are coming together for the public,” she says. “That is the full realization and the vision.”

The county includes 34 municipalities spread over 2,000 square miles with nearly 3 million residents, and provides a unique opportunity for May as Miami-Dade is not only a city, but a county and a regional provider.

“You have major universities there, an airport, and a port, so there are lots of opportunities to grow out that hub,” adds Wall.

This innovation and new approach can play a big part in providing a good multimodal transit service and Cruz-Casas is open to more mobility innovation.

“Miami-Dade has everything other than snow and slopes,” says Cruz-Casas. “It has heavy

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Carlos Cruz-Casas

Chief Innovation Officer at the Department of Transportation and Public Works, Miami-Dade County

dense areas like the urbanized downtown, beaches, suburban areas and even farms. If you can operate your technology here, where many companies come to test in our heavy rains, then you can operate anywhere.”

Increased equity and long termism

One organization that is helping to coordinate the testing of AVs is ITS America. It is the only non-profit in the country that brings together AV deployment, policy consensus, and deployment recommendations for both the private sector and local, state and federal government. It is also the only organization founded by Congress to scale technology.

Williams from ITS America says AVs can accommodate people with disabilities. For example, some accessible Toyota Sienna vehicles are used by May Mobility in every fleet.

“They can optimize route scheduling, based on traffic conditions and public transit timetables. There’s a lot that AVs can do additionally to connect with public transit,” she says. “The ultimate goal is that they serve the purpose of equity and inclusion, first and last mile, and the goals and needs of the community.”

Stan Caldwell, Adjunct Associate Professor of Transportation and

[Continued page 15 >](#)



Miami-Dade County, Florida

In December, Miami-Dade residents will be able to use one of ten autonomous vehicles operating in two of the MetroConnect zones: the Civic Center near downtown Miami, and Dadeland, which comprises a university, shopping malls, employment centers and apartments.

The 18-month trial will become a part of the suite of transit options offered by MetroConnect.

“Instead of going to other AV shuttles – that are limited in how they can operate in mixed traffic with road signals and the like – we decided to skip forward and started looking at how the technology can be already [used in those environments],” says Carlos Cruz-Casas, Chief Innovation Officer at the Department of Transportation and Public Works for Miami-Dade County, on why May Mobility’s offering was the most attractive.



**Carlos
Cruz-Casas**

Chief Innovation
Officer at the
Department of
Transportation and
Public Works for
Miami-Dade County



The main focus for the county is to prioritize the 25-mile elevated rail network and BRT in a network of high-frequency corridors but then include pockets of first- and last-mile on-demand services, including AVs.

“Shared rides are the way to go,” he adds. “We see AVs as fully compatible with on-demand transit and as the technology evolves and we see larger capacity vehicles, then we can start further supporting fixed-route bus services and BRT.”

A month after the launch of the AV trial, the county will embark on one of its most ambitious projects to date – the Better Bus Network. It entails a complete overhaul of the county’s 99 bus routes, in addition to the ongoing 20-year project to convert the entire traffic signal network into adaptive signal control and remote management.

For Cruz-Casas top of mind is the community rather than technology and to think first about the outcomes.

“We have a lot of people moving to Miami-Dade County and the community is with us,” he says. “We’re going to continue to grow our heavy rail, our rapid transit, our commuter rail, intercity rail and on-demand transit zones. All these are happening so more opportunities for mobility options will arise.”

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Miami-Dade County

Public Policy from Carnegie Mellon University, emphasizes that it is incumbent on the transit agencies to identify and then decide where to deploy rather than leaving it up to AV providers.

Cities need to look at their own data and identify where populations are cut off from existing networks, and locate the populations that really need augmented services, not just the ones who can pay for it.

May Mobility's ethos is that it wants to shape this together with the city and to learn together so that the company can advance its own technology when rolling out and reaching those communities.

This means working and contracting directly with cities or transportation agencies so the service aligns with the community's longer term strategic goals. These are usually, but not exclusively, tied to efforts surrounding economic growth, equity, improved health, greater connectivity, new jobs, or sustainability.

"We always ask: 'Where are the needs? Where can we make the most impact?'" says Wall from May Mobility. "Importantly, we want to see a long-term plan. We want to avoid communities that are looking to bring in innovation as a just a short PR thing. To us, that is not meaningful. Our goal is to introduce a service and then figure out with

"The ultimate goal is that [AVs] serve the purpose of equity and inclusion, first and last mile, and the goals and needs of the community."

Tina Williams

Director of Policy and Stakeholder Engagement, ITS America

the city how we can be there for many years to come."

The AV provider is also keen to scale further but incrementally. Rather than thousands of vehicles immediately it wants to scale steadily from 10, 30, 100 vehicles in each location based on if and where the needs arise.

Wall says that May Mobility is different in that the company offers shared rides, because it believes in the sustainability component and works with cities to identify predetermined stops.

"We are not a full TNC [transportation network company] and neither are we public transit," she explains. "We sit somewhere in the middle."

Why one service provider means better organization

Since July 2021, transit users in Pittsburgh have been able to find a bus, bike, scooter, moped, car or shared ride using the Transit app or by visiting 23 new mobility hubs rolled out across the city.

Named Move PGH, it was the first system in the US to integrate transit and shared mobility in both physical and digital mobility hubs and connects traditional and emerging shared transportation options into a single system.

Tosh Chambers, Senior Program Director at Move PGH, says that since the rollout, public transit ridership has ticked up year over year, including a portion of people using non-traditional forms of shared transportation to connect with public transit. Although shared shuttles or shared AVs are not part of the suite of services offered by Move PGH, Chambers says it is something he is interested in exploring.

“But we recognize the need for additional planning to understand where exactly in our network does that tend to benefit?” he says. “Where are these other micromobility services not meeting that need and where could AVs play a part?”

A key component of the Move PGH program is that only one company is allowed to operate for that particular service, whether that be e-bikes, e-scooters, or car share.

Chambers’ colleague Chase Klingensmith, the City of Pittsburgh’s Autonomous Vehicle Policy Analyst, wants to feed people into public transit but not be a competitor to public transit.

“That’s when you start deploying multiple services and that’s why the City of Pittsburgh files an RFP [Request for Proposals] when we engage with new technologies to ensure one service provider,” he says. “If there is going to be competition in the space [bidding for RFPs] we don’t want our citizens in the crossfire. It’s much easier to work with one provider and track how things are going.”

Caldwell from Carnegie Mellon, which partners with Move PGH, adds that as a result of this, shared mobility companies aren’t allowed to come in and go wherever they think they can make the most money.

He explains: “Instead, Move PGH sits down with a company and develops a concerted plan with them to say: ‘Okay, here’s how we want you to be able to make money but we want you to be able to do it in a way where you’re serving everyone.’”



Chase Klingensmith

City of Pittsburgh’s
Autonomous Vehicle
Policy Analyst

The future of AVs

AVs can have the biggest impact when they are accessible, shared and complement existing transit infrastructure to and from hubs such as college campuses, medical centers, and mobility hubs. The vehicles can improve accessibility, enhance connectivity, reduce congestion, customize routes, reduce parking demand, and integrate services.

“As we’ve seen, especially after Covid, people need different options to get to places as rider expectation and commuting patterns have changed,” says May Mobility’s Wall. “The key is how can you provide as many different modes of transportation as possible that really match well with the purpose of the rider to make sure that they can get from point A to point B, get to jobs, educational opportunities and healthcare. There’s a real opportunity for AVs to really shape the future of transportation.”