

Livermore Amador Valley **TRANSIT AUTHORITY**



THE
FUTURE OF
TRANSPORTATION

Shared Autonomous Vehicles

Project Overview

Why are Shared Autonomous Vehicles (SAVs) important to public transit and the economy?

Advances in shared autonomous vehicle (SAV) technology are moving forward at a rapid pace. With an ability to operate much more efficiently, the electric SAV will unleash the full potential of major transit investments, now and into the future, by functioning as a reliable feeder service for frequent and convenient public transportation, such as the BART system and the Livermore Amador Valley Transit Authority's (LAVTA) bus rapid transit network.

The result will be less congestion and pollution, greater safety on roadways, and a leap in the quality of life for residents. Specifically, the vision of this project has been to test and place into service, SAVs on public roads near the East Dublin/Pleasanton BART station.

The objective is to transport passengers who live or work beyond a convenient walking distance from the East Dublin/Pleasanton BART station and LAVTA's bus rapid transit system to and from the nearby business and retail complexes, so that they can forgo the hassle of driving a short distance and finding parking if an attractive alternative was available.

LAVTA's strategic partners in this project include:

The Bay Area Air Quality Management District
baaqmd.gov

The City of Dublin
ci.dublin.ca.us

The Bay Area Rapid Transit District (BART)
bart.gov

The Metropolitan Transportation Commission (MTC)
mtc.ca.gov

SAV distributor EasyMile
easymile.com

Transdev Vehicle Maintenance and Operator
transdev.com

Goals



Increase BART and LAVTA Bus Rapid Transit ridership

Shift single occupant vehicle trips to transit trips, reducing emissions

Increase farebox recovery for transit operations

Improve trip reliability, safety and the environment

Create transit jobs

In the future it is envisioned that through a collaborative effort, Contra Costa County and Eastern Alameda County will deploy more than 173 SAVs to provide an additional 3.8 million rides per year in public transportation, while realizing a 90% improvement in safety.



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CAUTION: VEHICLE MAKES SUDDEN STOPS
PLEASE MAINTAIN A SAFE FOLLOWING DISTANCE

EASY
MILE

8121372

e210

e210

About our team

Our working staff introduction.

Michael S. Tree

Executive Director

Michael S. Tree is the Executive Director of the Livermore Amador Valley Transit Authority. Prior to joining LAVTA in 2014, he acquired over 20 years of experience in senior positions within the public sector, including most recently as General Manager for the Missoula Urban Transportation District in Montana.



Toan Tran

Director of Operations and Innovation

Toan Tran is the Director of Operations and Innovation at LAVTA. Toan has over 17 years of experience working in the transit industry. Prior to joining LAVTA in 2020, he served as the Chief Operating Officer with the San Joaquin Regional Transit District in Stockton, CA, and the Manager of Transit Program Controls with the Orange County Transportation Authority in Orange, CA.




Tony McCaulay

Director of Planning and Marketing

Tony McCaulay is the Director of Planning and Marketing at LAVTA. Prior to joining LAVTA in 2017, he worked for 20 years with the Regional Transportation District (RTD) in Denver, Colorado, including positions in which he oversaw marketing, service planning, sales and customer information functions.



A scenic view of a town and mountains. The foreground is filled with lush green trees and a grassy hill. In the middle ground, a town with various houses and buildings is visible, including a prominent red barn. The background features rolling green hills and a range of blue mountains under a clear blue sky. The overall atmosphere is peaceful and inspiring.

Alone we can do so little;
together we can do so much.

SAV Project Phase One

Accomplishments and Lessons Learned

Livermore Amador Valley Transit Authority (LAVTA) is the first transit agency on the West Coast to provide autonomous service to civilians on public roads.

The testing phase has given LAVTA insight into how the SAV can function on public streets with other pedestrian, cyclist, and vehicular traffic in the same space. The vehicle has shown the capability of operator-validated stops and yields to obey traffic signs and right-of-ways.

Through the initial phase of testing, a speed increase from six mph to eight mph has been programmed into the vehicle's software. Speed increases allow the SAV to operate on streets with higher speed limits without substantially affecting the flow of traffic.

Testing



Testing included: keeping the vehicle on schedule, weather impacts, vehicle speed, battery consumption and mileage, various obstacles the vehicle reacts to, issues requiring manual override, and various environmental conditions.

Vehicle Speed



Gradual speed increases have been programmed with the consideration of safe operation of the vehicle and transportation of passengers, with the goal of more seamlessly integrating into the flow of traffic.

Revenue Service



The SAV is now open to the public, offering trips on the Phase One route in order to connect to the East Dublin/Pleasanton BART station and nearby businesses and retail. While the vehicle is fully autonomous, an operator will continue to be on board at all times.

SAV Project Phase One

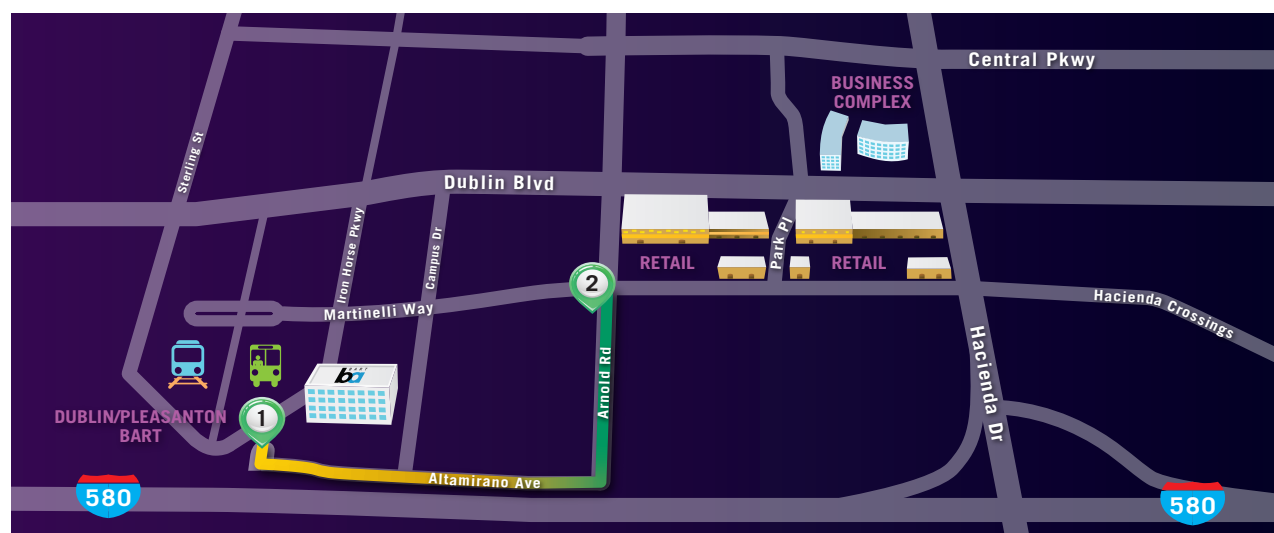
Accomplishments and Lessons Learned Cont.

LAVTA's SAV has operated autonomously for four hundred and twenty miles accident-free for the past several months since the start of testing.

As of recent events, LAVTA has reached a new milestone in completing Phase One of its SAV project. With respect to COVID-19 safety precautions, reservations have opened up to the public to book transportation for up to three passengers per trip.

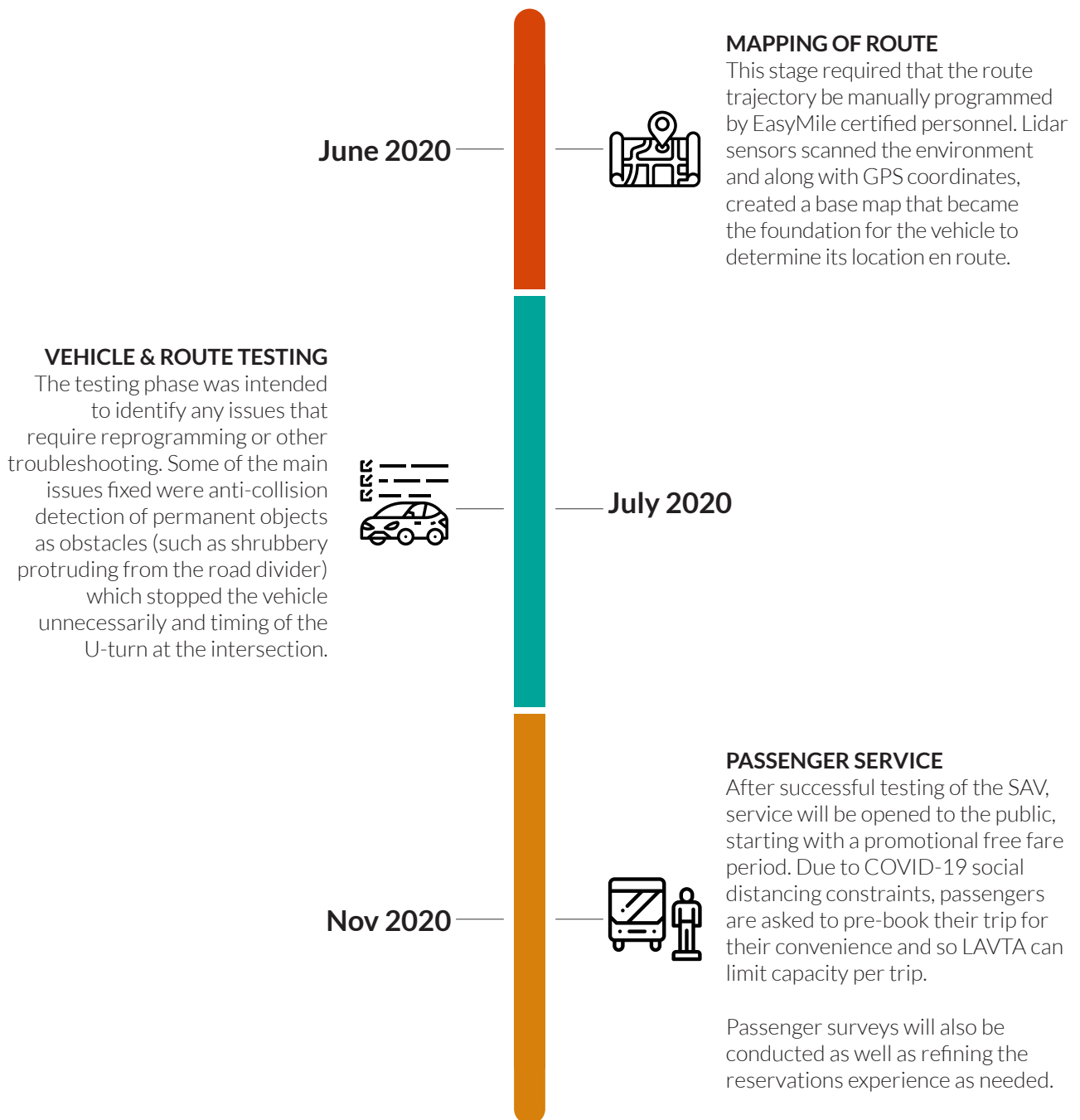
The current route begins at the East Dublin/Pleasanton BART Station and ends at the intersection right before the Persimmon Place Shopping Center. The East Dublin/Pleasanton BART Station is a transportation hub offering rapid transit, ride-hailing, taxi, and several bus services connecting people to destinations within and around the Tri-Valley.

The location of the SAV route is an opportunity to capture passengers who are seeking to travel to and from BART and the nearby shopping centers and business parks. Given the East Dublin/Pleasanton BART Station is the last stop before you hit the end of BART's rail line as well as a popular hub for fixed route bus service, serving this location is an important step in order to introduce the SAV as a first/last mile option.



Timeline

Phase One



Timeline

Phase Two

Next 12 Months

FURTHER TESTING

Even during revenue service, LAVTA will continue analyzing the vehicle, route, and service to better understand the SAV technology and improve customer service.

Some use case examples are:

- Auditory and visual boarding/alighting indications to passengers (including disabled and visually impaired)
- Vehicle speed and delay in various crosswalk scenarios, with and without operator validation
- Verifying vehicle location during route and relaying to passengers
- Addressing the Vehicle to Infrastructure (V2I) communication at intersection traffic lights
- Routing and operation for potential service expansions



VISION AND GOALS

Successful deployment of the SAV and expansion of the project will truly offer a convenient and efficient first/last mile mobility option by augmenting service to and from BART and LAVTA's rapid and local routes. Adding the options and amenities that riders want and need, such as improved facilities for a mobility hub, bike/scooter vv, and pedestrian walkways, will further promote public transit, and reduce traffic congestion and pollution.



And Beyond

SAV Project Phase Two

Expansion

Using the advancing capabilities of SAV technology, LAVTA will continue and expand the service testing begun in Phase One with the ultimate goal of providing a safe, convenient on-demand service to augment traditional transit service.

Even during revenue service, LAVTA will continue analyzing the vehicle, route, and service to better understand the SAV technology and improve customer service.

Part of the continued testing for service improvements include analysis of various use case studies to ensure equity for all passenger demographics and the best user experience possible. Examples:

- Auditory and visual boarding/alighting indications to passengers (including disabled and visually impaired)
- Vehicle speed and delay in various crosswalk scenarios, with and without operator validation
- Verifying vehicle location during route and relaying to passengers
- Addressing the Vehicle to Infrastructure (V2I) communication at intersection traffic lights
- Routing and operation for potential service expansions

Phase One will already provide transportation between the East Dublin/Pleasanton BART station and the closest retail shopping center, Persimmon Place. Phase Two of this project will include expanding the route to serve even more passengers at the business complexes within a mile of the station.



In order to keep up with SAV advancements, LAVTA will need to upgrade and expand the fleet as well as various infrastructures, such as the vehicle communication with traffic lights and signage.

Financials

SAV Project Phase Two

Capital Costs

■ Shared Autonomous Vehicles (4 x \$375,000)	\$1,500,000
■ V2I Upgrades (2 x \$250,000) Vehicle to Infrastructure communication with intersection traffic lights	\$500,000
■ Mobility Hub	\$350,000
■ Software Updates/Signage	\$100,000
■ Bike/Scooter Share Program	\$250,000
Total	\$2.7 million

Operating Costs

■ Shared Autonomous Vehicles Assumptions: <ul style="list-style-type: none"> • 3 revenue vehicles and 1 spare vehicle (5-10 minute headways) • 10 hours/day, Mon-Fri • Safety operators are unionized • Transdev is a turnkey operator 	\$4.3 million/year
■ TDM Marketing Budget	\$75,000/year
Total	\$4.4 million/year

Miscellaneous

■ Farebox Revenue Estimated ridership: <ul style="list-style-type: none"> • 26 rides/hour average • 800 rides/day 	\$417,600/year
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Now and Tomorrow

Some of Our Mobility Offerings

Fixed Route Service

Providing Local, Express, Rapid, and School Route bus service as well as accessible door-to-door paratransit in Dublin, Pleasanton, Livermore, and the surrounding unincorporated areas of Alameda County.



Go Tri-Valley

Fare subsidy program serving the Tri-Valley for Uber and Lyft trips that encourages connections to major transit hubs like Livermore Transit Center and BART and provides extended service hours coverage.



Shared Autonomous Vehicles

Recently completed a comprehensive testing process and has been certified for use on public streets by the National Highway Traffic Safety Administration. As it progresses, SAVs will improve mobility by providing first/last-mile solutions for passengers between the East Dublin/Pleasanton BART Station and nearby locations.



Bike/Scooter Share

Future development intended to complement public transit, such as bus rapid routes and BART connections.



Looking Ahead

The Future of Transportation

The efforts that we are making now are all steps towards achieving the visions and goals for better mobility and public transit access throughout Alameda County and the Bay Area. With the continue collaboration with our various transit and community partners and planning commissions, we can work to:

- Provide More Affordable and Better Access to Public Transit, including Paratransit and First/Last Mile Connections
- Improve Transit Reliability and Frequency
- Advance Communication for Traffic Signal Priority
- Maintain Safe Fleet and Infrastructures
- Support Multimodal Transit Navigation Technology and Applications
- Reduce Traffic Congestion
- Establish a Mobility Hub to Facilitate Connections between Various Mobility Options
- Address Climate Change and Air Quality
- Advocate for Safer Walking, Biking, and Scooter Facilities and Corridors
- Improve Options and Amenities for Fixed Route Service and Multimodal Service
- Explore Innovative Transit Solutions for Low and High Density Areas

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