FEDERAL TRANSIT ADMINISTRATION (FTA)

Transit Bus Automation Quarterly Update

Q1 2021 Update

U.S. Department of Transportation
Federal Transit Administration

This FTA document identifies and provides information on transit bus automation pilot projects, demonstrations, and tests and consists of:

➤ Summaries of news items published in Q1 2021 related to automated transit buses, including both domestic and international projects.

➤ Summaries of U.S.-based activities related to automated vehicle testing projects with transit agency participation. A sub-section lists projects receiving U.S. Department of Transportation (USDOT) funding.

The information in this document is gathered from publicly available sources (e.g., news articles, press releases, and government websites) and may not represent a comprehensive list of all U.S. transit agency automated vehicle activity. Information on additional projects may be sent to transitautomation@dot.gov.

1. NEWS ITEMS (DOMESTIC AND INTERNATIONAL)

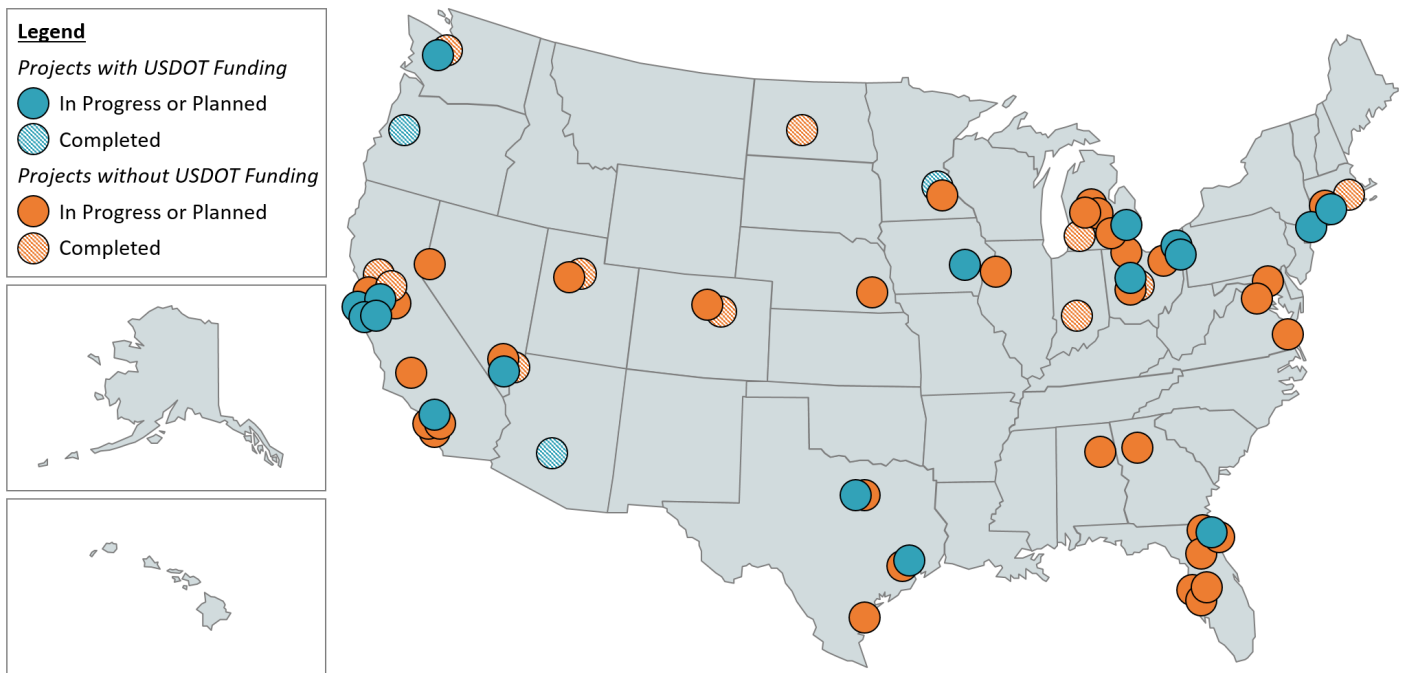The table below contains Q1 2021 news items related to transit bus automation.

Transit Bus Automation News

Month	News Item
January 2021	➤ ARTC received approval for one-year experimental operation of its WinBus shuttle in Taiwan (link) ➤ Aurrigo announced plans to trial a 10-seat shuttle as part of the 5G Create project in Milton Keynes, United Kingdom (link) ➤ Keolis began operating two Navya shuttles in Gothenburg, Sweden (link) ➤ May Mobility unveiled its new automated vehicle model based on a Lexus RX450h model (link) ➤ EasyMile and Sono Motors announced plans to test a solar-powered automated shuttle (link) ➤ WeRide unveiled its "Mini Robobus" and plans to test it on Bio Island in Guangzhou, China (link) ➤ New Flyer unveiled the Xcelsior AV automated transit bus (link) ➤ LILEE and the city of Tainan began conducting automated bus tests with passengers in Taiwan (link)
February 2021	➤ ANA began using an automated bus to transport employees at Tokyo Haneda Airport in Japan (link) ➤ ST Engineering, SMRT, and SBS Transit began collecting fares for an automated bus trial in Singapore (link) ➤ Perrone Robotics and Bestmile announce a partnership for fleet orchestration (link) ➤ Baidu launched a multi-modal MaaS pilot in Guangzhou, China (link) ➤ Gunma University began automated bus testing in Maebashi, Japan (link) ➤ Optimus Ride launched service in Washington, DC (link) ➤ Navya and Bluebus announced a partnership to develop an automated 20' bus (link) ➤ Mobileye, Transdev, and Lohr announced a partnership to develop automated shuttles (link) ➤ Avanza began operating an automated bus produced by Irizar in Málaga, Spain (link)
March 2021	➤ Ouster and QCraft began operating automated buses in Wuhan, China (link) ➤ University of Waterloo announced plans to begin operating its "WATonoBus" automated bus on campus (link) ➤ Solihull Council approved a two-year automated shuttle trial in United Kingdom (link) ➤ Local Motors received local permission to operate an Olli shuttle on public roads in Knox County, TN (link) ➤ Baidu received permits to operate commercialized service in Cangzhou, China (link) ➤ Sony Corporation tested remote operation of its Sociable Cart (SC-1) in Guam (link) ➤ Santa Clara VTA issued an "Accessible Automated Electric Vehicles" RFP (link) ➤ May Mobility launched an on-demand service in Arlington, TX (link) ➤ LILEE Systems received a permit for automated bus commercial service on two bus lines in Taiwan (link) ➤ The German government announced €10.9 million in funding for the "KelRide" automated shuttle project (link) ➤ Optimus Ride and Polaris announced a partnership to commercialize automated GEM shuttles (link)

2. AUTOMATED TRANSIT BUS TESTING ACTIVITIES IN THE UNITED STATES

The USDOT has identified many domestic planned, in-operation, and completed automated transit bus testing activities, as well as many transit agencies interested in participating in automated vehicle testing activities. In several cases, these projects have been or are funded through USDOT programs. Some transit agencies have expressed interest in participating in test activities but do not have a formalized project, or there may be limited information available on the project. The locations of automated transit bus testing are shown in the map below, and additional details are contained in the tables on subsequent pages. The projects included in the map and tables focus on testing automation systems for full-size transit buses or smaller transit vehicles (e.g., low-speed automated shuttles and light-duty vehicles).

U.S. Transit Bus Automation Testing Activities

Source: USDOT Volpe Center, April 2021

Projects with USDOT Funding

Many transit agencies have received USDOT funding for automated vehicle test activities. Some of this funding has been provided through Federal Transit Administration (FTA) programs such as:

❯ Accelerating Innovative Mobility (AIM)

❯ Congestion Mitigation and Air Quality (CMAQ) Improvement Program

❯ Innovative Safety, Resiliency, and All-Hazards Emergency Response and Recovery (SRER) Research Demonstrations

❯ Integrated Mobility Innovation (IMI) Demonstration Program

❯ Mobility on Demand (MOD) Sandbox Program

❯ Safety Research and Demonstration (SRD) Program

- [Strategic Transit Automation Research (STAR)](#)

- [Vehicle Assist and Automation (VAA) Demonstration](#)

Additional projects have been funded by other USDOT modal administrations or by departmental programs, including:

- [Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) Program](#)

- [Automated Driving System (ADS) Demonstration Grants](#)

- [Better Utilizing Investments to Leverage Development (BUILD) Program](#)

- [Smart City Challenge (SCC)](#)

The table below lists many projects with USDOT funding that test automated transit buses and related technologies. Cells with light orange shading and bolded text indicate projects that have been added or updated since the previous version of this document. Note that, in response to the COVID-19 public health emergency, many automated vehicle operations, especially those with shared rides, have been suspended—as a result, many of the projects listed with an "In Operation" status may be temporarily suspended. Each entry contains information on the transit agency or lead organization, a short description of the project, the funding program supporting the project, and a project status.

The status of "In Planning" indicates projects that are producing planning documents or conducting other activities to prepare for operations. The status of "In Operation" indicates projects that are operating a vehicle (e.g., to map out a route, to verify functionality, on a closed course, in mixed traffic, with or without passengers) or are in the data collection/evaluation phase. Projects with a "Completed" status are no longer in operation, and "Cancelled" projects have been discontinued and are no longer moving forward.

Projects with USDOT Funding

State	Transit Agency / Lead	Description	USDOT Program	Status
AZ	Valley Metro	Providing service to users of the RideChoice program via Waymo vehicles. The initial phase of testing provided rides Valley Metro employees. On-road testing was completed in summer 2020.	MOD	Completed
CA	Access Services	Testing automated vans to provide shuttle service between a light rail station and Veterans Administration (VA) hospital.	STAR (Strategic Partner)	In Planning
CA	Contra Costa Transportation Authority (CCTA)	Testing automated vehicles through three real-world demonstration projects.	ADS	In Planning
CA	San Francisco County Transportation Authority (SFCTA) and San Francisco Municipal Transportation Agency (SFMTA)	Testing automated shuttles to provide first-last mile circulation on Treasure and Yerba Buena Islands.	ATCMTD	In Planning
CA	**Santa Clara Valley Transportation Authority (VTA)**	**Developing accessibility features for an automated Local Motors Olli shuttle and testing it at the VA Palo Alto Health Care System.**	**CMAQ**	**In Operation**

State	Transit Agency / Lead	Description	USDOT Program	Status
CA	Santa Clara VTA	Partnering with the Western Reserve Transit Authority (WRTA) and CALSTART to test a purpose-built, common specification prototype automated bus in Mahoning Valley, OH and Santa Clara Valley, CA. VTA is participating as a member of the Connected and Automated Transportation Users Forum (CATUF) effort. In March 2021, an RFP to procure buses was issued.	AIM	In Planning
CT	Connecticut Department of Transportation	Testing automated, electric New Flyer buses on the CTfastrak bus rapid transit corridor to improve safety for riders with disabilities.	IMI	In Planning
FL	Jacksonville Transportation Authority (JTA)	Testing 15 automated vehicles and other ITS systems along Bay Street in Jacksonville, FL.	BUILD	In Planning
IA	University of Iowa	Testing automated vehicles in a loop from Iowa City through rural areas and small towns, providing an example for how ADS can connect rural populations (focus on connecting rural transportation-challenged populations such as older adults).	ADS	In Planning
MI	City of Detroit	Developing a replicable safety evaluation process and deploying vehicles on test tracks and on streets in Detroit to evaluate their safety. The project will also work with older adults and persons with disabilities to better understand their mobility challenges.	ADS	In Planning
MN	Minnesota Valley Transit Authority (MVTA)	Equipping buses in MVTA's express bus fleets with GPS-based technology to improve safety and bus service within narrow shoulder lanes along highly congested corridors (a non-automated system).	SRER	Completed
NY	Port Authority of New York and New Jersey	Testing lateral lane-keeping and bus platooning to improve operations and reduce headways between buses as they traverse Exclusive Bus Lane (XBL) between the Lincoln Tunnel and New Jersey Turnpike. Partners include Robotic Research and Southwest Research Institute (SwRI).	STAR (Strategic Partner)	In Planning
NV	Regional Transportation Commission of Southern Nevada (RTCSN)	Testing an automated circulator shuttle in the Las Vegas Medical District.	BUILD	In Planning
OH	Western Reserve Transit Authority (WRTA) - Eastgate Regional Council of Governments is the lead	Testing automated shuttles in a dedicated shuttle lane as part of the SMART2 Network in Youngstown, Ohio.	BUILD	In Planning
OH	WRTA	Partnering with the Santa Clara Valley Transportation Authority (VTA) and CALSTART to test a purpose-built, common specification prototype automated bus in Mahoning Valley, OH and Santa Clara Valley, CA. WRTA is participating as a member of the CATUF effort. In March 2021, an RFP to procure buses was issued.	AIM	In Planning

State	Transit Agency / Lead	Description	USDOT Program	Status
OH	Central Ohio Transit Authority (COTA) - City of Columbus is the lead	Testing EasyMile EZ10 automated shuttles for the Linden LEAP pilot, which began in February 2020. Due to COVID-19, the shuttles have been repurposed to deliver food boxes to residents in Linden, OH.	SCC	In Operation
OR	Lane Transit District (LTD)	Testing lateral lane-keeping and precision docking on LTD's Emerald Express Bus Rapid Transit.	VAA	Completed
TX	**City of Arlington**	**Integrating automated vehicles from May Mobility into its existing on-demand system operated with the Via ride-sharing service. The service includes a wheelchair accessible vehicle and allows University of Texas at Arlington students to ride fare free.**	**IMI**	**In Operation**
TX	Metropolitan Transit Authority of Harris County (METRO)	Testing an automated EZ Zeus cutaway bus from EasyMile and Phoenix Motors to provide service to Texas Southern University, the University of Houston, and Houston's Third Ward community. The service will connect to Metro buses and light rail.	AIM	In Planning
WA	Pierce Transit	Testing DCS Technologies' Pedestrian Avoidance Safety System (PASS) automated emergency braking in 30 buses. This project has been rescoped to focus on driver assistance technology, but may include an automation component in the future.	SRD	In Operation

Source: USDOT Volpe Center, April 2021

Projects without USDOT Funding

The transit agencies listed in the table below are involved in demonstration or pilot activities that are not part of a USDOT-funded program. As with the previous table, cells with light orange shading and bolded text indicate updates from the previous version of this document. In addition, due to the COVID-19 pandemic, many of the projects listed with an "In Operation" status may be temporarily suspended.

Projects without USDOT Funding

State	Transit Agency / Lead	Description	Status
CA	Central Contra Costa Transit Authority (CCCTA) and Contra Costa Transportation Authority (CCTA)	Testing two EasyMile EZ10 shuttles at GoMentum Station and Bishop Ranch business park.	Completed
CA	CCTA	Participating as a member of the CATUF effort.	In Planning
CA	Golden Empire Transit District (GET Bus)	Participating as a member of the CATUF effort.	In Planning

State	Transit Agency / Lead	Description	Status
CA	Livermore Amador Valley Transit Authority (LAVTA)	Testing an EasyMile EZ10 automated shuttle and providing service from the Dublin/Pleasanton BART Station to nearby locations. Service began in November 2020, and Transdev is managing operation of the shuttle. A previous short-term demonstration of an EasyMile EZ10 automated shuttle was conducted in 2018.	In Operation
CA	Yolo County Transit District (YCTD)	Demonstrating an EasyMile EZ10 automated shuttle.	Completed
CA	Foothill Transit	Participating as a member of the AECOM Automated Bus Consortium (ABC) effort.	In Planning
CA	Long Beach Transit (LBT)	Participating as a member of the AECOM ABC effort.	In Planning
CA	Los Angeles County Metropolitan Transportation Authority (LA Metro)	Participating as a member of the AECOM ABC effort.	In Planning
CO	Regional Transportation District (RTD) - Denver	Testing an EasyMile EZ10 automated shuttle to connect the 61st Avenue and Peña Boulevard commuter rail station to nearby areas.	Completed
CO	RTD	Participating as a member of the CATUF effort.	In Planning
FL	Gainesville Regional Transit System (RTS)	Testing an EasyMile EZ10 shuttle in partnership with the City of Gainesville and Transdev. Some initial testing took place in May 2018, but the project was on hold until it launched in February 2020.	In Operation
FL	Hillsborough Area Regional Transit Authority (HART)	Testing two Navya Autonom automated shuttles on a route between the TECO Line Streetcar and the Marion Transit Center along North Marion Street. The one year pilot began in October 2020. Beep is managing operation of the shuttle.	In Operation
FL	Jacksonville Transportation Authority (JTA)	Testing multiple automated shuttle models (EasyMile EZ10, Navya Autonom, and Local Motors Olli) on a 1/3-mile track as part of a project to replace the existing Skyway monorail. JTA is also testing a minibus to be provided by GreenPower and Perrone Robotics.	In Operation
FL	JTA	Participating as a member of the CATUF effort.	In Planning
FL	Pinellas Suncoast Transit Authority (PSTA)	Participating as a member of the AECOM ABC effort.	In Planning

State	Transit Agency / Lead	Description	Status
FL	PSTA	Testing two Navya Autonom automated shuttles along Bayshore Drive in St. Petersburg, FL. The three month pilot began in November 2020. Beep is managing operation of the shuttle.	In Operation
GA	Metropolitan Atlanta Rapid Transit Authority (MARTA)	Participating as a member of the AECOM ABC effort.	In Planning
IL	Quad Cities MetroLINK	Participating as a member of the AECOM ABC effort.	In Planning
IN	Bloomington Transit	Demonstrating an EasyMile EZ10 automated shuttle.	Completed
MD	Robotic Research LLC and New Flyer	Developing a 40' automated transit bus, with initial development and testing in Clarksburg, MD.	In Operation
MD	Maryland Transportation Authority (MDTA)	Participating as a member of the CATUF effort.	In Planning
MI	Michigan Department of Transportation (MDOT) and PlanetM	Participating as a member of the AECOM ABC effort.	In Planning
MI	MDOT, PlanetM, and Pratt and Miller Engineering	Constructing and testing automated shuttles at Western Michigan University in Kalamazoo.	Completed
MI	MDOT, PlanetM, and Ann Arbor Area Transportation Authority	Demonstrating the Q'Straint Quantum automated wheelchair securement system in Ann Arbor.	In Operation
MI	MDOT	Participating as a member of the CATUF effort.	In Planning
MI	PlanetM, Michigan State University, and Adastec	Testing a full-size automated bus on a seven-mile route in East Lansing, MI, beginning in 2021.	In Planning
MN	Minnesota Department of Transportation (MnDOT) and Rochester Public Transit	Participating as a member of the AECOM ABC effort.	In Planning
ND	Capital Area Transit	Demonstrating an EasyMile EZ10 automated shuttle.	Completed
NE	StarTran (City of Lincoln)	Testing an automated shuttle. A previous short-term demonstration of a Navya automated shuttle was conducted in 2018.	In Planning

State	Transit Agency / Lead	Description	Status
NV	Regional Transportation Commission of Southern Nevada (RTC of Southern Nevada)	Testing a Navya Autonom automated shuttle in Las Vegas near the Downtown Container Park.	Completed
NV	RTC of Southern Nevada	Participating as a member of the CATUF effort.	In Planning
NV	Regional Transportation Commission of Washoe County (RTC Washoe)	Testing a Proterra bus equipped with sensors as part of a larger project with Proterra and University of Nevada, Reno to develop an automated bus prototype. This project has been rescoped to focus on driver assistance technology, but may include an automation component in the future.	In Operation
OH	Central Ohio Transit Authority (COTA) - City of Columbus is the lead	Testing May Mobility shuttles on Scioto Mile.	Completed
OH	COTA	Participating as a member of the CATUF effort.	In Planning
OH	Stark Area Regional Transit Authority (SARTA)	Participating as a member of the CATUF effort.	In Planning
OH	Toledo Area Regional Transit Authority (TARTA)	Participating as a member of the CATUF effort.	In Planning
RI	Rhode Island Public Transit Authority (RIPTA) - Rhode Island Department of Transportation (RIDOT) is the lead	Testing May Mobility shuttles in downtown Providence.	Completed
TX	Corpus Christi Regional Transit Authority (CCRTA)	Testing EasyMile EZ10 shuttle at Texas A&M University-Corpus Christi began in January 2020. CCRTA partnered with MV Transportation to manage operations.	In Operation
TX	Dallas Area Rapid Transit (DART)	Participating as a member of the AECOM ABC effort.	In Planning
TX	Metropolitan Transit Authority of Harris County (METRO)	Participating as a member of the AECOM ABC effort.	In Planning
UT	Utah Transit Authority (UTA) - Utah Department of Transportation (UDOT) is the lead	Testing an EasyMile EZ10 automated shuttle in several different communities in Utah. The project began in April 2019.	Completed
UT	UTA	Participating as a member of the CATUF effort.	In Planning

State	Transit Agency / Lead	Description	Status
VA	Virginia Department of Rail and Public Transportation (DRPT) and Hampton Roads Transit (HRT)	Participating as a member of the AECOM ABC effort.	In Planning
VA	DRPT, Fairfax County, and Dominion Energy	Testing EasyMile EZ10 shuttle between the Dunn Loring-Merrifield Metro station and the Mosaic District. Initial testing began in August 2020, and passenger service began in October 2020. Transdev is managing operation of the shuttle.	In Operation
WA	King County Metro, Kitsap Transit, Community Transit, Pierce Transit, Intercity Ctransit, C-Tran, Ben Franklin Transit, Spokane Transit Authority	Testing of driver assistance systems—Mobileye Shield+ (a non-automated collision avoidance system)—on 38 buses from several transit agencies.	Completed

Source: USDOT Volpe Center, April 2021

Contact

The information in this briefing was compiled by the John A. Volpe National Transportation Systems Center in support of the FTA's Office of Research, Demonstration and Innovation (TRI). For more information, or to provide information on transit bus automation projects that were not included in this document, send an email to transitautomation@dot.gov.

The cover image shows a large transit bus from Pierce Transit, which is parked at the Virginia Tech Transportation Institute (VTTI) Smart Road test track. A member of U.S. Department of Transportation staff took the photo, and staff from Pierce transit and VTTI provided permission for its use.