Transit Bus Automation
Federal Transit Administration (FTA)
Quarterly Update

Q4 2019 Update

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

1) a summary of news items published in 2019 related to automated transit buses, including both domestic and international projects.
2) summaries of U.S.-based activities related to automated vehicle testing projects with transit agency participation. A sub-section lists projects that have received 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)

Table 1 contains 2019 news items related to transit bus automation.
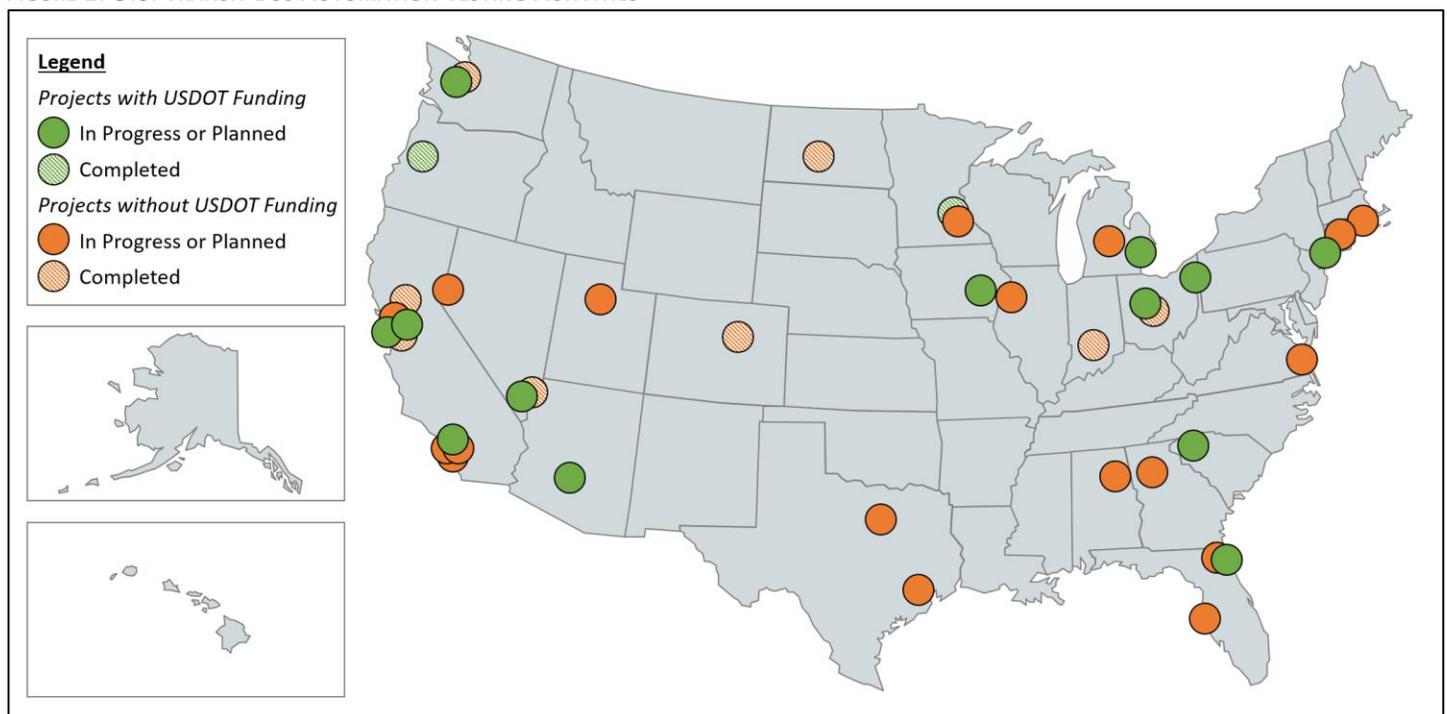
TABLE 1: TRANSIT BUS AUTOMATION NEWS

Month	News Item
December 2019	• Volkswagen announces that it will test automated shuttles and Scania transit buses in Doha, Qatar, with closed tests beginning in 2020 and trials beginning as early as 2021 (link)
November 2019	• Volvo and Keolis demonstrate automated yard operations at a Gothenburg-area depot (link) • Automated buses exhibited in Glasgow ahead of their 2020 launch on public roads (link) • Port Authority of New York and New Jersey posts draft resolution to test an automated bus system to reduce headways in the Lincoln Tunnel (link)
October 2019	• Automated Bus Consortium members announce candidate pilot projects (link) • Toyota announced that it will supply 20 e-Palette vehicles for the 2020 Olympics (link) • Singapore signs MOU to train 100 bus drivers to operate automated buses (link)
September 2019	• USDOT announces selected recipients of ADS Demonstration Grants (link)
August 2019	• Local Motors unveils "Olli 2.0," its 2nd generation vehicle with improved range and user interface (link) • ARTC of Taiwan unveils "WinBus," its automated minibus (link) • Singapore begins its first on-demand automated shuttle trial (link) • Texas A&M teams with Designated Driver for automated shuttle teleoperation (link)
July 2019	• New automated shuttle pilot launches include May Mobility in Grand Rapids, MI (link); Optimus Ride in New York, NY (link); and EasyMile in Austin, TX (link) • Automated shuttle incidents occur in Utah (link) and Austria (link) • Pierce Transit to begin testing AEB on four buses in Pierce County, Washington (link)
June 2019	• EasyMile announces new 3rd generation EZ10 vehicle with seat belts and wheelchair anchor points (link)

Month	News Item
May 2019	- AECOM partners with transit agencies to form Automated Bus Consortium (link) - Four consortia chosen for next stage of EU FABULOS automated bus project (link) - New Flyer and Robotic Research partner on automated bus technology (link) - May Mobility begins testing automated shuttles in Providence, RI (link) - FTA announces Integrated Mobility Innovation (IMI) funding opportunity (link) - New Flyer announces launch of automated bus program (link)
April 2019	Japan announces automated bus pilot to begin in April 2020 (link)
March 2019	- Alexander Dennis begins closed course phase of automated bus trial in United Kingdom (link) - Optimus Ride announces plans for pilot tests in New York and California (link) - Volvo begins testing an automated bus in Singapore (link)
February 2019	- Scania and Nobina announce automated bus trials in Sweden (link) - New South Wales announces sounding process for automated bus trial (link)
January 2019	- All Nippon Airways tests automated bus at Haneda Airport in Tokyo (link) - Intel and Beijing announce plans to commercially deploy automated buses by 2022 (link) - DeepBlue Technology debuts its "Smart Panda Bus," automated bus in Shanghai (link)

2) Automated Transit Bus Testing Activities in the United States

The USDOT has identified many domestic planned, in-progress, 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 being 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 Figure 1, 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).

FIGURE 1: U.S. TRANSIT BUS AUTOMATION TESTING ACTIVITIES

Source: USDOT Volpe Center, January 2020

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:

- Innovative Safety, Resiliency, and All-Hazards Emergency Response and Recovery (SRER) Research Demonstrations
- Mobility on Demand (MOD) Sandbox Program
- Safety Research and Demonstration (SRD) Program
- Strategic Transit Automation Research (STAR)
- Vehicle Assist and Automation (VAA) Demonstration

FTA's Integrated Mobility Innovation (IMI) Program includes funding for additional automated transit bus demonstrations, with project selections to be announced soon. 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)

Table 2 lists many projects with USDOT funding that test automated transit buses and related technologies.

TABLE 2: PROJECTS WITH USDOT FUNDING

State	Transit Agency / Lead	Description	USDOT Program	Status
AZ	Valley Metro	Tested Waymo vehicles with Valley Metro employees initially. Currently providing service to users of the RideChoice program via Waymo vehicles.	MOD	In Progress
CA	Access Services	Testing automated vehicles to provide shuttle service between a light rail station and Veterans Administration (VA) hospital.	STAR (Strategic Partner)	Planned
CA	Contra Costa Transportation Authority (CCTA)	Testing automated vehicles through three real-world demonstration projects.	ADS	Planned
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	Planned
FL	Jacksonville Transportation Authority (JTA)	Testing 15 automated vehicles and other ITS systems along Bay Street in Jacksonville.	BUILD	Planned
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	Planned
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	Planned
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

State	Transit Agency / Lead	Description	USDOT Program	Status
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.	STAR (Strategic Partner)	Planned
NV	Regional Transportation Commission of Southern Nevada (RTCSN)	Testing an automated circulator shuttle in the Las Vegas Medical District.	BUILD	Planned
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 SMART[2] Network in Youngstown, Ohio.	BUILD	Planned
OH	Central Ohio Transit Authority (COTA) - City of Columbus is the lead	Testing of automated shuttles is scheduled to begin in November 2019.	SCC	Planned
OR	Lane Transit District (LTD)	Testing lateral lane-keeping and precision docking on LTD's Emerald Express Bus Rapid Transit.	VAA	Completed
SC	County of Greenville	Testing of automated shuttles (modified Cushman Shuttle 6 and Local Motors Olli models).	ATCMTD	In Progress
WA	Pierce Transit	Testing DCS Technologies' Pedestrian Avoidance Safety System (PASS) automated emergency braking in up to 30 buses.	SRD	In Progress

Source: USDOT Volpe Center, January 2020

Projects without USDOT Funding

The transit agencies listed in Table 3 are currently involved in demonstration or pilot activities that are not part of a USDOT-funded program.

TABLE 3: PROJECTS WITHOUT USDOT FUNDING

State	Transit Agency / Lead	Description	Status
AL	New Flyer and Robotic Research LLC	Developing a 40' automated transit bus, with initial development and testing in Gaithersburg, MD, followed by additional testing and demonstration in Anniston, AL.	Planned
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.	In Progress
CA	Livermore Amador Valley Transit Authority (LAVTA)	Demonstrating an EasyMile EZ10 automated shuttle.	Completed
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 project.	Planned
CA	Long Beach Transit (LBT)	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
CA	Los Angeles County Metropolitan Transportation Authority (LA Metro)	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
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
CT	Connecticut Department of Transportation (CTDOT)	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
FL	Jacksonville Transportation Authority (JTA)	Testing multiple automated shuttle models (EasyMile EZ10, Navya Autonom Shuttle, and one other model) on a 1/3-mile track as part of a project to replace the existing Skyway monorail.	In Progress
FL	Pinellas Suncoast Transit Authority (PSTA)	Participating as a member of the AECOM Automated Bus Consortium project.	Planned

State	Transit Agency / Lead	Description	Status
GA	Metropolitan Atlanta Rapid Transit Authority (MARTA)	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
IL	Quad Cities MetroLINK	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
IN	Bloomington Transit	Demonstrating an EasyMile EZ10 automated shuttle.	Completed
MI	Michigan Department of Transportation (MDOT) and PlanetM	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
MN	Minnesota Department of Transportation (MnDOT) and Rochester Public Transit	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
ND	Capital Area Transit	Demonstrating an EasyMile EZ10 automated shuttle.	Completed
NV	Regional Transportation Commission of Southern Nevada (RTCSN)	Demonstrating a Navya Autonom automated shuttle in Las Vegas near the Downtown Container Park.	Completed
NV	Regional Transportation Commission of Washoe County (RTC)	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.	In Progress
OH	Central Ohio Transit Authority (COTA) - City of Columbus is the lead	Testing May Mobility shuttles on Scioto Mile.	Completed
RI	Rhode Island Public Transit Authority (RIPTA) - Rhode Island Department of Transportation (RIDOT) is the lead	Testing May Mobility shuttles in downtown Providence.	In Progress
TX	Dallas Area Rapid Transit (DART)	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
TX	Metropolitan Transit Authority of Harris County (METRO)	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
UT	Utah Transit Authority (UTA) - Utah Department of Transportation (UDOT) is the lead	Testing an EasyMile EZ10 automated shuttle in different communities in Utah.	In Progress
VA	Virginia Department of Rail and Public Transportation (DRPT) and Hampton Roads Transit (HRT)	Participating as a member of the AECOM Automated Bus Consortium project.	Planned
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, January 2020

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.