



FEDERAL TRANSIT ADMINISTRATION (FTA)

Transit Bus Automation Quarterly Update

Q2 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 Q2 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 Q2 2021 news items related to transit bus automation.

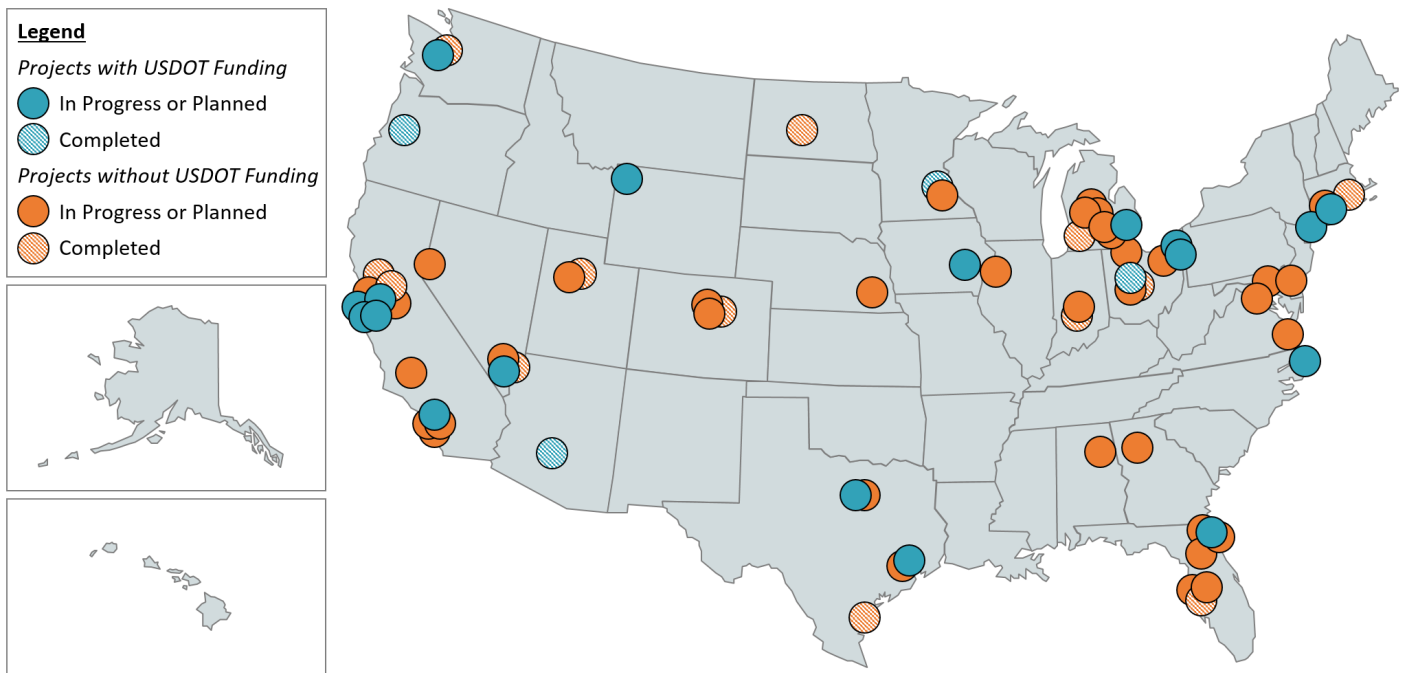
Transit Bus Automation News

| Month | News Item |
|-------------------|--|
| April 2021 | <ul style="list-style-type: none"> ➤ Cruise Automation signed a deal to begin operating a ride-hailing service in Dubai, UAE (link) ➤ Baidu received approval to operate a commercial automated bus service in Chongqing, China (link) ➤ National Park service (NPS) announced an EasyMile shuttle pilot at Wright Brothers National Memorial, NC that would begin in June 2021 (link) ➤ EasyMile raised €55M (\$67M) in a Series B funding round (link) ➤ EasyMile and the Colorado Smart Cities Alliance presented to the Golden City Council with a plan for a year-long test pilot with seven shuttles (link) |
| May 2021 | <ul style="list-style-type: none"> ➤ A Westfield automated shuttle began operating at Lake District National Park in the United Kingdom (link) ➤ Volkswagen (along with its transport service provider MOIA) and Argo announced plan to begin testing automated electric ID. BUZZ AD vans in Germany in summer 2021 (link) ➤ Aurrigo delivered a second automated shuttle and began engineering trials in Cambridge, UK (link) ➤ May Mobility announced a new shuttle service in Ann Arbor, MI to begin in October 2021 (link) ➤ May Mobility integrated its automated driving system into a Toyota Sienna van and began testing in Ann Arbor, MI (link) ➤ The Regional Transportation Commission (RTC) of Southern Nevada selected Stantec to lead the GoMed project in Las Vegas, NV (link) ➤ Beep raised \$20M in Series-A investment (link) ➤ Aurrigo commenced an automated shuttle trial in mixed traffic on public roads in Cambridge, UK (link) |
| June 2021 | <ul style="list-style-type: none"> ➤ The Colorado Smart Cities Alliance announced that an EasyMile shuttle pilot in Golden, CO will begin in August 2021 (link) ➤ Aviva and Darwin announced they would test Navya automated shuttles in Oxfordshire, United Kingdom (link) ➤ Beep launched two Local Motors Olli shuttles in Yellowstone National Park, WY (link) ➤ Perrone Robotics completed a series of automated bus demonstrations in Westminster, MD and Charlottesville, VA (link) ➤ GM began to produce pre-production Cruise Origin vehicles, and provided Cruise with access to a \$5B credit line for commercial production, which is scheduled to commence in 2023 (link) ➤ The TEMPUS (“Test field Munich – pilot test for urban automated road traffic”) project team announced plans for a mid-2022 bus platooning test in Munich, Germany (link) ➤ University of Western Australia began testing of its “nUAWy” automated bus (link) ➤ May Mobility launched a service in Indianapolis, IN (link) ➤ Local Motors and Protean Electric extended their partnership to accelerate shuttle adoption (link) ➤ University of Waterloo launched an automated shuttle (link) ➤ An incident with the “Autonomous Vehicle Advantage” (AVA) shuttle in Dunedin, FL resulted in an injured pedestrian (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, July 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 \(BUILD\) Program¹](#)
- [Federal Highway Administration \(FHWA\) Office of Federal Lands Highway \(FLH\)](#)
- [Federal Lands Transportation Program \(FLTP\)](#)
- [FHWA Technology and Innovation Deployment Program \(TIDP\)](#)
- [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 |

¹ In 2021, the BUILD discretionary grant program was renamed as the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program, and, prior to 2018, it had been known as the Transportation Investment Generating Economic Recovery (TIGER) grant program.

| State | Transit Agency / Lead | Description | USDOT Program | Status |
|-------|---|--|--------------------------|--------------|
| 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 |
| 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 |
| NC | North Carolina Department of Transportation (NCDOT) and National Park Service (NPS) | Testing an EasyMile EZ10 automated shuttle on a route at the Wright Brothers National Memorial. Transdev is managing operation of the shuttle. | FLTP | In Operation |
| 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 |

| State | Transit Agency / Lead | Description | USDOT Program | Status |
|-------|---|---|---------------|--------------|
| NV | Regional Transportation Commission of Southern Nevada (RTCNSN) | 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 |
| 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. The shuttles ceased operation in April 2021. | SCC | Completed |
| 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 |
| WY | National Park Service (NPS) | Testing two Local Motors Olli automated shuttles on routes in the Canyon Village area of Yellowstone Park. Beep is managing operation of the shuttle. | TIDP & FLH | In Operation |

Source: USDOT Volpe Center, July 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 |
| CA | Livermore Amador Valley Transit Authority (LAVTA), the City of Dublin, the Bay Area Air Quality Management District, BART, and the Metropolitan Transportation Commission | 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 |

| State | Transit Agency / Lead | Description | Status |
|-------|---|---|-----------------------------------|
| CO | City of Golden | Testing seven EasyMile EZ10 automated shuttles on pre-defined routes in Golden, CO. The pilot is a partnership between the City of Golden, the Colorado School of Mines, the Colorado Smart Cities Alliance, and EasyMile. The pilot project will run from August 1, 2021 until July 31, 2022. | In Planning |
| DE | Delaware Department of Transportation (DelDOT) | Testing two EasyMile EZ10 Gen 3 automated shuttles on a 1.2 mile (22 minute) loop on the DelDOT Campus in Dover, DE. The shuttles will operate in other locations around the state once feasibility is determined. | In Operation |
| 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 |
| FL | PSTA and Tampa Bay Area Regional Transit Authority (TBARTA) | Testing two Navya Autonom automated shuttles along Bayshore Drive in St. Petersburg, FL as part of the "Autonomous Vehicle Advantage (AVA)". The four month pilot began in November 2020. Following the initial AVA pilot, shuttle service using a Local Motors Olli shuttle began in Dunedin, FL in May 2021. That service was temporarily paused following an incident in June 2021. Beep is managing operation of the shuttle. | In Operation – Temporarily Paused |
| 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 |

| State | Transit Agency / Lead | Description | Status |
|-------|---|---|--------------|
| IN | Bloomington Transit | Demonstrating an EasyMile EZ10 automated shuttle. | Completed |
| IN | Toyota Mobility Foundation (TMF), Energy Systems Network (ESN), Indiana Economic Development Corporation (IEDC), and IndyGo | Testing May Mobility shuttles (five Lexus RX 450h SUVs and one wheelchair-accessible Polaris GEM shuttle) as part of the "A2GO" service in downtown Indianapolis, IN and Indiana University–Purdue University Indianapolis (IUPUI), from June 2021 to November 2021. The service will relocate to Fishers, IN in November 2021. | In Operation |
| 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 |
| MI | Ann Arbor SPARK, Mcity, and Michigan Economic Development Corporation (MEDC) | Testing May Mobility shuttles (four Lexus RX 450h SUVs and one wheelchair-accessible Polaris GEM shuttle) as part of the "A2GO" service, connecting Kerrytown, the University of Michigan campus, and the State Street corridor in Ann Arbor, MI. Service is scheduled to commence in October 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 |

| State | Transit Agency / Lead | Description | Status |
|-------|---|--|------------------|
| 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 |
| 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 an EasyMile EZ10 shuttle (called "SURGE") at Texas A&M University-Corpus Christi began in January 2020. CCRTA partnered with MV Transportation to manage operations. | Completed |
| 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 |

| State | Transit Agency / Lead | Description | Status |
|-------|---|--|--------------|
| UT | UTA | Participating as a member of the CATUF effort. | In Planning |
| 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 (called “Relay”) 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, July 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.