

ACCELERATING INNOVATIVE MOBILITY (AIM) DEMONSTRATION PROJECT



HOUSTON METRO SHUTTLE OF THE FUTURE:

MID-SIZE LEVEL 4 AUTONOMOUS AND ZERO EMISSION SHUTTLE BUS DEPLOYMENT

**METROPOLITAN TRANSIT AUTHORITY OF HARRIS COUNTY, TEXAS
(HOUSTON METRO)**

(FORMERLY, "DEMONSTRATION FOR TRANSIT'S FIRST/LAST MILE SOLUTION: THE EZ ZEUS, A ZERO-EMISSION, LEVEL 4, AUTOMATED SHUTTLE BUS THAT IS FMVSS COMPLIANT, ADA-COMPLIANT, AND BUY AMERICA-COMPLIANT")



U.S. Department of Transportation
Federal Transit Administration

PROJECT SUMMARY

Automation Level(s): 4

Houston METRO believes automation and electrification are important contributors to the sustainability of public transportation. The Federal Transit Administration (FTA) and transit agencies globally have been researching and evaluating the potential of automation for the past few years. With funding more limited than ever, Houston METRO appreciates the support of FTA and is excited to be able to demonstrate how innovative technology may address and even improve existing and future operations.

The project will operate in mixed traffic and connect users to METRO's high-capacity transit system of bus routes, a nearby light rail line and transit center. The area of service includes two universities with heavy pedestrian use and includes adjacent high comfort bicycle lanes. Research areas also include how the vehicle manages light rail crossings and travel under and near a major highway underpass. Each of these environments will allow for testing and research in the real-world environments that most transit agencies encounter.

Houston METRO believes the automation of the Phoenix Motorcars EZ Zeus, an all-electric mid-size shuttle presents a unique opportunity for the U.S. transit industry to create a shared, electric, autonomous vehicle that is compliant with Federal Motor Vehicle Safety Standards (FMVSS), Buy America, and the Americans with Disabilities Act (ADA). It applies novel, state of the art technology from Perrone Robotics, a leader in transit vehicle automation, to the proven, well-known Phoenix Motorcars EZ Zeus, built on an E-450 Ford Chassis, that is Altoona rated for 200,000 miles and 7 years. This unique partnership will introduce an exciting new solution to the transit industry while leveraging many years of operational and manufacturing experience.

PROJECT GOALS

The goal of the Houston METRO Shuttle of the Future is to develop and demonstrate a mid-size level 4 autonomous zero emission shuttle to serve as a first/last mile community connector to those areas with a historically underserved population. This shuttle will be fully compliant with the Americans with Disabilities Act (ADA), Federal Motor Vehicle Safety Standards (FMVSS), and Buy America. As a result, it meets National Highway Traffic Safety Administration (NHTSA) requirements to operate in mixed traffic and at regular speed limits. The project will develop this prototype vehicle and research and test it on routes developed under Houston METRO's existing University District Project with a focus on understanding the process of how to integrate a Level 4 autonomous vehicle(s) into a transit fleet. Understanding use of such technology in terms of equity is also a focus as the planned routes connect underserved communities to jobs, health care and educational opportunities. Ultimately the project will provide an understanding of the operations, maintenance, customer engagement and charging of such vehicles as Houston METRO, and other transit agencies, seek to incorporate these types of vehicles into its fleet.

Houston METRO Shuttle of the Future: Mid-Size Level 4 Autonomous and Zero Emission Shuttle Bus Deployment is to provide a unique innovation to:

- To create and test a fully compliant AV shuttle for first/last mile use.
- Understand equity and access, customer adoption and acceptance from the perspective of diverse communities and ADA passengers.
- Increase vehicle efficiency and capacity to allow service for a larger number of riders.
- Research and understand the safety of autonomous vehicle for public transit use.
- To evaluate the operations and safety pertaining to AV operation in and around an active light rail line.

VEHICLE INFORMATION

The METRO FutureLink is built on an E-450 Ford Chassis, electrified by Phoenix Motorcars. The vehicle was then shipped to Perrone Robotics to combine Perrone’s proprietary TONY autonomous kit with the existing electrified Phoenix Motorcars EZ Zeus. The METRO FutureLink is configured with 15 passenger seats and capacity for two ADA passengers. FutureLink provides safe, user-friendly level boarding for ADA patrons.

- **Chassis:** Ford E-450 Super Duty Chassis with a Starcraft Allstar Body
- **Gross Vehicle Weight Rating:** 14,500 lbs.
- **Powertrain:** Lithium-Ion Battery Pack
- **Driving Range:** 100-160 Miles
- **Top Speed:** 65 mph
- **Braking System:** Dual Mode Regenerative Braking System
- **Seating Configurations:** 15 passenger seats and 2 wheelchair locations

DATA COLLECTION, MANAGEMENT, & SHARING

A Data Management Plan was created that details how the project team will collect, store and manage data. The Data Management Plan (DMP) project team, led by STV Inc., will update the DMP as necessary when requested by the Federal Transit Administration (FTA). AECOM will manage the review process with all project partners and submit revisions to Houston METRO, which will be responsible for approving any changes and submitting revised documents to FTA.

PROJECT STATUS & SCHEDULE

The project had its kick-off in December 2023 and will move into full operations in January 2024 and operate through December 2024.

BUDGET

The total project cost is estimated at \$2,357,435, with \$1,473,435 awarded by the FTA and \$884,000 in matching funds.

FTA Funding	Non-Federal Cost Share	Total Amount
\$1,473,435	\$884,000	\$2,357,435