



Transit Automation Case Study

Pierce Transit

Beginning in January 2016, Pierce Transit, along with several other transit agencies in Washington State, participated in an 18-month project under the Transit Cooperative Research Program (TCRP) Innovations Deserving Exploratory Analysis (IDEA) program.¹ The project, led by the Washington State Transit Insurance Pool (WSTIP) and the University of Washington, tested the Mobileye Shield+ collision avoidance warning system on transit buses. The project demonstrated the technology's potential to significantly reduce the frequency and severity of bus collisions and provide estimates of the potential magnitude of reductions in collisions and claims. In total, the system was installed on 38 buses from several different transit agencies, including seven of Pierce Transit's buses. In addition to the Mobileye Shield+ system, to provide the study team with real-time data, each bus was equipped with a cellular telematics unit and supplemental cameras with video recording capabilities. Buses with the system operated in revenue service for several months, including a three-month testing and data collection period.

In January 2017, the Federal Transit Administration (FTA) awarded Pierce Transit a \$1.66 million Safety Research and Demonstration (SRD) grant to fund a \$2.4 million project to implement and research collision warning and automated braking technology in buses.² As part of the project, a lidar-based Automatic Emergency Braking (AEB) system will be installed on up to 30 Pierce Transit buses. Initial testing and baseline configuration at Virginia Tech Transportation Institute (VTTI) used simulated pedestrian and vehicle targets and included more than 150 scenarios with different driving maneuvers, weather conditions, and lighting. VTTI is also assisting with the evaluation of the impact of the AEB system on passengers—two buses will have cameras and data recorders installed for monitoring passenger motion during braking. The University of Washington is assessing accuracy of the system using front-mounted cameras on four of the buses.

After completion of in-service engineering testing in fall/winter 2019, Pierce Transit will conduct a revenue service field demonstration (initially gathering baseline data with the AEB system silenced and braking disabled, and later with the AEB system providing alerts and activating the braking system when triggered), which is scheduled to operate through April 2021.³ Pilot project results will be used to inform the business case of transit agency investment in collision avoidance and emergency braking system technology. The AEB system being tested is made by DCS Technologies, Inc.

In February 2020, the project team decided, in consultation with FTA, to postpone the automated braking component for revenue service testing. The project will move forward with testing the driver warning aspect of the system, while trying to engage the Original Equipment Manufacturer (OEM) for the automated braking component portion of the project. Pierce Transit also noted that considerations regarding liability and safety related to the automated braking component contributed to their decision to not move forward with that portion of their project unless the OEM was able to support the project.



A Pierce Transit bus equipped with the AEB system being tested at the VTTI Smart Road Facility

*John A. Volpe National Transportation Systems Center (top)
Virginia Tech Transportation Institute (bottom)*

¹ Spears, J., Lutin, J., Wang, Y., Ke, R., & Clancy, S. (2017). "Active Safety-Collision Warning Pilot in Washington State: IDEA Program Final Report." Washington State Transit Insurance Pool. May 9, 2017. <<http://onlinepubs.trb.org/onlinepubs/IDEA/FinalReports/Transit/Transit82.pdf>>.

² FTA. (2017). "Fiscal Year 2016 SRD Program Grant Selections." FTA Website. January 2017. <<https://www.transit.dot.gov/research-innovation/fiscal-year-2016-srd-program-grant-selections>>.

³ Pierce Transit. (2 July 2019). "Pierce Transit Takes Industry Lead in National Study to Improve Pedestrian, Rider, Bus Operator Safety" [Press Release]. Pierce Transit Website. August 2019. <<https://www.piercetransit.org/news-releases/?id=405>>.