

0-6875: Automated and Connected Vehicle (AV/CV) Test Bed to Improve Transit, Bicycle, and Pedestrian Safety

Background

Crashes involving transit vehicles, bicyclists, and pedestrians are a concern in Texas, especially in urban areas. This research explored the potential of automated and connected vehicle (AV/CV) technology to reduce or eliminate these crashes. The project objectives focused on identifying safety concerns related to the interaction of transit vehicles, bicyclists, and pedestrians, and targeting AV/CV technologies to mitigate or eliminate those concerns. Concept applications were identified, along with public- and private-sector partners. A concept of operations (ConOps) plan for designing, testing, piloting, demonstrating, and deploying candidate applications through an AV/CV Test Bed to Improve Transit, Bicycle, and Pedestrian Safety was developed.

What the Researchers Did

To accomplish these objectives, the research team conducted 25 meetings and 4 workshops with diverse stakeholder groups to gain insight into safety issues and concerns. They reviewed AV/CV case studies of related technologies and examined federal, state, and local legislation and policies related to AV/CV, bicyclists, and pedestrians. The research team developed near-term applications using AV/CV technologies to improve safety, and held roundtable forums with stakeholders and technology firms to review the approaches and to identify possible partnerships. In collaboration with Texas A&M University Transportation Services and the private firms Mobileye and Rosco, a pilot of the

Mobileye Shield+™ collision avoidance system was conducted on one Texas A&M bus. Figure 1 illustrates the bus operating in regular service on the Texas A&M campus. The research team monitored the pilot, using the results to assist in developing the ConOps plan for an AV/CV Test Bed to Improve Transit, Bicycle, and Pedestrian Safety.



Figure 1. Texas A&M University Bus Piloting Collision Avoidance System.

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What They Found

The ConOps plan includes the overall vision and goals for the AV/CV Test Bed to Improve Transit, Bicycle, and Pedestrian Safety. The plan describes the operational scenarios—who, what, why, where, when, and how—for the following near-term candidate applications:

- **Smart buses**—onboard automated collision avoidance systems to warn drivers of bicyclists and pedestrians close to a bus.
- **Smart intersections**—automated communications between buses and traffic signals to provide visual and audio alerts of turning buses to bicyclists and pedestrians.
- **Smart bicycles**—sensors on bicycles to warn bicyclists of nearby vehicles and pedestrians through tactical warnings on the handlebar and seat.

- **Smart bicyclists and pedestrians**—smartphone applications to warn bicyclists and pedestrians of approaching transit vehicles.
- **Smart bike racks on buses**—automated alerts to bus drivers of passengers loading and unloading bicycles from front-mounted bike racks.

What This Means

Moving forward with the ConOps implementation plan will begin improving transit, bicyclist, and pedestrian safety in Texas. The ConOps implementation plan outlines the next steps for the Texas Department of Transportation and its partners in designing, testing, piloting, and deploying the near-term candidate applications.

For More Information

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