Florida Department of Transportation Research

University of Florida Testbed Initiative – Alternative Transportation Safety Systems

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Current Situation

Public transit operators face many daily challenges, whether traffic, drivers cutting in, bicycles, or pedestrians. Though low in frequency, but some transit crashes have resulted in injury or death to people both inside and outside the bus. Gainesville's Regional Transit System (RTS) provides almost 40,000 transit trips per day, one of the highest levels in the state, and crashes have occurred, resulting in crash and liability expenses – in the case of RTS, over $1 million per year in recent years, a significant expense on tight municipal transit budgets. Like other Florida transit services, RTS is committed to preventing all transit crashes. Advanced driver assistance systems (ADAS) like collision avoidance systems have the potential to decrease crash risks or conflicts associated with transit operation, which could improve safety, efficiency, and economy.

College campuses are crowded with pedestrians and bicyclists, presenting a safety challenge for transit operators.

Research Objectives

University of Florida researchers evaluated the effectiveness of a collision avoidance system advanced driver assistance system to reduce conflicts between transit buses and pedestrians and bicycles.

Project Activities

The project comprised three main tasks. The researchers identified the behavioral and infrastructure conditions that lead to incidents or near-incidents. Then, they assessed the perceived acceptance and usefulness of the collision avoidance system to drivers. Lastly, they developed a benefit-cost tool to analyze the financial justification for ADAS.

The collision avoidance system monitors motion near the bus with an array of sensors and uses three displays to communicate with the driver by visual and auditory alerts. The collision avoidance system was installed on 10 RTS buses with routes that include the University of Florida campus. For two months, the system was operated with all sensors functioning and data being recorded, but the alert displays were not active. Then, the alert displays were activated for 12 months. The system alerts that signaled a possible conflict or incident, such as potential collision, reduced headway, or aggressive braking were of particular interest to the researchers. Collision avoidance system conflict data taken before and after alert activation were analyzed in aggregate and for specific routes. Conflict data were analyzed relative to time of day, day of week, and month.

Comparing data before and after activation, alerts generally decreased. For example, pedestrian conflicts decreased by 20% to 30%. A similar pattern was found with route-based analyses, though for some routes, one or two alert types showed small increases. A hotspot analysis found 14 road features where alert frequency was correlated with location, including curves, roundabouts, bus stops, and crosswalks.

Focus groups with drivers indicated a high degree of driver acceptance, but additional training was desired. A cost-benefit analysis was created that agencies can use to evaluate the cost effectiveness of adding ADAS to municipal buses.

Project Benefits

This project lays a foundation for the use of a new safety technology that can further improve safety for all road users in Florida.

For more information, please see www.fdot.gov/research/.