Florida Department of Transportation Research

Evaluation of Connected Vehicle Applications on Mahan Corridor, Phase II

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Current Situation

Sensors and video cameras installed on many roadways and intersections across the U.S. detect vehicle queues, traffic flows, and vehicle speeds in order to optimize signal timing, detect possible roadway incidents, and otherwise help agencies improve safety and traffic efficiency. This information can also be sent to connected vehicles equipped to "talk" to roadway infrastructure and receive information about potential slowdowns, traffic signals, weather, and more. Connected vehicles rely on an onboard unit (OBU) and a roadside unit (RSU), part of an overall Intelligent Traffic System (ITS).

One of the 22 intersections on US-90 (Mahan Drive) which were part of the project.

Research Objectives

Florida State University researchers evaluated RSU-OBU communications that deliver signal phase and timing (SPaT) data and roadway geometry data (MAP) to OBU-equipped vehicles via digital short-range communications (DSRC), for both the efficacy of the system and for improvements in the efficiency and safety of road users along a corridor of signalized intersections.

Project Activities

The project was conducted on an 8 mile stretch of US-90 in Tallahassee, Florida, that includes 22 signalized intersections. The intersections were equipped with RSUs originally configured for one-way communication (RSU to OBU).

Four main tasks were undertaken to evaluate the RSU-OBU system. First, the researchers examined the effect of the system by studying operations and safety on the study corridor before and after implementation of signal optimization methods and CV technologies. Second, driver behavior in OBU-equipped vehicles was observed when SPAT data were available and when they were not. Third, operational information such as travel time reliability was compared between the RSU-equipped Tallahassee corridor and a similarly equipped corridor in Gainesville, FL. Fourth, the researchers qualitatively reviewed C-V2X communications, where V2X means "vehicle to everything," such as vehicle to infrastructure, vehicle to vehicle, vehicle to pedestrian, etc.

In the two years of the project, the researchers found that the system was robust and sustainable and led to both efficiency and safety benefits. They explained the value of proper education and support for local agencies to help them keep their technology up to date and to stay abreast of technological changes.

Project Benefits

This project demonstrated the viability of an adaptable data exchange system for local transportation infrastructure and properly equipped vehicles, which, as more vehicles become equipped, can yield safety and efficiency benefits.

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