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Performance Evaluation of Connected Vehicle (CV) and Transportation Systems Management and Operations (TSM&O) Projects in Florida

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Current Situation

Technology that connects human experience with artificial intelligence is increasingly reaching every sector of society – including Florida’s transportation network. To stay ahead of this curve, the Florida Department of Transportation (FDOT) currently has 33 deployed projects that explore this interconnectivity through Connected Vehicle (CV) technologies and Transportation Systems Management and Operations (TSM&O) strategies.

While the goal of any CV or TSM&O effort is to enhance the transportation system, the financial gears that move these projects along can grind to a halt if the costs to implement these projects outweigh the benefits received from them. Estimating and understanding the benefit-to-cost (B/C) ratio of CV and TSM&O projects could help justify future funding requests associated with implementing additional safety and mobility strategies.

Research Objectives

The goal of this project was to develop approaches to evaluate the qualitative and quantitative performance of CV projects and current TSM&O strategies. Although other CV projects and TSM&O strategies were considered in the study, the FIU research team primarily focused on two TSM&O programs: Rapid Incident Scene Clearance (RISC) and Road Ranger Service Patrol (RRSP). Using these programs, the researchers developed performance criteria to better determine the benefits of CV and TSM&O projects.



In a recent study, Florida International University researchers analyzed the benefit-to-cost ratio of Connected Vehicles and Transportation Systems Management and Operations strategies following crashes.

Project Activities

After conducting a literature review, the research team performed a B/C analysis to quantify the mobility and safety benefits of implementing the RISC and RRSP programs.

The RISC program incentivizes crash clearance contractors to respond to major crashes quickly and to clear scenes with specialized equipment. To evaluate RISC, the research team collected incident data from 2016-2019 along a 144-mile section of I-75. The team compared data from incidents responded to by both RISC vendors and non-RISC vendors to calculate the B/C ratio for the program. Using reduction in secondary crashes as a performance measure for estimating safety benefits, researchers found that RISC achieved a B/C ratio of 5.78; that is, for every dollar spent on the RISC program, \$5.78 is returned in savings by avoiding secondary crashes. Using reduction of incident-related traffic delays to measure mobility benefits, they found every dollar invested in the program returned \$1.20.

Similarly, the research team used secondary crashes and incident-related traffic delays to measure the RRSP program’s performance. RRSP is an FDOT-funded motorist assistance service such as tire changes, clearing incidents from travel lanes, and other minor emergency repairs that are free to motorists. To evaluate RRSP, the team collected incident and speed data from 2017-2019 across 294.2 miles of I-95 in Florida. They found the RRSP program achieved a B/C ratio of 5.15 for safety benefits, or \$5.15 saved per dollar spent on the program by avoiding secondary crashes. For mobility benefits, RRSP achieved a 7.44 B/C ratio, which is \$7.44 returned in incident-related delay savings.

Because CV technologies are unique per project, the researchers also recommended each deployment be evaluated independently, providing flexibility to consider quantitative and qualitative benefits throughout the CV project development process.

Project Conclusions and Benefits

This research resulted in new performance criteria, better equipping FDOT to understand the impacts of new strategies on the transportation system and justify funding requests for such projects.

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