Florida Department of Transportation Research

Before and After-Implementation Studies of Advanced Signal Control Technologies in Florida

January 2020

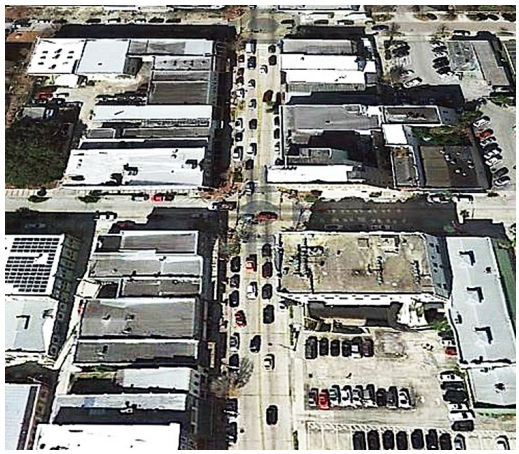
Project Number
BDV32-977-05

Project Manager
Raj Ponnaluri
FDOT Traffic Engineering and Operations Office

Principal Investigator
Lily Elefteriadou
University of Florida

Current Situation

As Florida continues to grow, making sure that everyone can get where they're going as safely and efficiently as possible becomes more challenging. More lanes or roads aren't always the answer, and they aren't always possible. One area for possible improvements is signal timing – of which drivers are often keenly aware. However, signal timing is complex and affects the efficiency of an entire road network. New technologies, such as adaptive traffic signal control (ATSC), can help existing roadways. ATSC can relieve congestion by adjusting the timing of traffic signals in response to traffic patterns. The Florida Department of Transportation (FDOT) has provisionally installed ATSC on eight corridors in Florida to see if it can overcome the limitations of traditional signal systems.



US-17 in Deland showed improvements in efficiency and safety using adaptive traffic control systems.

Research Objectives

University of Florida researchers evaluated ATSC operation on several corridors in Florida, before and after installation of ATSC, documenting advantages and disadvantages of different approaches and implementations.

Project Activities

A literature review was conducted to document the state of the industry and best practices for adaptive systems. Several ATSC systems were reviewed, including the InSync and Synchrogreen ATSC Systems. Five ATSC installations in the U.S. and Canada were examined for best practices.

The researchers studied the eight corridors with provisional ATSC installations. The corridors are four- to six-lane roads found in Panama City, Panama City Beach, Gainesville, Deland, Pinellas County, Bartow, Sarasota, and Manatee County. The length of highway with ATSC installed ranged from one to nine miles. For evaluation of ATSC performance, the researchers collaborated with local agencies to chose two critical intersections and three critical time periods per installation. Data were collected over a two-year period.

For efficiency evaluations, the researchers focused on five measures of performance with and without ATSC: travel time, delay at intersections, queue length, queue-to-lane storage ratio, and passenger car equivalent flows. Safety evaluations were based on data for total crashes, crash severity, crash type, and time of day. Generally, ATSC increased efficiency, but in one case, efficiency worsened, and ATSC was removed. Safety effects were more mixed.

Benefit-cost was analyzed for the ATSC installations. Also, interviews were conducted with local agency staff members, focusing on previous traffic control technologies used by the agency, experience with ATSC, cost components, and institutional issues.

Project Benefits

New technologies like ATSC hold great promise for improving the efficiency and safety of Florida highways. Projects like this advance the understanding of where and how these technologies are most useful.

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