

Request for Research Funding for FY 2023-2024

Project Number (Research Center Use Only): TEO-24-03

Requesting Office	District 5 Traffic Operations	Priority High	3 of 11
Proposed Title	Prediction of safety opportunities using automated traffic signal performance measures		
Justification	Automated traffic signal performance measures (<i>ATSPM</i>) are being deployed around the nation with many applications and benefits. The ATSPM system allows us to obtain big and detailed data of signal operation and performance. ATSPM has been focused on improving the efficient flow of vehicles, reducing delay and read-end collisions. There is potential to extend this work to enhance safety by replicating traditional traffic signal studies in for timing modification specifically focused on safety. Specific implementations include protected vs permissive left turn phasing, leading pedestrian interval, and red protect (holding red for red light running). This work will be implemented on AWS allowing the Department to immediately utilize the work product for reporting ATSPM signals,		
Impact	The research will allow the Department to move from reacting once there is a public complaint to actively managing their signals		
Affected Offices	Signal Design, Safety and TSM&O will be affected. Also, the central offices of safety, traffic operations, and technology/data would be involved		
Existing Work	Florida has been in the forefront of using ATSPM. Seminole County and District 5 have been pioneers. The ATCMTD I-4 FRAME project underway at the I-4 corridor is also expected to deploy an ATSPM system. ATSPM data have been used for mobility improvement, this project would be the first to use it for safety. Extending the use and benefits from ATSPM equipped intersections in the state would be a low-cost and efficient way to benefit from the technology		
Keywords Used In Existing Work Search (Cannot leave blank)	Automated traffic signal performance measures (<i>ATSPM</i>); signal efficiency; SPaT; intersection safety		
Related Contracts (Give contract numbers)	Some of the work at UCF, mostly for the ATTAIN project, extend the use of ATSPM for SPaT prediction for I2V applications. (BDV24-562-11)		
Funding Request	\$160,000	Anticipated Duration	Estimated length of time to complete work: 12 months
Project Manager	Jeremy Dilmore, PE Dist 5 TSMO Engineer Co-PM: Dibakar Saha	Contracting Method	Direct contract with the university of Central Florida with Dr. Aty.
Equipment	None	Comments* (understanding leases are preferred, include the proposed use of the equipment, whether lease options are feasible, whether work to be done with equipment could instead be procured through service expenditure, etc.)	

Urgency	Score - 1	Intersection safety is a statewide concern. Strategies to improve safety at signalized intersections have been identified and resources exist to make these improvements. However, with the vast number of signalized intersections in the state there is a need for a screening system to identify the intersections with the most need.
Implementability	Score - 1	With District 5 migrating their ATSPM data to AWS, this system will be able to run in real-time, making it immediately implementable.

Project Benefits (Succinct, complete explanation)

A variety of low-cost safety improvements are possible at signalized intersections such as implementing no right turn on red, leading pedestrian interval (LPI), and conversion of permitted left turns to protected left turns. However, resources (both time and money) are limited, so intersections need to be prioritized for these improvements. Additionally, each improvement targets a particular safety concern.

Currently, studies with traditional data are used to evaluate safety concerns at signalized intersections and propose recommended improvements. ATSPM data could be used as an alternative to traditional data collection and allow for a widespread evaluation of many signals. ATSPM data can also be used in a dashboard system that evaluates change over time and alerts operators to changes in the field that may affect safety.

This project will create algorithms to process raw ATSPM data into safety scores for a variety of measures to allow intersections to be prioritized for improvements.

Project Benefits (Select all that apply and explain)	Quantifiable Benefits (units, dollars, etc...if applicable)	Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits
<input type="radio"/> Materials Enhancement		
<input type="radio"/> Materials Savings	Reduced need for traditional field data collection	Traditionally, studies with field data collection are used to identify field safety concerns. This project proposes a system to replace/reduce the need for field data collection and traditional studies.
<input type="radio"/> Time Savings	Aggregate savings in minutes per hour per intersection	Signal delay Travel time reliability
<input type="radio"/> Lives Saved/Injuries Prevented	Lives and injuries	Crash frequency and rates Post Encroachment Time (PET), Time-to-collision (TTC)
<input type="radio"/> Other (Explain)	Efficiency and future deployment of CV	Low-cost implementation of ATSPM technology and preparing for the advent of CAV

*Comments should explain and support urgency, financial benefit, and implementability scores