Request for Research Funding for FY 2023-2024			
Project Number (Research Center Use Only): FRO-24-01			
Requesting Office	Freight and Rail Office	**Priority**	1 of 3 (projects may not have the same ranking – no ties)
Proposed Title	Freight Signal Priority Adoption – Evaluation of Industry Determinants & Implementation Plan		
Justification	The Florida Department of Transportation (FDOT) is leading the nation in the deployment of Connected and Automated Vehicles (CAVs) with the goal of reducing fatalities and improving the safety and mobility of Florida's ever increasing population. As a CAV technology, Freight Signal Priority (FSP) is intended to reduce stops and delays to increase travel time reliability for freight traffic, and for enhancing safety at intersections. There are currently about 50 projects either in planning, design, and operation under the FDOT CAV initiative. The largest deployment to date, the Interstate 4 Florida's Regional Advanced Mobility Elements (I-4 FRAME) will deploy CAV technologies on 77 miles of I-4, 122 miles of limited-access routes and signalized arterials, with a total of 491 traffic signal systems upgraded with the latest technologies (2). Whereas the benefits of FSP have been studied and understood and well known to FDOT and the freight industry, there is lack of evidence and understanding of how FSP can be best implemented as part of a combination of CV technologies, specifically the choice of location and type of freight carriers to which the FSP should apply to. One of the major constraints is related to the top-down approach used to select FSP deployment areas, with the location decision based on the expected benefits in terms of travel time reliability and safety produced by simulation exercises conducted on selected roadways and with no direct input from the industry (3). This approach, while intended to produce travel time reliability and safety improvements, can result in unexpected bottlenecks (e.g., due to extended signal timing) on unprioritized arterials or negative externalities, with potential economic losses to the freight industry and the State's economy. One of the main reasons is due to the fact that the FSP application requires adoption of the CV technology from the industry. While the roadway infrastructure is ready for the full deployment, without industry buy-in or input (i.e., data on key origin-destination points, critical hours/schedule of travel, freight cargo (perishable vs non-perishable vs essential goods)), FSP implementation might not fully produce its expected benefits to the State transportation system and its economy.		
Impact	This study will assist FDOT in engaging the freight industry into adopting and implementing FSP technology to further contribute to a safer and more reliable transportation system. The main goals of this project are to: 1) Identify and study areas where FSP is currently being implemented or in planning phases to understand key benefits and trade-offs; 2) identify additional network areas where FSP could be implemented, which meet FDOT's goals with the highest likelihood of adoption from the freight industry; 3) Engage freight industry stakeholders to define an implementation plan that has the highest potential for FSP adoption with the highest safety and travel time reliability benefits and the least negative impacts on the freight industry and the traveling public.		
Affected Offices	The project will be of interest and produce results for a wide range of FDOT Offices and state and local agencies: • FDOT Freight & Rail Office • FDOT Safety Office • FDOT Traffic Engineering and Operations Office • FDOT Freight, Logistics and Passengers Office • FDOT Transportation Data & Analytics Office • FDOT Motor Carrier Size and Weight Division [Office of Maintenance] • FDOT District Freight Coordinators • Metropolitan Planning Organizations Various local city departments throughout the State of Florida		
Existing Work	1) Analysis of Safety and Mobility Conditions Prior to Implementation - Task 4 - Freight Signal Priority. 2022, Florida Department of Transportation 2) Concas, S. and S. Ranka, Interstate-4 (I-4) Florida's Regional Advanced Mobility Elements (FRAME) Project Evaluation Plan. 2021, Florida Department of Transportation. 3) Kaisar, E.I., M. Hadi, T. Ardalan, and M.S. Iqbal, Evaluation of Freight and Transit Signal Priority Strategies in Multi-Modal Corridor for Improving Transit Service Reliability and Efficiency. 2020, Florida Department of Transportation. 4) Potential Applications to Expand the Texas Connected Freight Corridor Systems, 2022, Texas Department of Transportation. 1) Rakha, H. A., Baird, M. J., and El-Shawarby, I. (2014). Designing Traffic Signal Yellow and Change Intervals considering Truck Impacts. Transportation Research Record, 2438(1)		

Keywords Used In Existing Work Search **(Cannot leave blank)**	Safety and Mobility; Freight Signal Priority; Advance warning, rail grade crossing, countermeasures, connected vehicle applications, warning sign, LED sign, Crashes, incorrect turns		
Related Contracts (Give contract numbers)			
Funding Request	$225,000	**Anticipated Duration**	18 months
Project Manager	Eugene Jules	**Contracting Method**	Direct Contract with University of South Florida
Equipment	N/A	N/A	
Urgency	1	The significant number of crashes statewide stresses the need to improve safety. The FDOT large scale adoption of CV technologies is intended to substantially reduce crashes and fatalities. The results of this research will contribute to a strategic deployment and utilization of FSP where it is most needed, with the largest safety and mobility benefits to Florida's travelers.	
Implementability	1	FDOT is actively implementing FSP strategies through current and planned ITS deployments. Findings from the study will be used by the FDOT to strategically implement FSP strategies in coordination with freight industry stakeholders.	

Project Benefits (Succinct, complete explanation)

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**
o Materials Enhancement		N/A
o Materials Savings		Autonomous vehicles will be able to utilize narrower lane widths so savings in pavement alone could be in the billions. Project conclusions will prepare the Department for transitioning its design practices accordingly.
o Time Savings	Potentially in the billions of dollars	FSP is proven to greatly improve travel time and travel time reliability. The savings are mostly accrued to the freight sector, with spillover or indirect effects to many other sectors of the economy. Large scale deployment and adoption of FSP in key bottleneck areas of the state can produce substantial economic impacts and benefits.
o Lives Saved/Injuries Prevented	Also potentially in the billions of dollars	The Department's primary goal is safety. FSP adoption on a large scale is likely to substantially reduce crashes and fatalities, especially in areas where commercial freight is most prevalent and the network most congested. Widespread, targeted, FSP implementation could result in dramatic value of statistical life (VSL) savings.
o Other (Explain)	Increased societal benefits	The literature provides evidence of reduced fuel consumption and greenhouse emissions from trucks as a result of FSP. Further, in times of crisis such as pandemics or natural disasters, FSP can be utilized to efficiently prioritize freight delivering essential goods or address supply shortages.

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