Request for Research Funding for FY 2023-2024			
Project Number (Research Center Use Only): FTE-24-01			
Requesting Office	Florida's Turnpike Enterprise (FTE), FDOT District 3, and FDOT Central Office	**Priority**	1 of 1 (projects may not have the same ranking – no ties)
Proposed Title	Development of a Traffic Incident Management Toolbox and Evaluation of Data Sources for Effective Early Warning and Detection of Abnormal Traffic Conditions		
Justification	There are a variety of traffic incident management (TIM) data sources and early warning systems available which can detect abnormal traffic conditions before incidents occur. Understanding the strengths and weaknesses of these data sources and systems can help FDOT proactively identify and warn drivers of these conditions. Comparing new data sources (such as crowdsourced data) and innovative early warning systems (such as Artificial Intelligence (AI) systems) with existing data and systems used by FDOT (including computer aided dispatch (CAD) data and SunGuide data) will help FDOT identify the potential benefits of these new tools. Developing a TIM toolbox that shows the potential benefits of different data sources and early warning systems for different scenarios (including different types of traffic events, different times of day, and different locations) will allow FDOT to select the most effective and appropriate tools for potential pilot testing and implementation in the future. This toolbox will be tailored as most appropriate for various end users (traffic management center operators, FDOT management, etc.) These new data sources and early warning systems can help reduce congestion and the potential for crashes, saving lives and helping FDOT reach Target Zero.		
Impact	This research will help FDOT identify effective TIM tools which can proactively identify and warn drivers of potentially hazardous or abnormal conditions on limited access roadways before they result in major congestion or crashes. The evaluations of TIM data sources and early warning systems conducted in this project will help FDOT understand when and where each tool would be most effective, allowing FDOT to make effective decisions regarding implementation of these tools in the future.		
Affected Offices	Traffic Incident Management, Traffic Operations		
Existing Work	A thorough literature review on various TIM data sources and early warning systems used throughout the United States will be conducted as part of this proposed project, Below are some examples of these TIM data sources and systems from the literature. Nevada DOT. (2019). Crowdsourcing: Traffic Incident Management Tools. *EDC5 Webinar Series*. https://transportationops.org/ondemand-learning/adventures-crowdsourcing-incident-management-tools-edc5-webinar-series Fries, R., Chowdhury, M., & Ma, Y. (2007). Accelerated Incident Detection and Verification: A Benefit to Cost Analysis of Traffic Cameras. *Journal of Intelligent Transportation Systems*, *11*(4), 191–203. https://doi.org/10.1080/15472450701653499 Pande, A. et al. (2005). A Freeway Safety Strategy for Advanced Proactive Traffic Management. *Journal of Intelligent Transportation Systems*, *9*(3), 145–158. https://doi.org/10.1080/15472450701653499		
Keywords Used In Existing Work Search **(Cannot leave blank)**	Traffic incident management, Freeway incident detection		
Related Contracts (Give contract numbers)	None		
Funding Request	$314,945	**Anticipated Duration**	24 months (21 months + 3 months for final report review)

Project Manager	Eric Gordin, P.E. (FTE), Amy DiRusso, P.E. (FDOT D3), and Shawn Kinney (Central Office)	**Contracting Method**	Direct contract with University of Central Florida (Principal Investigator: Haitham Al-Deek, Ph.D., P.E.)
Equipment	N/A		
Urgency	1	Traffic crashes and other similar incidents result in significant operational and safety impacts (congestion, fatalities, injuries) every year, with FHWA estimating that 25% of all congestion is due to traffic incidents (crashes, work zones, weather, etc.). Being able to proactively identify conditions that could possibly result in traffic incidents and warn drivers of these conditions before incidents occur is important to reduce congestion and improve traffic safety.	
Implementability	1	The developed TIM toolbox will contain rankings of the studied data sources and early warning systems based on their accuracy and potential benefits for a wide variety of cases. This will allow operators, managers, and other personnel to easily identify effective data sources and technologies and help FDOT select the most appropriate and effective tools for different conditions. While this project will not contain any new equipment installations, pilot tests of recommended data sources and early warning systems can be conducted in future projects.	

Project Benefits (Succinct, complete explanation)

This project will help improve the ability for traffic management centers (TMCs) to proactively identify conditions which could lead to traffic incidents by providing them with a toolbox of effective TIM data sources and early warning systems. This project will estimate the potential benefits which could be obtained by utilizing these data sources and early warning systems in Florida based on their implementations in other states. Using these TIM tools will help FDOT reduce traffic incidents, saving time and lives.

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		
o Materials Savings		
o Time Savings	Congestion Reductions	The potential time savings provided by different TM data sources and early warning systems will be estimated based on data from Florida limited access facilities and results from implementations in other states. These time savings will be used to estimate congestion reductions for different conditions.
o Lives Saved/Injuries Prevented	Reduction in Crashes and Their Associated Fatalities, Serious Injuries, and Costs	The potential reduction in crashes due to the use of TIM data sources and early warning systems will be determined. Based on these estimated reductions, associated reductions in fatalities, serious injuries, and comprehensive costs can be calculated.
o Other (Explain)	Ranking of Effective TIM Tools for Different Conditions	Various TIM data sources and early warning systems will be compared to each other and to existing data sources and systems used by FDOT for different conditions. These tools can then be ranked so FDOT can select the most effective tools for future pilot tests or implementations.

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