Request for Research Funding for FY 2022-2023			
SPR Subpart B Project: FTO-23-01			
Requesting Office	Forecasting and Trends Office	**Priority**	1 of 2
Proposed Title	Feasibility study of using open-source platforms for Florida's Statewide Model (FLSW)		
Justification	The FDOT Travel Demand Modeling Division – part of the Forecasting and Trends Office - has for more than three decades promoted a unified statewide modeling approach for consistency with the application of engineering and planning travel demand modeling activities. As part of this effort, the department makes available a common travel demand forecasting model software platform for use by all public agencies in Florida which include FDOT, MPOs, County and City Governments and Regional Planning Councils. This platform is intended to support modeling activities in the state and represent the Florida specific standardized modeling procedures outlined in the Florida Standard Urban Transportation Model Structure (FSUTMS). With the advancement of computing technology and increasing demand for travel forecasting models to evaluate new transportation policies and strategies using advanced modeling structures, it is critical that a progressive modeling platform is provided to meet Florida's need for state-of-the-art software to effectively advance the state's modeling capabilities. The development and application of travel demand models has historically relied upon the use of off-the-shelf software programs. These programs incorporate thousands of lines of codes written and controlled by private vendors who then package and sell their product to public agencies and other supportive private consulting groups. These programs are designed to reach a broad audience by offering ready-to-use functionality; however, much of the code is proprietary, inaccessible, and oftentimes inflexible to custom needs. In addition to their inflexible structure due to the inaccessibility of the source code, commercial programs consider different design and level of detail in terms of data structures, modeling approaches, and workflows. As a result, the exchange of data between models that use different design and level of detail requires significant time and effort.		
Impact	The goal of this project is to modernize the Florida Standard Urban Transportation Modeling Structure (FSUTMS) as an agnostic travel demand modeling platform and to investigate the feasibility of using open-source software as an alternative to traditional vendor-developed software. To achieve this goal, the critical requirements of a suitable open-source platform for FDOT's Florida Statewide Model (FLSM) must be identified. From the software design perspective, the project will identify the key required qualities such as being easy to read, understand, and engage with, as well as possessing an efficient, modular, and incremental design. Such features are essential for FDOT's FLSM as they will enable a broad range of audiences to use the software and allow them to extend the program with new functionality in terms of modules and methods when needed. This will bring up ample opportunities in terms of policy evaluation and incorporating new transportation technologies that current commercial platforms fail to address. From the transportation modeling perspective, particular attention will be devoted to the requirements and features of current FLSWM's components including trip generation, distribution, modal split, and traffic assignment. The project will also investigate how open sourcing can pave the path for upgrading the current modeling paradigm from a trip-based model to advanced tour-based and activity-based models. From a data perspective, this project will explore how to best link data inputs and model outputs with the Mobility Data Integration Space to facilitate scenario planning for emerging technologies.. While using an open-source platform can offer significant benefits, it comes with some challenges that should be carefully weighed before making any decision. Focusing on the potential challenges, this project will: identify the resources required for continuous maintenance of the program, explore the security measures needed to be taken to protect against cyber threats, and assess acceptance of the platform by FDOT's national and regional partners including FHWA, MPOs, etc.		

Affected Offices	The proposed project will involve a range of FDOT Offices and Districts, including the Forecasting and Trends Office, Transit Planning Office, and all FDOT District Offices.		
Existing Work	To the best of our knowledge, there is not yet any similar study in other state DOTs. This project is one of a kind and serves as the first step towards revolutionizing statewide transportation modeling.		
Keywords Used In Existing Work Search **(Cannot leave blank)**	Statewide Transportation Planning Model, Open Source, Software Independence, Trip-based Model, Activity-based Model		
Related Contracts (Give contract numbers)			
Funding Request	$200,000	**Anticipated Duration**	18 Months
Project Manager	Thomas Hill State Modeling Manager (850) 414 - 4924 Thomas.Hill@dot.state.fl.us	**Contracting Method**	Direct contract with the University
Equipment	N/A	No equipment costs are anticipated for the research project.	
Urgency	1	There is an urgent need to investigate the feasibility of using open-source software as an alternative modeling platform to traditional vendor-developed software for FDOT's statewide model. This project will directly support efforts to revise and update FSUTMS guidelines for software agnostic platforms.	
Implementability	1	The project outcome can assist the Forecasting and Trends Office in planning for migrating from current vendor-developed statewide modeling platform to an efficient and state-of-the-art open-source platform.	

Project Benefits (Succinct, complete explanation)

Open-sourcing the model can significantly expand the audience and allow for extending the model with new functionalities, testing new management policies, and incorporating new transportation technologies that current commercial platforms fail to address. It also can pave the path for upgrading the current modeling paradigm from a trip-based model to advanced tour-based and activity-based models.

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**
○ Materials Enhancement		
○ Materials Savings		
○ Time Savings		
○ Lives Saved/Injuries Prevented		
○ Other (Explain)		

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