

Request for Research Funding for FY 2020-2021

Requesting Office	State Traffic Engineering and Operations Office	Priority High	5 of 6
Proposed Title	Performance Evaluation of Connected Vehicle (CV) Projects in Florida		
Justification	<p>Transportation agencies have been increasingly considering Connected Vehicle (CV) technologies to improve safety and mobility of the transportation network. The Florida Department of Transportation (FDOT) has been at the forefront in deploying CV technologies across the state. The Florida Connected Vehicle Initiative has a total of 23 projects till date; of which, six are operational, 13 are in the design and implementation phase, while four are in the planning phase. While FDOT is optimistic about the potential benefits of these technologies, it is crucial to develop the benefit-to-cost (B/C) and return-on-investment (ROI) models to justify the funding requests associated with implementing CV initiatives. The validity of these estimations is dependent on the ability to accurately measure the quantitative and qualitative benefits of the CV deployments. While the quantitative measures focus on mobility and safety impacts, the qualitative measures include the lessons learned; the policies, procedures, and guidelines developed and adopted throughout the course of these projects; etc.</p> <p>CV technologies, when discussed at a broader level, focus on the high-level technological advances to improve safety and mobility. However, at the implementation stage, the CV deployments constitute a wide array of new and emerging applications such as Pedestrian Collision Warning, Emergency Vehicle Preemption, CV Traffic Signal System, Vehicle to Vehicle (V2V) Basic Safety Messages, etc. The CV Initiative in Florida includes several independent projects such as the Gainesville Signal Phase and Timing (SPaT) Trapezium; programs such as the I-4 Florida's Regional Advanced Mobility Elements (FRAME); and partnerships with several agencies and consortia such as the Tampa Hillsborough Expressway Authority (THEA). As such, each CV deployment initiative is unique in its own right and has to be evaluated independently to document both the quantitative and qualitative impacts. Evaluating the CV deployment projects, programs, and partnerships in Florida would better prepare FDOT for future CV deployments.</p> <p>This project will develop a data-driven approach to measure both the quantitative and qualitative impacts of CV deployment initiatives in Florida. Different criteria will be considered for evaluating the wide spectrum of projects, programs, and partnerships. As case studies, depending on data availability, the performance of the CV projects that are operational in Florida will be measured and documented. A state-of-the-practice review of the deployed CV applications from across the country focusing on the performance measures, evaluation criteria, and performance metrics will be conducted. The project will also recommend a scan tour of six states by a team of transportation professionals from across Florida to better understand the procedures adopted by other agencies in measuring the performance of CV deployments.</p>		
Impact	<p>Since CV technology is still evolving, it is imperative to assess the robustness, effectiveness, usability, and acceptance of the applications as they are being deployed. In other words, we need to actively and continuously monitor and evaluate the performance of the CV applications. The assessment criteria entail monitoring the impact of CV applications on both safety and mobility of the transportation system.</p> <p>The study results will help FDOT develop and apply approaches to document the quantitative and qualitative benefits of the CV deployment projects, program, and partnerships in Florida. These results can be used to estimate the B/C ratios and ROI for the existing and new CV implementation initiatives. This study will provide the information required to justify the funding requests associated with implementing CV initiatives.</p>		
Affected Offices	Traffic Engineering and Operations Office		
Existing Work	The CV deployments in Florida have rarely been evaluated, because of lack of data and/or standardized evaluation procedures. None of the existing or completed studies have focused on a comprehensive evaluation of both the quantitative and qualitative benefits of CV deployments in Florida.		
Keywords Used In Existing Work Search	Impacts of CV deployments, B/C of CV projects, Safety and mobility benefits of CV applications.		

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Related Contracts (Give contract numbers)	None		
Funding Request	\$125,000	Anticipated Duration	15 months; but interim results will be disseminated for immediate use
Project Manager	Raj Ponnaluri, Ph.D., P.E. PTOE, PMP	Contracting Method	Direct contract with Florida International University with Dr. Priyanka Alluri as the Principle Investigator
Urgency	1	With 23 CV projects at various implementation stages, there is an urgent need to develop data-driven procedures to document both the quantitative and qualitative impacts of the CV projects, programs, and partnerships in Florida.	
Implementability	1	The results will be used by FDOT to estimate B/C ratios to justify the funding requests associated with implementing CV initiatives.	
Project Benefits (Succinct, complete explanation) This project will help monitor and document the safety and mobility impacts of the deployed CV applications. These benefits can be used to estimate the B/C ratios of implementing CV initiatives.			
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			
<input checked="" type="checkbox"/> Time Savings	Measure the mobility benefits of each of the deployed CV applications	This study will develop data-driven approaches to quantify the mobility benefits of the deployed CV initiatives in Florida.	
<input checked="" type="checkbox"/> Lives Saved/Injuries Prevented	Measure the safety benefits of each of the deployed CV applications	This study will develop data-driven approaches to quantify the safety benefits of the deployed CV initiatives in Florida.	
<input checked="" type="checkbox"/> Other (Explain)	Measure the safety, mobility, and qualitative benefits of each of the deployed CV applications	This study will develop data-driven approaches to quantify the benefits of the deployed CV initiatives in Florida. These benefits could be used to estimate the B/C ratios of CV projects and help justify funding requests for future deployments.	

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