Request for Research Funding for FY 2021-2022			
Requesting Office	PTO CO	**Priority**	2 0f 2
Proposed Title	Alternative LiDAR Applications for Transit Agencies		
Justification	LiDAR has come into widespread use recently and is growing increasingly popular among transportation agencies to streamline processes, improve system efficiencies, and measure and monitor conditions. Even though LiDAR has been commercially available since the 1990s, with advancement in data processing and storing capabilities, the technology is now continually undergoing rapid development in surface and object sensing. Despite the advancement in the technology itself, the application in transit use case is lacking. LiDAR data offers high resolution data that is non-intrusive which has several potential use case in transit planning, safety, and operation. This project will investigate the potential use case with field deployment and real world application. The potential outcome of this study is a qualitative and quantitative list of utility function and performance measure using LiDAR data for transit use case. There is no study till date and this project will pave the way for novel research and findings.		
Impact	Consequences of not doing the research? It is currently and will continue to be a missed opportunity for agencies by not leveraging the new data stream available that is high resolution and non-intrusive. This project will potentially lead to novel processes and procedures that transit agencies can adopt for better efficiency and potentially improving safety of transit and its users. How shall the results impact practice? Over 30 transit agencies within Florida can benefit with awareness, consideration, and implementation of new data sources into existing practices. In some cases, there are no data to quantify the performance measures – for example, wait time at bus stops or average proximity of transit riders at bus stops, etc. LiDAR data has the potential to support or quantify the basic performance measures that could have lasting effect in the management and operation of transit agencies.		
Affected Offices	State Transit Office, Gainesville RTS		
Existing Work	Currently there is no ongoing or completed work on the application of LiDAR data for transit use case.		
Keywords Used In Existing Work Search **(Cannot leave blank)**	• LiDAR for transit use case • LiDAR alternative application • LiDAR for transit planning, mobility, and safety		
Related Contracts (Give contract numbers)	N/A		
Funding Request	$414,210	**Anticipated Duration**	24 months
Project Manager	Gabe Matthews David Sherman	**Contracting Method**	Direct contract with University of Florida (UF)
Urgency	1	Technology is changing rapidly and even though the application of LiDAR has been explored in general traffic operation, transit use case has not been explored. This novel study will open several avenues for alternative use cases of LiDAR in transit planning, operation, and safety.	
Implementability	1	This is an implementation project where the LiDAR equipment will be installed and various transit use cases will be investigated. The outcome of this study will document the benefit of LiDAR and the potential scalability of LiDAR application by 30 other transit agencies in Florida.	

Project Benefits (Succinct, complete explanation)

The benefit of this research effort is to perform a qualitatively and quantitatively analysis to answer the following question: How can the non-intrusive, high resolution data from LiDAR be of benefit to transit agencies in each of these cases – planning, safety, connected and autonomous

vehicles (CAV), and unprecedented scenarios (e.g., COVID)? In addition, this project will categorically document the advantages and limitations of LiDAR – specifically for transit agencies with respect to safety, mobility, and planning.		
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		Planning: potential use case is to quantify the wait time in transit stops which provides a performance measure for transit agencies for planning and operation.
o Lives Saved/Injuries Prevented		Safety analysis: The data will be investigated with conflict analysis. Some RTS bus are equipped with advanced driver assistance system (Mobileye) that provides data on potential conflicts. A comparative safety analysis between ADAS Mobileye conflict data and LiDAR trajectory analysis will be validated with ground truth data (video). Longitudinal study of social distancing at Transit bus stops will be documented. This will inform transit agency if any relevant measures need to be taken for public awareness or staff safety protocols.
o Other (Explain)		

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