ARDOT TRC TRANSPORTATION RESEARCH COMMITTEE

PROBLEM STATEMENT
No. 41

RESEARCH PROBLEM STATEMENT

DATE: 09/05/2019	**PROJECT AREA:** Special Projects

TITLE: UAS LiDAR for Developing Small Project Elevation Models

PROBLEM STATEMENT:

Providing digital terrain models and survey data for small area project such as bridge replacements requires detailed elevation models which are time consuming to develop using conventional total station surveying techniques. Other typical surveying methods such as GPS and airborne photogrammetry have issues due to the typical wooded areas surrounding the project sites. Unmanned aerial systems (UAS) with a LiDAR sensor can reduce the time and effort required to develop these elevation models without sacrificing the accuracy of the data. LIDAR UAS has advanced significantly in the last 5 years providing easier to use systems with more standardized workflows for developing elevations models from the raw LiDAR data. The project would utilize a Phoenix aerial LiDAR unit mounted on a DJI m600 UAS, which is owned by the University of Arkansas, to understand the flight requirements, sensor setup, data analysis, accuracy and benefits of using UAS LiDAR to develop these elevation models. The use of UAS is a FHWA Every Day Counts Innovation indicating the technologies ability to make meaningful impacts on transportation projects today.

OBJECTIVES:

The goal of the project is to assess the accuracy and benefits of using LiDAR UAS to collect high quality survey data for small area projects such as bridge replacements. The LiDAR results collected using LiDAR UAS, already owned by the University of Arkansas, will be compared to conventional survey results to assess the level of accuracy of the LiDAR models. The UofA has a number of UAS and LiDAR experts at the Center for Advanced Spatial Technologies (CAST) and within the College of Engineering which can contribute to the success of the project.

FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:

The research project plans to generate project usable data for current bridge replacement projects which can be directly used in design likely providing return on investment even before project completion. The data collected will be verified to ensure accuracy of the data. Using the collected data, recommended equipment, data collection procedures, software, and workflow best practices will be established. A fully implementable plan for ARDOT or a contractor to develop UAS LiDAR data for future sites will be provided.

Estimated Project Duration: 24 **Months**

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Standing Subcommittee Ranking	Advisory Council Ranking	Statement Combined with Statement Number(s)
1/5		