Statement No. 38

Arkansas State Highway and Transportation Department
Transportation Research Committee

RESEARCH PROBLEM STATEMENT

DATE: 09/02/2016 | **PROJECT AREA:** Special Projects

TITLE: The Use of UAVs (Drones) for Transportation Applications

PROBLEM STATEMENT:

Recent changes to Federal Aviation Administration (FAA) regulations on the commercial and government operation of Unmanned Aerial Vehicles (UAVs) have made it easier to use UAVs for many highway applications. Many varieties of commercial UAVs now exist to perform a variety of highway applications from small DJI Phantom UAVs, which carry cameras capable of taking 4K video and 12 MP still images, to large Octocopter and fix wing UAVs capable of carrying LiDAR units and other heavy remote sensing instruments. These UAVs are capable of performing a number of operations for various divisions within the AHTD in a more efficient, accurate, and cost effective manner than may currently be done. The systems are capable of quickly taking numerous images of proposed highway alignments to update aerial images for planning and design purposes, update topographic or digital elevation models (DEMs) for roadway design and cut and fill estimates, monitor landslide movements without placing people on the slide, estimate cut/fill completed on job sites to determine pay quantities, take unique images for public outreach projects to publicize AHTD projects underway, and inspect bridges or other difficult to access infrastructure. Each of these potential applications represents a unique area where UAVs could be used effectively to provide new or additional high quality information for engineers to use in the planning, design, and maintenance of transposition infrastructure.

OBJECTIVES:

The objective of the study is to determine the benefit of using UAVs for AHTD applications by assessing the cost effectiveness, accuracy and ease of use by conducting a series of blind studies to test various UAVs capability for transportation applications. Applications can include A) develop updated aerial images for new highway design, B) Develop DEM of highway alignment for earthwork planning and roadway design, C) develop estimate of cut/fill for roadway projects and compare to contractor estimates, D) perform landslide monitoring with pre/post movement flights, E) perform bridge inspections on difficult to access highway bridge.

FORM OF RESEARCH IMPLEMENTATION:

Results from the project will provide AHTD with the transportation applications where UAVs will provide a benefit to AHTD. Procedures to follow when flying for these applications will be established. The project will also determine which UAV is the best option for AHTD applications or whether outside contracting of data gathering is most effective for certain applications.

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Estimated Project Duration: 24

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Standing Subcommittee Ranking	Advisory Council Ranking	Statement Combined with Statement Number(s)
6 / 7	1	1,21