Statement No. 1

Arkansas State Highway and Transportation Department
Transportation Research Committee

RESEARCH PROBLEM STATEMENT

DATE: 09/09/2016	**PROJECT AREA:** Maintenance

TITLE: Cost Effective, Portable and Simplified Tool for Health Monitoring of Vertical Structure

PROBLEM STATEMENT:

From a maintenance perspective, structural health monitoring is an important task for maintenance and inspection engineers to evaluate current condition of bridges and culverts, and develop future maintenance and rehabilitation plans. Instead of employing costly and time consuming field instrumentation and data acquisition systems, robots can be used to accomplish this task. The proposed proof-of-concept study will assess the feasibility of a simple, portable and cost effective robotic tool for estimating displacements and defects of bridges including overpasses and underpasses along the desired path/direction. The gathered displacement data will be analyzed using computer models, which will calibrate the data for local conditions and process raw data in a meaningful way. The proposed tool is expected to be an alternative of expensive field instrumentation and monitoring process for bridge inspectors. To this end, a proof-of-concept will be developed through robotic instrumentation, data collection, calibration and validation. The outcome of this study is expected to reduce risk of premature bridge deterioration, and reduce monitoring and maintenance cost of AHTD.

OBJECTIVES:

1. Assess the use of a simple, portable and cost effective robotic device to measure displacements of new and existing vertical structures (bridges, overpasses and underpasses).
2. Develop a proof-of-concept through instrumentation, data collection, calibration and validation of robots
3. Recommend test and operation protocols and systems for robotic tools and techniques

FORM OF RESEARCH IMPLEMENTATION:

1. A report containing guidelines of robotic operation, data collection, and validation from new construction and existing structures
2.Organize a two-hour workshop for bridge inspectors and AHTD engineers

REVIEWER: Davin Webb **Estimated Project Duration:** 12

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Standing Subcommittee Ranking	Advisory Council Ranking	Statement Combined with Statement Number(s)
3/6	1	21,38