ARDOT TRC TRANSPORTATION RESEARCH COMMITTEE

PROBLEM STATEMENT
No. 13

RESEARCH PROBLEM STATEMENT

DATE: 09/24/2020 | **PROJECT AREA:** Maintenance

TITLE: Use of Drones in Inspecting Bridge Deck Conditions

PROBLEM STATEMENT:

Use of the drone technologies in inspecting bridge decks has gained more interest in recent years and they are nonintrusive, versatile, and cost-effective compared to physical inspection. In particular, the surface condition (patching, cracking, stripping, rutting, etc.) data can be gathered, stitched, and analyzed and will eliminate the physical or vehicular (i.e., ARAN) inspections. The A-State team has used this technology by using DJI M-210 V2 quadcopter, which is capable of carrying two sensors for agricultural applications. One of the sensors is an Altum Multispectral and thermal sensor that generates five multispectral bands (blue, green, red, near-infrared, and red edge) and the thermal band. The other sensor is a Potential sensor that is typically used for inspection and can Zoom up to 30X. The main goal of the proposed study is to capture surface and structural deterioration images bridge decks and generate condition maps through photogrammetry and image analysis tools and visualize the data by using ArcGIS tools. The outcomes of the proposed study are expected to eliminate physical inspections and thus make the bridge deck inspection quicker and safer for inspectors.

OBJECTIVES:

1. Conduct a thorough literature review in terms of drone technology, its usage, and regulatory requirements
2. Survey DOTs to gather hands-on information about the use of drones for bridge inspection
3. Survey the ARDOT inspectors to gather requirements of the drone-based inspection method
4. Inspect selected bridge decks using drone technology
5. Process the collected images and analyze them
6. Compare the drone-based inspection data with ARAN and physical inspection data
7. Develop guidelines/recommendations on how to use the developed technology

FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:

1. Technical report containing the findings of the study
2. Train inspectors how to use the tools developed as part of this project

The drone-based inspection tasks will be quicker and safer than the physical inspection.

Estimated Project Duration: 24 **Months**

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Standing Subcommittee Ranking	Advisory Council Ranking	Statement Combined with Statement Number(s)
4/8	16	