

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Date: Sept 30, 2021

Lead Agency (FHWA or State DOT): Indiana DOT

INSTRUCTIONS:

Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # <i>(i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</i> <u>TPF 5-387</u>	Transportation Pooled Fund Program - Report Period: <input type="checkbox"/> Quarter 1 (January 1 – March 31) <input type="checkbox"/> Quarter 2 (April 1 – June 30) <input checked="" type="checkbox"/> Quarter 3 (July 1 – September 30) <input type="checkbox"/> Quarter 4 (October 1 – December 31)	
Project Title: Development of an Integrated Unmanned Aerial Systems (UAS) Validation Center		
Name of Project Manager(s): Tommy E. Nantung	Phone Number: (765) 463-1521 ext. 248	E-Mail tnantung@indot.in.gov
Lead Agency Project ID:	Other Project ID (i.e., contract #):	Project Start Date: 1/1/2019
Original Project End Date: 12/31/2022	Current Project End Date: 12/31/2022	Number of Extensions: None

Project schedule status:

On schedule
 On revised schedule
 Ahead of schedule
 Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Percentage of Work Completed to Date**
\$650,000	\$370,128	71%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date**
\$23,547	3.6%	85%

**Since end date has been extended, project percentages have been updated (estimates)

Project Description:

This study proposes to develop the basic standards, protocols, and testing requirements that a given UAS must meet and demonstrate for a particular application.

Progress this quarter (includes meetings, work plan status, contract status, significant progress, etc.):

- The development of the UAS Evaluation Chamber for Bridge Inspection has been completed (See Figure 1). As discussed in previous reports, the chamber presents a GPS denied environment that can be used to evaluate UAS in a controlled and repeatable environment. A scoring rubric for UAS is currently being developed.
- A standardized “cold weather” evaluation test is nearly completed. This test will be used to provide a relative indication of the effect of cold weather (in the range of 20F to 30F) as compared to “warm” weather (<60F) operation times of a UAV.
- The development of a “pilot check list” is completed. The check list is to be completed prior to flights in the context of bridge inspections.
- The development of a standardized “turbulence test” is well underway. This test will be used to evaluate the performance of the UAS in turbulent wind conditions to determine the effect of turbulence on the quality of the data collected.
- The proposed camera and image quality evaluation criteria are nearly complete.

Anticipated work next quarter:

- It is planned to bring various bridge inspectors to the S-BRITE center to get real-world feedback on the test.
- Develop draft scoring and test procedures for evaluating the performance of UAS within the UAS Evaluation Chamber.
- Finalize the cold weather and turbulence tests along with the pilot check list.
- Schedule Project Panel meeting for some time in the 4th Quarter of 2021. It has been decided to push the meeting to the 4th quarter to allow a more comprehensive project update. Further, it is hoped that project partners can travel to Purdue for an in-person meeting.
- Submit the testing procedures developed to date for review by the project partners prior to meeting referenced above

Significant Results:**Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the Agreement, along with recommended solutions to those problems).**

1. The COVID-19 restrictions resulted in Purdue University shutting down entirely in Mid-march 2020. All access to laboratory facilities were halted effectively bringing all research to a standstill. In mid-June 2020, standard Operating Procedures were being developed for review by the University to begin safe operations. Bowen Laboratory and the S-BRITE Center were cleared to allow research to re-start in mid-July of 2020. Clearly, COVID has been a major impact on this and other research projects. The Research Team continues to try and work hard to try and make up for lost time due to the laboratory shut downs while still working as safely as possible and within the confines of Purdue’s COVID-19 operation procedures.

Potential Implementation:

None to date