

Project Overview Report

1. UTC Identifying Number

DTRT13-G-UTC28

2. Center Identifying Number

CAIT-UTC-NC31

3. Project Title

Unmanned Aerial Vehicle Augmented Bridge Inspection Feasibility Study

4. Principal Investigator & Contact Information

Marc Maguire
Assistant Professor
Utah State University
Logan, UT 84322

5. Rutgers/CAIT Project Manager

Patrick Szary, Ph.D.

6. Customer Principal

Dan Gorely
Bridge Asset Management Engineer
Idaho Transportation Department

7. Project Description

Departments of Transportation (DOTs) perform inspections at regular intervals for all assets including bridges. Bridges are inspected by teams of bridge inspectors and represent a significant portion of the budget within a bridge or structures division. Lowering inspection costs using Unmanned Aerial Vehicles (UAVs) or drones would allow DOTs to more effectively use their funds in other areas such as rehabilitation or replacement of aging infrastructure.

UAVs equipped with thermal and visual spectrum cameras, can be used to perform targeted investigations of sensitive regions. The UAVs can be flown by a pilot on the ground, programed to automatically follow a path and collect data for inspection using GPS. This may give the inspection team the more time to spend on other tasks or other bridges and reduce the need for inspection equipment like boom trucks. The purpose of this project is to assess the current state of UAV bridge inspection, identify challenges and shortcomings then propose and/or develop solutions. This will be accomplished by creating basic protocols for UAV image collection, geographical positioning system denied navigation and safe navigation. These tasks will first be performed and perfected in a controlled environment and later used in a tandem human-UAV inspection on an in-service bridge.

8. Implementation of Research Outcomes (or why not implemented)

Pending the results of the research, the techniques can be easily implemented by a state DOT with their own UAVs and UAV operators or through contractors. Ideally, the results will be adopted into a best practices type document through ITD. Other DOTs or local agencies can use these results as well.

9. Impacts/Benefits of Implementation (actual, not anticipated)

TBD

10. Dates and Budget

Start Date: 4/1/2016

End Date: 12/31/2017

UTC (CAIT) Dollars: \$ 51,361

Cost Sharing: \$ 63,110

Total Dollars: \$ 114,470

11. Keywords

Bridge Inspection, Unmanned Aerial Vehicles, Non Destructive Evaluation

12. Web Links (Reports and Project Website)

<https://cait.rutgers.edu/cait/research/unmanned-aerial-vehicle-augmented-bridge-inspection-feasibility-study>