DRISI
Caltrans Division of Research,
Innovation and System Information

Research Results

Benefits of adopting UAS technology in everyday operations

Estimate savings for Caltrans through the use of Unmanned Aircraft Systems (UAS) applications and identify drivers of cost-savings for a framework to forecasting financial benefits.

Modal

MAY 2021

Project Title:
Unmanned Aircraft System (UAS) Benefits, Savings Forecast, and Methodology

Task Number: 3513

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WHAT WAS THE NEED?

UAS also commonly known as drones, have increasing and widespread applications for transportation and public works agencies. Applications range from detailed surveying, bridge inspections, and construction to broader monitoring for environmental concerns, geology, and traffic operations.

Many State Departments of Transportation (DoT) have recognized the potential benefits from adopting UAS technology in their everyday operations: from possible financial savings, to added benefits given by improved safety conditions for workers as well as broader use and more refined deliverables (e.g., obtained by having access to areas that are hard to reach or not visible for a human operator). To date, such potential benefits have to be proved, and the research community has started to grapple with the problem of estimating financial savings, as well as quantifying the value of added benefits brought by the UAS technology. As of 2018, 20 State DoTs have declared to use UAS for daily operations, with 15 more States declaring an ongoing research phase. The States of Washington and Kansas have tackled cost-benefits analysis from drone operations since 2008 and 2016, respectively. Utah and North Carolina have also been active centers for the study of financial savings from the use of drone technology. In the past five years, the industrial sector has also started looking into the potential savings allowed by the use of this technology for deliveries, as well as for providing permeating social services such as wi-fi connections.

WHAT WAS OUR GOAL?

The goal of this research was to estimate the savings for the California Department of Transportation (Caltrans) attained by engaging in the use of Unmanned Aircraft Systems (UAS). The goal was also to identify the drivers of cost savings when UAS are used for Caltrans related applications, towards the development of a framework for forecasting savings within the entirety of Caltrans. The final goal was to identify upcoming/emerging technology in the field of UAS and upcoming regulatory changes and how Caltrans can adapt its statewide operations accordingly.

WHAT DID WE DO?

The proposed study was to consist of the following seven key components (Project was terminated at step two):

1. Researching and summarizing other States' cost-benefit analysis ingredients with mapping to Caltrans areas of interest. This provided a starting point for the entire work and also shaped how the following tasks were approached.
2. Started a dialogue with a select advisory panel mediated through the Caltrans Division of Aeronautics. The researchers will identified current "Base Costs" associated with running operations in the applications of interest, and will begin the process of quantifying the forecasted number of UAS operations within the various applications.
3. The researchers were to leverage the know-how from industry partners as well as from other SJSU faculty involved with surveying/geology/ inspection applications on cost-benefit analysis for sensor-options in the various applications of interest.
4. Researchers were going to identify cost drivers for the various applications. The "base costs associated to technology" will be estimated. Researchers were going to look into the areas of safety improvement, accessibility to broader results, and ethical impact.
5. A careful assessment of the findings were to be executed to draft a framework for estimating savings.
6. The researchers were to respond to and address peer review comments and develop a final report.
7. The researchers were going to develop a series of infographics and fact sheets to support technology transfer activities. These activities may have included presentations to conferences and/or journal publications in addition to participating in an online webinar and presentation to Caltrans staff.

WHAT WAS THE OUTCOME?

Caltrans terminated the contract during phase two due to a duplication of efforts from the researchers and an internal group within Caltrans. The State Cost-Benefit analysis will be used as a reference.

WHAT IS THE BENEFIT?

Knowing what other states cost-benefit is, this helps Caltrans Aero group decide on continued research and is a useful reference with planning/ policy.

IMAGES

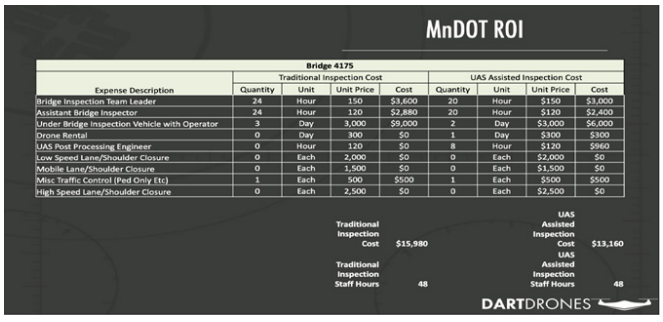

Image 1: Minnesota Bridge 4175 Inspection Cost Comparison using UAS