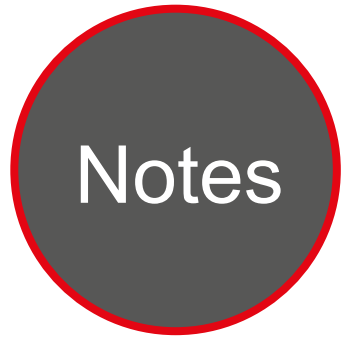


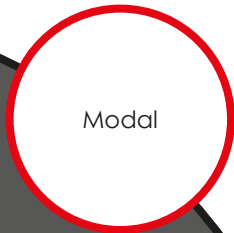


Caltrans Division of Research,
Innovation and System Information

Research



Notes



Modal

MAY 2020

Project Title:
Support Caltrans Unmanned
Aircraft Systems (UAS) Program

Task Number: 3513

Start Date: June 1, 2018

Completion Date: August 30, 2021

Task Manager:
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Unmanned Aircraft System (UAS) Benefits, Savings Forecast, and Methodology

Estimate savings to California Department of Transportation (Caltrans) through the use of UAS applications and identify drivers of cost-savings in order to develop an overall framework to forecast savings.

WHAT IS THE NEED?

Unmanned Aircraft Systems (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 (DOTs) have recognized the potential benefits of adopting UAS technology in their everyday operations. Benefits range from possible financial savings, improved safety conditions for workers, and more refined deliverables (e.g., access to areas that are hard to reach or not visible to a human operator). To date, such potential benefits have yet to be proven, 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 UAS technology.

As of 2018, 20 State DOTs have declared they 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. 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 of using UAS technology for deliveries and social services, such as Wi-Fi connections.



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WHAT ARE WE DOING?

The proposed study will consist of the following seven tasks:

- **Task 1:** Reviewing and summarizing other States' cost-benefit analysis ingredients and focusing on Caltrans areas of interest.
- **Task 2:** Work with a select advisory panel mediated through the Caltrans Division of Aeronautics to identify current "Base Costs" associated with running operations in the applications of interest.
- **Task 3:** Leverage the know-how on cost-benefit analysis for sensor-options in the various applications of interest.
- **Task 4:** Identify cost drivers for the various applications with focus on safety improvement, accessibility and ethical impact. The "base costs associated to technology" will be estimated.
- **Task 5:** Draft a framework for estimating savings.
- **Task 6:** Respond to and address peer reviewed comments and develop a final report.
- **Task 7:** Develop a series of infographics and fact sheets to support technology transfer activities.

WHAT IS OUR GOAL?

The first goal of this research is to estimate the savings to Caltrans attained by engaging in the use of UAS. The second goal is to identify the drivers of cost savings when UAS are used for Caltrans related applications, which will assist the department to develop an overall framework to forecast savings. The final goal is to identify upcoming/emerging technology in the field of UAS and upcoming regulatory changes to determine how Caltrans can adapt its statewide operations accordingly.

WHAT IS THE BENEFIT?

Federal and local agencies are embracing drone technology in order to save time and money on their day-to-day operations. This research project will help leverage the existing efforts related to estimating savings for Caltrans through the use of UAS for applications including but not limited to surveying, bridge inspections, construction, emergency response, environmental monitoring, geology, maintenance, and traffic operations. The research also helps create a framework for forecasting financial benefits.

WHAT IS THE PROGRESS TO DATE?

January 1, 2020 – March 31, 2020

During this quarter, the main focus for the researchers has been to undertake a background literature evaluation to better understand what DOTs around the country have been describing about cost savings with UAS. This background will be key for subsequent tasks as the variables necessary for a cost savings formula are developed. A variety of informative UAS operational and cost-savings details have been collected from state DOTs and published research. Preparation work has also started for Task 2.

Due to the COVID-19 pandemic, there is uncertainty about the timeframe to distribute a survey to the necessary population of UAS operators, informed managers, and experts. The research team feels that it is important to not burden the key informants with additional demands until a semblance of a routine begins to emerge. As the virus subsides, the hope is that a survey distribution will be appropriate by the end of summer.



The Mineta Consortium for Transportation Mobility (MCTM), at SJSU is where the research is being conducted.