



BRIGHAM YOUNG UNIVERSITY  
AUVSI CAPSTONE TEAM (TEAM 45)

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## Capstone Project Contract

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## Revision History

ID	Rev.	Date	Description	Author	Checked By
PC-444	1.0	10-02-2018	Opportunity development initial stage	Andrew Torgesen	Kameron Eves
”	”	”	”	”	Ryan Anderson
”	”	”	”	”	Jacob Willis
”	”	”	”	”	Tyler Critchfield
”	”	”	”	”	John Akagi

## Introduction

Each year, the Association for Unmanned Vehicle Systems International (AUVSI) hosts a Student Unmanned Aerial Systems (SUAS) competition. While each year's competition has unique challenges, the general challenge is to build an Unmanned Aerial Vehicle (UAV) capable of autonomous flight, object detection, and payload delivery. This year's competition will be held June 12<sup>th</sup> to 15<sup>th</sup>, 2019 at the Naval Air Station in Patuxent River, Maryland.

The UAVs entered into the competition are judged primarily on their mission success during the competition. Each team is also required to submit both a report and a flight readiness review presentation. The report should justify the UAV decision, explain design trade-offs, demonstrate the team's engineering process, and highlight the capabilities of the UAV. The flight readiness review presentation demonstrates that the UAV is capable of safely completing the competition. The overall score for a team is based on a combination of the points from the mission, report, and presentation.

For the last two years BYU has sponsored an AUVSI team to compete in the competition. The 2017 team was primarily volunteer based and placed 10<sup>th</sup> overall while the 2018 team was a Capstone team and placed 9<sup>th</sup> overall. This year's team is also a Capstone team consisting of BYU Mechanical, Electrical, and Computer Engineering students and looks to place in the top 10 teams again.

## **Project Objective Statement**

Improve upon last year's BYU AUVSI unmanned aerial system (UAS) by improving path planning, obstacle avoidance, visual object detection, and payload delivery by April 1, 2019 with a budget of \$3,500 and 2,500 man hours.

## Contact Information

Team Member Name	Team Position	Contact Information
Andrew Ning	Coach	aning@byu.edu 801-422-1815
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## Project Approval Matrix

Development Stage	Expected Completion Date	Design Artifacts Required for Approval	Budget
Opportunity Development	October 5, 2018	Project Contract, System Requirement Matrix	\$100
Concept Development	November 2, 2018	Description of Concept, Concept Definition, Test Procedures and Results	\$500
Subsystem Engineering	January 18, 2019	System Design Package, Subsystem Test Procedure and Results	\$2,000
System Refinement	March 22, 2019	Validated Prototype, Product Definition, System Achieved Values	\$800
Final Reporting	April 1, 2019	Final Report Compilation	\$100

## Key Success Measures

Measures (units)	Stretch Goal	Excellent (A)	Good (B)	Fair (C)	Lower Acceptable	Ideal	Upper Acceptable
Obstacles Hit (#)	0	1	3	5	0	0	5
Waypoint Proximity (ft)	10	15	20	25	0	0	100
Characteristics Identified (%)	Autonomous Detection	40	30	20	20	100	100
Airdrop Accuracy (ft)	5	25	50	75	0	0	75
Number of Manual Takeovers	0	1	2	3	0	0	3



## Change Management Procedure

An Engineering Change Order (ECO) will be used to facilitate the proposal, approval, and implementation of any future changes to this contract. The ECO template is found on page 249 of the Product Development Reference (Mattson and Sorenson). A change is initiated by filling out the template and submitting it to all involved parties for approval. Upon unanimous approval, this contract will be edited, the version number will be changed, and the revision history section will be updated with the relevant information, including a reference to the ECO created.