Brigham Young University

AUVSI Capstone Team (Team 45)

Capstone Project Contract

Contents

Revision History

ID	Rev.	Date	Description	Author	Checked By
PC-444	1.0	10-02-2018	Opportunity development stage	Andrew Torgesen	...

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^{th} to 15^{th}, 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^{th} overall while the 2018 team was a Capstone team and placed 9^{th} 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
Andrew Torgesen	Team Lead	andrew.torgesen@gmail.com 661-210-5214
Brandon McBride	Controls/Payload Team	brandon.mcbride4@gmail.com 801-520-9165
Derek Knowles	Vision Team	knowles.derek@gmail.com 405-471-4285
John Akagi	Controls/Payload Team	akagi94@gmail.com 858-231-4416
Brady Moon	Controls/Payload Team	bradygmoon@gmail.com 435-828-5858
Tyler Miller	Vision Team	tylerm15@gmail.com 385-399-3472
Ryan Anderson	Controls/Payload and Airframe Team	rymanderson@gmail.com 208-789-4318
Jake Johnson	Vision Team	jacobcjohnson13@gmail.com 801-664-7586
Tyler Critchfield	Controls/Payload and Airframe Team	trcritchfield@gmail.com 206-939-8274
Jacob Willis	Controls/Payload Team and Safety Officer	jbwillis272@gmail.com 208-206-1780
Connor Olsen	Vision Team	connorolsen72@gmail.com 385-230-3932
Kameron Eves	Controls/Payload Team	ccackam@gmail.com 702-686-2105

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 (#)		1	3	5	0	0	5
Waypoint Proximity (ft)	10	15	20	25	0	0	100
Objects Identified (%)	Autonomous Detection	40	30	20	20	100	100
Airdrop Accuracy (ft)		25	50	75	0	0	75
Number of Manual Takeovers		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.