

# First Semester Progress Report

## Programmable Flight Controller

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## Abstract

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# **1 List of Acronyms**

GUI - Graphical User Interface

BLDC - Brushless Direct Current

## **2 Objectives and Deliverables**

### **2.1 Overall Objective**

The main objective of the project is to develop a programmable flight controller that responds appropriately to control inputs and disturbances. The flight controller will receive control inputs over WI-FI from a base station. The base station can be any device that is WI-FI enabled and has the appropriate software installed. The software on the base station will be a graphical user interface (GUI) that allows the user to send control inputs to the drone and view statistics of the drone during operation.

The objectives of the project have been broken down into what will be accomplished in the first semester (Short term objectives) and what will be accomplished in the second semester (Long term objectives). These objectives along with specific details of each can be viewed in sections 2.2 and 2.3 respectively.

## **2.2 Short Term Objectives (October 2016 - December 2016)**

### **2.2.1 Simulation**

The simulations will allow us to gain an understanding of how the controller will respond to specific inputs. The simulation can then be tuned until the output is within the constraints set by Dr. Rhineland. We will be simulating both the flight dynamics and controller using MATLAB and Simulink exclusively.

### **2.2.2 Construction of the Drone**

The drone parts will arrive separately and assembly will be required. The extent of the assembly will be to attach the 4 brushless DC motors and batteries to the base of the drone. On top of the assembly the preliminary layout of the required hardware will be decided on. The layout is subject to change as we begin the final assembly in the second semester.

### **2.2.3 Initial Design of the Controller**

A preliminary design of the flight controller will be constructed in software.

### **2.2.4 Initial Testing**

The initial design of the controller will be tested using the brushless direct current (BLDC) motors supplied by Dr. Rhineland. The initial tests will allow us to gain insight on what changes to the flight controller must be main

in order to meet the constraints. Along with the testing of the controller tests will be conducted to characterize the BLDC motor.

## **2.3 Long Term Objectives**

### **2.3.1 Graphical User Interface**

As mentioned the base station

## **3 Background and Significance**

## **4 Proposed Approach and Validation**

## **5 Preliminary Report**

## **6 Work Plan and Milestones**

## **7 Distribution of Tasks**

## **8 Budget**