

# EE CprE 491 – Fall 2019

## MicroCART Senior Design Team

### Weekly Report 2

*Sept. 29th - Oct. 6th*

*Faculty Advisors: Phillip Jones, Matt Cauwels, James Talbert*

#### Team Members:

Evan Blough -- Technical Team Lead, Embedded Software Lead  
Kynara Fernandes -- Ground Control Station Lead  
Aaron Szeto -- Controls Lead  
Joe Gamble -- Embedded Hardware Lead  
Shubham Sharma -- Crazy Fly Implementation Lead, Website Manager  
Jacob Brown -- Physical Hardware Lead

#### Summary for Progress this Week

This past week we worked on developing our design document. Everyone continued to research their respective focus areas. We also continued to develop the systems for the second drone.

#### Past Week Accomplishments

- Current Draw from ESC - Evan
  - Tried to make a python script for raspberry pi that generated PPM input
  - Significantly easier to test with an rc receiver, but I couldn't find a working one
  - We decided to just get the overall current draw from the batteries
- Organized and developed tasks - Evan
  - I added a bunch of Trello cards for things we need to work on for the class and for the project
  - I worked on the design documents and weekly reports
- Documentation of Embedded Software - Evan
  - I continued looking into the current embedded C running in the quad\_app folder.
  - I made some diagrams, so I could see how the code works. This is just one, I have these for some of the source files in quad\_app. Once I have a lot of these I hope to be able to piece together several of them into a high level overview.
  - [https://drive.google.com/file/d/1\\_Xu7RC9y2OaIxrEErRKz0cdwdPxWvHTq/view?usp=sharing](https://drive.google.com/file/d/1_Xu7RC9y2OaIxrEErRKz0cdwdPxWvHTq/view?usp=sharing)
  - The diagrams are in multiple layers, so to see the second one I made you need to open it with draw.io software
- Look into Matlab and Simulink - Aaron
  - Successfully got Simulink flight sim running and went through the GitHub tutorial
  - Got the Matlab parameters running and measuring
- Finished flashing wifi module - Kynara and Joe
  - Downloaded and set up ESP open SDK
  - Flashed wifi module, so that it can be added to the PCB shield board

- QT and the groundstation - Kynara
  - Got familiar with the QT framework
  - Got familiar with ground station source code
  - Studied PID control theory to understand the current state and the features needed to be implemented in the future
- Finished the first two portions of the Design Document and Lightning talk
  - Everyone
- Hardware - Jacob
  - Began soldering the I/O shield for the Zybo-board
  - Began exploring ways to record a current reading
- Crazyflie setup -Shubham
  - Worked this week to research on the Crazyflie 2.0
  - Set up a development environment on the computer.
  - Updated weekly reports and technical documents on the website.

### Pending Issues

- A lot of code to look through, and there isn't that much external documentation. Most of it is just comments in the source
- Found issues with compiling due to outdated issues with computers.
- Discovered a **major** bug with the build files of the current ground station. Discussed with team and James and now looking for ways to fix it
- Team communication/unity issues
- Run into issues and don't have enough time to resolve them
- Ground Station is currently in a state where it cannot be compiled.
- Zybo-board shield didn't solder as smoothly as planned

### Individual Contributions

Team Member	Contribution	Week 3 Hours	Total Hours
Evan Blough	Project Planning, Tried to make the raspberry pi script to drive the ESC. Worked on the Design Document assignment. I documented and research the code on the quad.	12	21
Kynara Fernandes	Worked on flashing WIFI chips. Got familiar with QT framework and ground station source code. Design doc and lightning talk	13.5	19.5
Joe Gamble	Worked to flash Wi-fi chips for devices. Determined necessity to work with zybos for the vivado demonstration	9	15
Jacob Brown	Soldering I/O shield, current draw	5	10
Aaron Szeto	Added to design document. Got model parameters running. Started Simulink flight sim	6	12
Shubham Sharma	Progress with the website by updated technical documents and adding in weekly reports.	7	12

	More progress with research into Crazyflie 2.0. More confident in the development environment		
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### Plans for Coming Week

- Finish Current draw on motors
- Finish soldering components
- Continue researching subsystems
- Get Simulink flight sim working on a personal laptop
- Check the Matlab/Simulink model for outdated info.
- Vivado demonstration
- Make ground station compilable
- Set up a computer with the crazyflie development environment
- Since we received clearance for the Crayflie, start to fly them.
- Fly more than one at a time (tentative)

### Summary of Weekly Advisor Meeting:

(This is for the previous week's meeting)

This week we met with Dr. Jones and Matt. We decided to push back the meeting to 4 PM to allow almost everyone to attend on time. Matt gave us some direction on taking current draw from the motors. Dr. Jones made a list of parts he was ordering for us to continue development. We then talked about what each role/area can focus on in the future. We decided that the Embedded Software Lead could spend more time researching the embedded C on the drone. The GCS Lead could lookup networking and Qt. The GCS Lead could also start working on a PID tuning sliding bar and an actual versus set points graph that could be used for PID calibration. The Embedded Hardware lead was going to look through the VHDL on the FPGA. The Controls Lead was going to look through the matlab and simulink and take a current draw from the motors. Those were all the topics we discussed at the previous meeting.