Senior Design Team may23-45: MicroCART Team

Spring Semester Bi-Weekly 5 report (4/3 to 4/14)

Members:

- Austin Beinder- Simulations Lead
- Cole Hunt - Git Master/Device OS
- Connor Ryan - Physical Systems Lead
- Emily Anderson - Telemetry/Backend Lead
- Gautham Ajith - YouTube/GUI Lead
- Grant Giansanti - Client interaction/Testing
- Tyler Johnson - Project Manager

Weekly Progress Summary

These last two weeks have been mainly focused on transitioning from the MP4 lab to the new lab. MP4 lab was relatively successful, although we had some major issues at the beginning. Here is the work split up from the previous weeks.

MP4: Tyler, Austin, Grant, Emily and Gautham

- Gautham, Tyler, Grant and Austin have volunteered to help out the TAs for the MP4 lab with Tyler, Austin and Grant spending most of the time helping out.
- Gautham and Austin have worked together on putting a correct image of our lab
- Austin has been reworking the GUI from fresh using CFlib and Python and Emily has been supporting him

New Drone: Everyone

- Gautham, Cole, and Emily worked on setting up a wifi connection to the Raspberry Pi Zero W2. Gautham and Cole were able to setup communication through ssh to the Pi and created a TCP socket connection and Cole w Connor created a test program to test LEDs on Pi
- Tyler created a working test stand and finished a yaw harness for the test stand and drone. Austin and Tyler have been testing it out and found some issues that will be revised.
- Austin and Connor have been able to run the crazyflie software/hardware on the new drone using the crazyflie processor. They were able to test it with the test stand and ran into some issues with the screws and other hardware issues
- Connor specced out a new iteration of the FlyPi board and changed the UVLO tolerance. It should be created soon.

- Grant worked on creating the baremetal application. He has written code for the I2C, timers, gpio, etc. He also tested out the I2C with the seeeduino.

Individual Contributions

Team Member	Contributions	Total Hours Spring
Austin Beinder	● Got positional controller working in x and y axis using xy test stand. Haven't nailed down the z axis yet. The test stand does not seem helpful for find the "right" pid values, but it was helpful for making sure my logic was right. Basically I could see clearly whether or not my controller was correcting or not, and that made debugging a bit easier than my experience with MP1. ● Fixed MP4 problems as pseudo TA. The correct image isn't on the computers anymore though because it got wiped friday night. Will be working with ETG today and tomorrow to correct this. ● Printed Tylers new test stand and battery holder ● Worked w/ Connor to get big quad deck working right. We just need to tune the PID right now then it supposedly should be able to fly. Main thing blocking is the test stand. ● Prototyping a new Quad GUI. ● Helped a couple groups w/ MP4 while in lab ● Started tuning yaw rate controller, currently having some issues with getting the motors to not crank up way too much. Also nylon screws, and sometimes tuning pids is hard ● Began connecting the framework of my lil python gui to an actual crazyflie. About 70% done, maybe needs about 2 more hours of effort before the entire gui is recreated and better than the original. Have demo of logging state estimate on new gui, and setting parameters and logging variables. Still need to add connecting/disconnecting (Emily's thing) and sending setpoints.	164

Cole Hunt	● Started Ad Hoc Network setup on Rpi Zero. ● Issues with connecting Rpi to IASTATE network for package installation ● Created LED test for Pi Zero ● Created TCP test for Pi Zero over IASTATE Network ● Started cflib breakdown to redirect messages to a TCP socket and not a radio frequency	73
Connor Ryan	● Worked on software for BigQuad deck. Found some resources and handed off to Austin ● Updating hardware files to match modifications needed ● Compiled hardware list ● Updated FlyPi board to reflect modifications ● Spec'ed new parts for FlyPi board, UVLO needs 0.1% tolerance, switch had power limit concerns	113
Emily Anderson	● Worked on connecting drone to wifi with cole and gautham ● Worked on learning qt python and read through the existing pycrocart code austin made ● Added a connection/scan button with radio channel drop down select	76
Gautham Ajith	● Worked on connecting wifi with drone w emily and cole ● Helped with setting up lab ● Bi-Weekly Status report ● Worked with Cole to Create TCP test ● Looked at architecture to understand how messages are being sent	73
Grant Giansanti	● I2C interface testing with the seeeduino ○ Works with 8 bytes data transmission with 2 byte resolution for each motor. ○ Works at 400 kHz ● I2c code written for baremetal on the pi (Have not been able to test) ● Basic baremetal initialization code ● Briefly helped debug motor calibration with big quad deck ● Wrote more low level libraries for timers, gpio, irq ● Investigated how bare metal is being used with the controller	96
Tyler Johnson	● Finshed next rev of the test stand	91

	○ Had trouble getting the test stand to stick to the 3D printer and had alot of failed prints ● Printed the next rev of the test stand and then started to test the yaw PID. Works really well and is very stable ● I am not sure about the roll stand because the drone is very powerful and I am not sure how stable the stand will be	

Next Week Plans

- Testing baremetal code on the pi.
- Setting up baremetal and wifi on cores
- Send CRTP messages across
- Continue tuning pid with nylon screws
- Trying to send setpoints and logging over wifi
- PCB ordered