

Senior Design Team may23-45: MicroCART Team

Spring Semester Bi-Weekly 3 report (3/5 -3/24)

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

Advisor:

- Dr. Jones - Advisor

Weekly Progress Summary

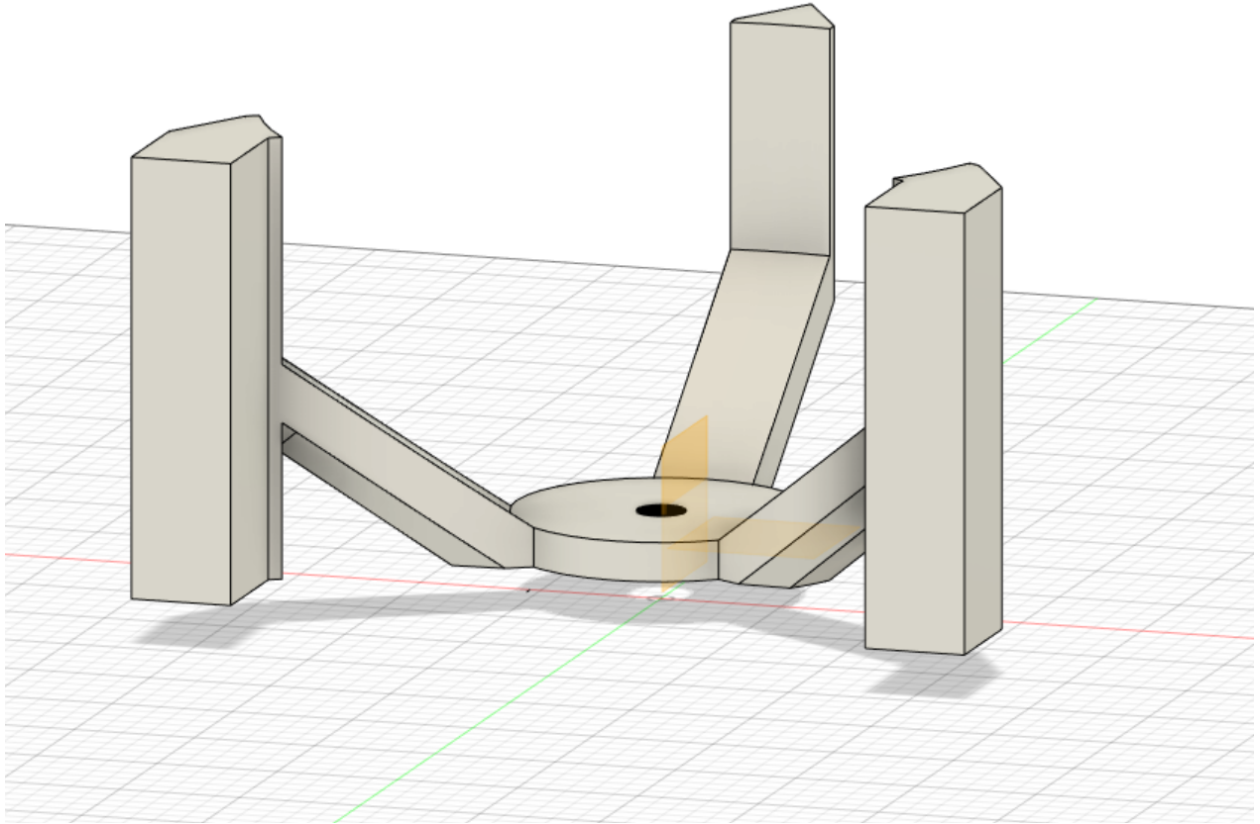
We have completed oursprint 5. To view our progress further in depth:

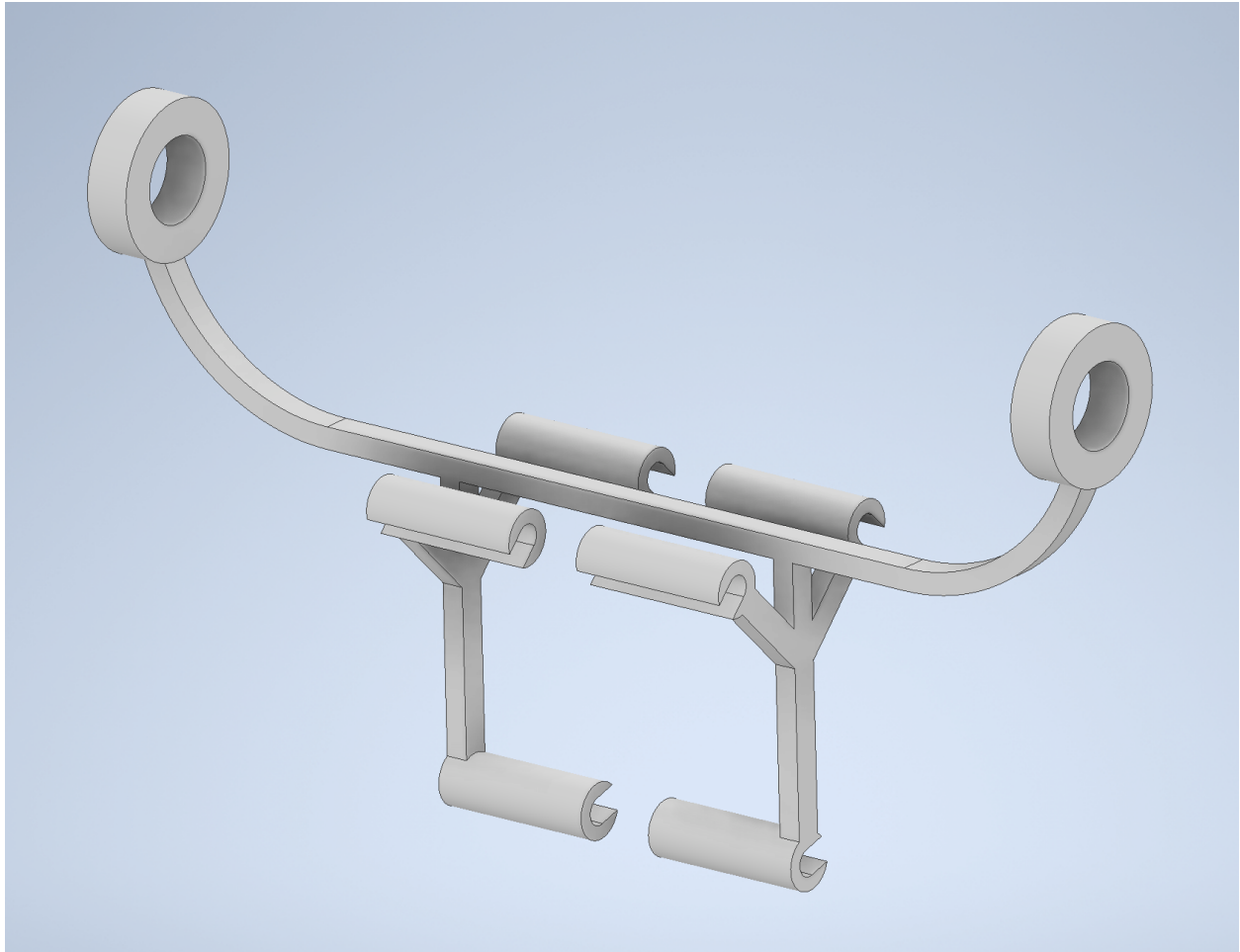
<https://git.ece.iastate.edu/danc/MicroCART/-/boards/970>

Past Weeks Accomplishments:

- PCB ready for order
- XY test stand somewhat working but still iterating
- Reconfigured the esc with the new flight controller to work with pwm
 - Need to figure out a way to autocalibrate the esc now
- Test script for bluetooth with raspberry pi (Restructuring Workflow)
- Queue for backend
- Lighthouses working better
- Debugged issue why drone was not flying with GUI changes (check firmware always)
- MP-4 Image - <https://iastate.box.com/s/ye7aptryusrhravtkvzvziq25sukkvyn>
- Mp-4 Progress
 - Did a run through of MP 4 on the lab computers
 - Fixed a issue with the GUI “parameters completed” uploading button not working quite right
 - [Final edits on MP4 doc are done](#)
 - Created MP4 image

- New drone Progress
- Hardware pwm on the Seeeduino





Individual Contributions:

Team Member	Contributions	Hours	Total Hours Spring
Austin Beinder	<ul style="list-style-type: none"> ● Couple more iterations on the test stand ● Angled the third lighthouse and now it seems to work well with one of the lighthouse decks but not the other as much <ul style="list-style-type: none"> ○ Need to try a few more configurations ○ Also need to try using new lighthouse decks ○ One of the old decks is behaving badly ● Started integrating the pid controller you gave at the beginning of the year into the simulation visualizer ● Couple more test stand iterations ● Helped test MP4 on lab computers 	8	112

<p>Cole Hunt</p>	<ul style="list-style-type: none"> ● MP-4 Walkthrough and Instruction Testing ● Bluetooth research <ul style="list-style-type: none"> ○ Use same Bluetooth communication architecture as crazyflie, but adjust radio address to channel of Pi with the SYN43436 chip. ● MP4 Test run ● Researched Communication protocols to use with crazy file software architecture 	<p>3</p>	<p>52</p>
<p>Connor Ryan</p>	<ul style="list-style-type: none"> ● PCB designs completed. Files included in separate email. Haven't heard any feedback so I'm assuming no problems have been found ● Parts sourced and bill of materials created ~\$40/board. Precision diode for UVLO and 20 pin connectors/cables or the more expensive parts. ● Would like to order boards and parts on Tuesday from ETG. Thought I should ask before spending lots of money. ~\$150 from \$30 for boards plus \$40x3 for parts for three boards. Will likely be a little less after education discount and we already have some of the parts on hand. ● Looked through the IMU related Crazyflie code but made limited progress since polling the sensors depends on freertos queues ● ESCs use CMOS logic so anything above 2V is a 1 ● Final board review with Austin, changed battery connection to expansion boards to consider voltage rating ● Reviewed pin outs and hardware PWM options with Grant ● Usability testing of MP-4 ● Researching wireless connection options and comm file structure. Focusing on peer to peer wifi connection. 	<p>10</p>	<p>82</p>
<p>Emily Anderson</p>	<ul style="list-style-type: none"> ● Worked on term 1 review presentation that is due Friday ● Continued to look at dropping packets from setting params ticket ● Busy with other class midterms/projects ● Out of town 3/7-3/16 ● Created MP4 Image and uploaded it to cybox for team to use to test on lab computers ● Ran through mp4 on lab computers and made notes 	<p>6</p>	<p>56</p>

	<ul style="list-style-type: none"> Exported final (hopefully) MP4 image with added fix for the complete label 		
Gautham Ajith	<ul style="list-style-type: none"> Biweekly status report Helped Austin out a little Fixed issue related to drone not flying when running lab portions Recorded term presentation with Tyler Went through p1 of lab with changes to GUI Updated the lab document Attempted to move lighthouses around 	11	54
Grant Giansanti	<ul style="list-style-type: none"> Researched a lot on DSHOT and internal registers on the seeeduino <ul style="list-style-type: none"> Calculated the amount of cycles for high and low based on the seeeduino's clock Learned how to use the timer and DRAM registers on the seeeduino Reconfigured the esc to work with pwm <ul style="list-style-type: none"> As of now we can go back and use pwm Looking into how to create a pwm calibrate between the esc and seeeduino Revising the seeeduino to use hardware pwm Calibrated the the min and max duty cycles using picoscope Motors can rev 	12	68
Tyler Johnson	<ul style="list-style-type: none"> Sick this week Finished mp4 Worked on presentation for term 1 Made and recorded term presentation MP-4 help Test stand revisions making the threads right on the test stand to make it able to have a set screw on test stand. 	7	69

Next Week's Plans:

- WiFi proof of concept
- Continue experimenting with test stand
- Assembly final hardware
- Recording and posting lighthouse demos, Lab Part 1, and Lab Part 2
- Have a copy of the VM installed in the lab for TAs by Thursday March 23rd.

Advisor meeting:

- Gautham figured out the crazyflie which wasn't working had the wrong firmware
 - Find out if there is a way to check the firmware version running on the crazyflie
- Grant has the seeduino working with hardware pwm, used premade function to initialize timers but set match registers manually
 - Premade functions maybe using a different type of prescaler than 288 boards
- May need to revise documentation based on changes to Virtual Box software
- Bootloading conflicts were reported last year, flashing other groups
- Questionable if freertos works in linux
- Socket programming is recommended for the wifi connection
- Hole size for the test stand from last year is not matching.
- Remind Dr. Jones through email to add us to the CPRE488 Discord