

Senior Design Team may23-45: MicroCART Team

Spring Semester Bi-Weekly 1 report (2/3 to 2/17)

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

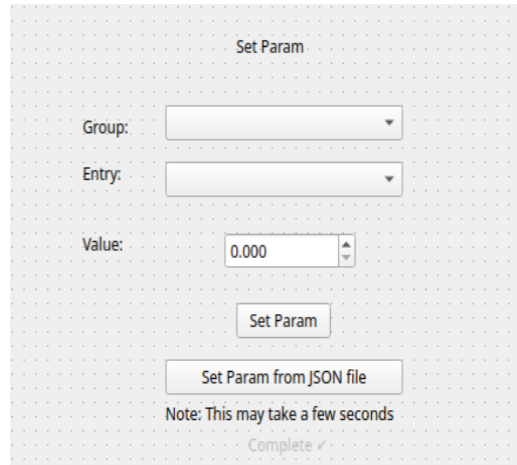
Weekly Progress Summary

We have completed our first two sprints being Spring 1 and Sprint 2. We have switched to 2 weeks sprints and retros with each sprint starting on Sunday and ending on Thursday. To view our progress further in depth: <https://git.ece.iastate.edu/danc/MicroCART/-/boards/970>

Another task we have is to make new YouTube tutorial videos showcasing the MP-4 lab and CrazyCART features that we are iterating upon. We have split the task load below

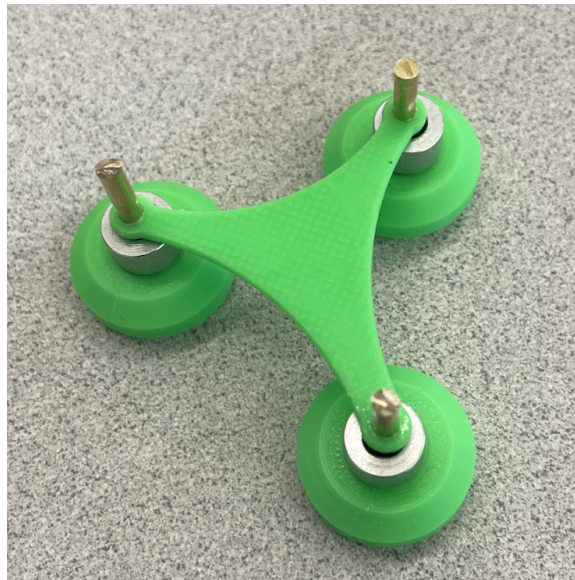
- Test Stand code walk through by Connor
- Crazyflie integration presentation - Cole
- GUI walk through revision 2 - Gautham and Emily
- Part 1 video recorded but not edited yet - Austin

We have been working on the last two sprints to add a JSON file in order to edit PID parameters easily. The goal of this is for it to be more convenient to edit and view parameters with an added bonus of preventing crashes happening. The image below shows the new implementation.



With the new changes to the GUI, we also have been working on editing the lab documentation for MP-4. There were portions of the lab documentation that needed to be updated for clarity purposes and to accommodate some of the new features with the GUI.

We also have been working on creating a new test stand for the new, non-crazyflie drone that we have been developing since the beginning of last semester. The image below shows the most recent iteration of it.



Individual Contributions

Team Member	Contributions	Total Hours Spring
Austin Beinder	<ul style="list-style-type: none"> ● Rerecorded part 1 intro video, need to edit ● XY cart is coming along but not done yet 	54

	<ul style="list-style-type: none"> ● Finished architecture slideshow rough draft Presentation ● Simulation works with visualization and gamepad. I'll play more with it after getting some other stuff done. Next step is comparing to real life. After that the next step is finding the nested PID matlab version you gave me and seeing how it works with that. Also converting to quaternions. ● Played a lot with the non linear simulation and plugged in logged components of it to the old vr sink. Would like to figure out how to view this in real time but simulink is being troublesome. I am realizing I should abandon the "matlab porting" project I had been working on in favor of using your model entirely because this is basically what you've been saying the whole time and I've been misunderstanding. ● Brainstormed ways to cut weight on the xy cart because it is too heavy and has too much friction: <ul style="list-style-type: none"> ○ Currently weighs ~100 grams vs. the crazyflie's 18ish grams: target weight: 10 grams for now ○ Metal plate weighs 24 grams, 3d print another one ○ Wheels are about 15 grams each iirc: 3d print lighter ones and use a bunch of graphene to lubricate ○ Too much friction: cut weight and add lubricant ● I have not finished the videos I was going to work on. 	
Cole Hunt	<ul style="list-style-type: none"> ● Fully integrated test stand to backend communication using a request. <ul style="list-style-type: none"> ○ currently in integration testing ● Completed Controller Integration Video ● Wrote/Integrated TestStand class to handle new serial commands ● Troubleshoot IMU Test Environment with Tyler 	32
Connor Ryan	<ul style="list-style-type: none"> ● Started working on PCB rev 2. Making the board smaller and adding more connections for the expansion boards will require switch to 4-layers. ● Do we need to monitor battery level for motor output? 	49

	<ul style="list-style-type: none"> • Go through MP-4 and clean up lab doc • Test Stand YouTube video 	
Emily Anderson	<ul style="list-style-type: none"> • Thoroughly tested the set params from JSON file ticket • Added a banner to display when setting params from json file is finished • finalized youtube video, rerecored and posted to cybox • Out sick for a few days 	37
Gautham Ajith	<ul style="list-style-type: none"> • Sick :(• Worked on removing the get parameters for MP4 ticket • Video reviews • Tried to replicate issue with test stand (related to try-catch) • Re-did portion of GUI runthrough with Emily 	26
Grant Giansanti	<ul style="list-style-type: none"> • Bug fixes with json parser <ul style="list-style-type: none"> ◦ Tested with setting all 12 parameters and with changing the values twice with the gui opened ◦ Pulls the json file from a fixed location that is more accessible for the user • Merging branches for mp4 v1.5 • JSON parser works! 	35
Tyler Johnson	<ul style="list-style-type: none"> • Did another design of the test stand adding a set screw. I will just slice the stand to allow for the set screw to be placed • Continued debugging IMU. Looking on the pico scope I get data I just don't think its correct looking at the data sheet. • I looked at the code on the github of how to connect the drone to the light houses <ul style="list-style-type: none"> ◦ Austin and I will be tackling this this week • Finished the next revision for the test stand • Started testing the IMU, First board was shorted then the second works but cannot capture data sent out <ul style="list-style-type: none"> ◦ Currently using a nano to capture data 	38

Next Week Plans

- Austin, Tyler, Gautham and Cole will be working on getting a small lighthouse demo running
- Update the script for Part 2 of the lab: Connor
- Compare lighthouse data and simulation demo: Austin
- Working on PCB breakout board Rev 2: Connor
- Bug fixes and smoother GUI to recent changes: Emily and Grant
- Code reviews on GUI changes and Simulation: Gautham, Grant, Cole and Emily

Who is able to go to Scholars day?

- Gautham, Cole, Connor, Tyler