Senior Design May 24, 32

MicroCART Senior Design Team

Week 20 Report

February 10 - February 16, 2024

Faculty Advisor: Philip Jones

Members:

Justin Kenny - Scribe
Steve Frana - Technical Lead
Trevor Friedl - Project Manager
Travis Massner - UI/UX Designer
Clayton Kramper - Technical Lead
Will Maahs -Team Organization Lead

Links

- [Shared Google Drive Folder](#)
- [Tentative Project Gantt Chart](#)
- [MP4 Timing Data](#)
- [Microcart Packet Structure](#)

Summary of Progress this Week

We have been working on getting the shared memory example up and running this week. After having some difficulties with making and building the code, we ran the code, but it didn't behave as expected. We are going to try to get two UARTs working and also attempt to run it on the Raspberry Pi 3 first. This didn't work on the first try but we will attempt to troubleshoot the code to get that working.

We finished testing the MP4 lab with the new cflib adapter. We ran into the issue of the crazyflie disconnecting and appearing to not receive the packets, however, we found that restarting the crazyflie would solve this issue. As far as the MP4 lab, we didn't run into any issues with running it with the new cflib adapter. So, after finishing the MP4 lab testing, we merged the cflib_groundstation branch into the main branch.

This week, we looked over the current state of the FlyPi PCB more closely. After reading the wiki from last year's team, it seems there are a couple of things left to look over for further improvement, mainly an issue revolving around the battery drainage from the Undervoltage Lockout (UVLO) circuit. To look deeper into this, we started by running ERC and DRC checks through KiCAD to make sure the PCB schematic didn't have any undetected problems.

This week, we also worked on a demo for Scholars Day. We are planning on doing a similar demo as last years team using the lighthouses. We were able to get the lighthouses setup and configured and

the drone was reading them. We have not tested the actual "swarm demo" yet. We may modify the demo slightly after we can successfully run the "swarm demo".

Pending Issues

- We need to rework the logic for how the progress bar is updated within PycroCart_2.0. This is a minor detail and shouldn't require too much effort.
- Add documentation for PycroCart
- Unsure of the difficulty of porting drone firmware FreeRTOS.
- Crazyflie Radio seems to be disconnecting from the crazyflie somewhat frequently

Individual Contributions

Member	Contributions	Weekly Hours	Total Hours
Justin Kenny	- Built sample shared memory program and attempted to run it on the Zero 2W and the RPi 3. - Debugged issues with shared memory program.	8	116
Steve Frana	- Built shared memory program for raspberry pi's - Ran bare-metal program and Linux together on Zero 2W - Checked on hardware documentation and found components to connect it to raspberry pi	5	108
Clayton Kramper	- Prepped for scholars day - Set up lighthouse hello world - Successfully got hovering in place with lighthouses - Troubleshooting/Reading about Supervisor "Arming" and "auto-arming"	6	96

Travis Massner	- Finished testing the MP4 lab with new cflib adapter - Merged the cflib_groundstation branch into main	5	81
Will Maahs	- Working on shared memory - Setting up lighthouse demo - Troubleshooting/Reading about Supervisor "Arming" and "auto-arming"	6	105
Trevor Friedl	- Read through OVA and VDI clean-up sources and added them to the VM wiki - Went through FlyPi PCB Designs and Documentation - https://docs.google.com/document/d/1nE4et5tKcan9hs4gtpTfhasI7ltMU9heBeUqeZddGQw/edit - Started researching how to get CrazyFlie firmware on a BareMetal application	6	87

Comments and Extended Discussion

Plans for coming Week
- Debug shared memory program issues on the RPi 3.
- Figure out how to use 2 UART ports on baremetal programs.
- Document running LED blink program on raspberry pi Zero 2W.
- Figure out if the crazyflie drops setpoints if it doesn't receive any packets.
- Package up MP4 into a clean VM ASAP for the TAs.
- Finish PycroCart documentation on the Wiki of the Git Repo
- Film a video on how to use both of the PycroCart GUIs
- Film a video fully explaining the current state of PycroCart
  - Suggestions for future teams
  - Motivations
  - Things to not do
- Trevor:
  - Finish looking at the PCB and see if there are any possible issues with routing on the board
  - Check connections on the existing FlyPi board using concurrency tests from a multimeter.