

EE CprE SE 492 – MAY15-28

MicroCART Senior Design Team

Weekly Report 24

March 23 – March 29

Faculty Advisers

Phillip Jones

Nicola Elia

Member	Position	Weekly Hours	Total Hours
Paul Gerver	Key Concept	16.5	195.5
Tyler Kurtz	Key Concept	5	174.5
Ravi Nagaraju	Webmaster	6.5	115.5
Adam Campbell	Webmaster	4	111.5
Joe Benedict	Communications	16.5	227.75
Jacob Rigdon	Communications	5	125
Matt Vitale	Team Lead	6.25	146.25
Matt Post	Key Concept	-	36

Progress

- 1) Extracted magnetometer heading from sensor data
- 2) Successfully tested second prototype of Zybo power PCB
- 3) Established definitive goals and timeline for remainder of the semester

Plan of Action

- 1) Manual flight demonstration is the highest priority milestone at this time
- 2) Plan Poster and Final Document completion
- 3) Revisit PID tuning per Dr. Jones' instruction

Pending Issues

- 1) There is an issue with the on-board logging system and data from the quad is not being sent to base station after exiting flying loop
- 2) The old quad has a connection issue - a motor is failing – can't be used for demos currently

## Notes on Zybo Power PCB

Voltage regulates between 5.0 and 5.5 V for the 2-cell battery. The source of the 0.5 V range in regulation is unknown at this point, however, the circuit is still functional for our purposes at this time. Optional changes: 1) make the power-on LED dimmer, 2) make the low battery LED brighter, 3) adjusting the comparator resistor value so it activates at a higher input voltage.

## Contributions

Paul – 16.5 Hours, 195.5 Total

- Worked with Joe and Matt V to choose poster design - 1
  - We have a plan that will make the poster look unique, fulfill all requirements, and easy to read
- Presentation - 1.5
  - Worked with Joe to review all presentation slides, make immediate changes, and add notes to possible changes. Draft sent to Dr. Jones for input
- Game Plan - 3.5
  - Joe and I met to create the game plan to reach our end of semester goal of having the new quad fly within the camera system
  - Looked at team's end goal, current progress in all development areas, and created appropriate deadlines for tasks.
- Demo & Setup for middle school kids - 1.5
  - Attempted to use old quad in demo, ran into issues with a single motor stopping after a few seconds of flight
    - Ian tried to fix it and we concluded it was a connection issue
  - Showed off new quad on ECP machine to middle school group, fairly successful
- Magnetometer data and heading - 5
  - Calculated magnetometer sensitivity coefficient from factory settings
  - Cleaned up code for obtaining magnetometer data
  - Calculated heading degree information from data
  - Tested magnetometer readings with motors running. There was an increase in the average magnetic flux, but the data was not sporadic
- Data collection and analysis - 4
  - Revamped the logging code structures in Quad source code to collect all data that we want
  - Working on fixing the communication issue to base station (my thought is that some array isn't being incremented or something along those lines. I'm investigating today [Sunday] so hopefully I have it fixed by Monday)

Tyler – 5 Hours, 174.5 Total

- Client and team meeting – 1.5
- Roll pitch testing, decided better weight distribution is needed before continuing – 3.5

Ravi – 6.5 Hours, 115.5 Total

- Updated website - 0.5
- Updated wiki to reflect this year's team's work - 1.5
- Created new PCB layouts and gerber files - 2
- Successfully tested second prototype of Zybo power PCB w/Joe & Ian - 1.5
- Meeting w/client - 1

Adam – 4 Hours, 111.5 Total

- Meeting with client - 1
- Worked with Tyler and Paul to test the PID and work toward manual flight - had issues with weight distribution involving the battery, going to try Velcro - 3

Joe – 16.5 Hours, 227.75 Total

- Client meeting, Team Goals meeting and general clerical work - 1.5
- Several meetings with Paul and Matt to plan/review/update the final PPT presentation, the project presentation poster and prioritizing final team goals/assignments - 5.0
- Cleaned up the lab for visiting student demonstrations and attempted to get the old demo quadcopter working - 3.0
- Tested motor battery monitoring circuit with Ian to verify expected performance with MOSFET set backwards in the circuit. - 1.0
- Testing Zybo battery regulator prototype 2 with Ian and Ravi - 1.0
- Built prototype 2 of Zybo regulator circuit and soldered keyed connector on AA battery pack Zybo power supply - 5.0

Jacob – 5 Hours, 120 Total

- Client meeting – 1
- Team Documentation – 1
- Demonstrations - 1
- Lab work with PID team – 2

Matt V. – 6.25 Hours, 146.25 Total

- Helped with concepts of presentation/poster - 1.5
- Helped set up for first demo - 1.5
- Set up for second demo - 1.5
- Second demo - .75

Matt P. – 0 Hours, 36 Total

- Nothing reported

## Meeting Minutes

### 1) Status of MicroCART

- Where are we?
- Where do we want to be at the end of the Semester?
- How do we get there
- Dr. Jones is very eager to see progress on what to him seems like group stagnation
- Dr. Jones requested a document regarding the goals for the last few weeks be created and shared with him

### 2) 492 Requirements

- Meeting with Dr. Amariucaí is on Thursday, April 2
- Presentation needs updating and polishing
  - Use rubric
  - Capture specific events with pics and/or video
  - Add examples of unforeseen issues to highlight problem solving skills
- Poster planning will begin this week, due on Sunday, April 19
- Final document needs updating, due Tuesday, April 28

### 3) Zybo battery regulator circuit

- Second build and test should be finished before next meeting
- Overall, implementing this circuit is not a high priority because the current AA battery pack is functioning without issues

### 4) Documentation

- All team members need to upload all their videos to the Drive for proper archiving on the repository, wiki page and website
- Overall documentation needs to be assessed so a plan can be developed to cover the missing elements

### 5) Demonstrations for visiting groups

- Need to clean up the lab
- Need to test the old demo quad
- Use the ECP machine for demonstrations

### 6) Paul Uhing will be taking the 3-axis testing stand for the 488 labs sometime next week