

EE CprE SE 492 – MAY15-28

MicroCART Senior Design Team

Weekly Report 26

April 6 – 12

Faculty Advisers

Phillip Jones

Nicola Elia

Member	Position	Weekly Hours	Total Hours
Paul Gerver	Key Concept	11	214
Tyler Kurtz	Key Concept	0	179.5
Ravi Nagaraju	Webmaster	2	124.5
Adam Campbell	Webmaster	7	124.5
Joe Benedict	Communications	5	237.75
Jacob Rigdon	Communications	4	124
Matt Vitale	Team Lead	4	153.75
Matt Post	Key Concept	16.5	60.5

Progress

- Successfully received camera data on Quad via Bluetooth
- Refined PID coefficients for manual flight
- Added new, secure, 90 degree connectors on the Zybo board to/from sensor board and RC Receiver

Plan of Action

- 1) Plan Poster and Final Document completion
- 2) Integrate new Quad into old demonstration
- 3) Dedicate team members to website, archives and documentation

Pending Issues

- Using C program to receive data packets from the quad through Bluetooth is not working. Needs to be worked on to improve data logging speeds

- Quad propellers were damaged during manual flight tests and there were no replacements. As we are now at the stage where manual/camera flights are common, we need a good supply of props in case they break.
 - On order?
 - We must ensure we have enough for testing and demos
- With the current logging schema (storing values in memory for post flight communication), memory can run out of space, and make the quad uncontrollable
- Need to have hardware kill switch implemented in case of software failure, lost connection, etc... Preferably have this in place and tested before resuming manual flight testing. Ideas have been discussed and there may be solution already.
- Bluetooth can come loose during extended flights
- Unable to boot from SD card over the weekend. Were able to boot from it with the new board on Friday
 - can still program with the JTAG so it's not a pressing issue

Contributions

Paul – 11 Hours, 214 Total

- Worked with Matt P to refine PID coefficients for both inner and outer PIDs - 8
 - ECP machine for pitch and roll values
 - Joe has video (Not yet uploaded)
 - Ran into sensor board connection issue here which started the instigation to get more robust connections
 - Gave quad non-zero set point, collected data, saved plot
 - Dowel testing of pitch and roll
 - 4 videos in Drive
 - Fine-tuned each axis to respond quickly
 - Added D components to both pitch and roll outer PIDs
 - 3-axis stand testing
 - 1 video in Drive
 - Readjusted P and D coefficients to make quad stable
- Worked with Adam to test Camera data to Quad through Bluetooth - 2
 - We were successful in getting packets to the quad and ensuring values were correct
- Added document to Video folder describing each video - 1
 - Also added some folders to better organize things

Tyler – 0 Hours, 179.5 Total

- Nothing to Report

Ravi – 2 Hours, 124.5 Total

- Meeting w/Client - 1.5
- Updated website - 0.5
- Waiting on PCBs/new parts to arrive and videos to be uploaded to YouTube channel

Adam – 7 Hours, 124.5 Total

- Meeting with client - 2
- Working on further implementing the Bluetooth packet system; tested it with camera system updates and was able to achieve consistent 50hz receiving and processing; need to test it with the actual PID in flight now - 5

Matt P. – 16.5 Hours, 60.5 Total

- Worked with Paul and Joe on inner loop pitch tuning and ran into issues (See Paul's description above) - 7
 - Found IDC connectors to use in place of the PMODS
 - Put New connectors on the board
 - Soldered connections coming from motors
 - Tested connections during tuning and saw no issues other than the Bluetooth coming loose during long tests
- Completed retuning of PIDs and are ready for manual flight testing - 8
 - Saw issues with noise when running fresh batteries and high throttle causing quad to become unstable
 - decreasing "P" gain in the inner loop fixed this
 - Quad performed much better in all areas on the test stand
 - able to hover easily, just need better yaw control or trimming
 - responded to commands quickly with much quicker settling times thanks to adding the D component and increased P values
 - Able to run motors at 100% without the quad going unstable
 - In addition to Paul's comments we also got multiple data logs for each part during retuning tests
- Client meeting -1.5

Joe – 5.0 Hours, 237.25 Total

- Client meeting – 1.0
- Flying practice with Flame Wheel 450 and mini-quads – 2.0
- Assisted with PID tuning with Matt P and Paul – 2.0

Jacob – 4 Hours, 124 Total

- Team Meeting - 1
- Team Documentation – 1
- Website Work - 1
 - Weebly research

Matt V. – 4 Hours, 153.75 Total

- Organized YouTube videos for Paul U. to upload - 1
- Cleaned up base station's files - 1
- Worked on getting a new time slot for presenting - 2
 - Swap with other team fell through, emailed George, awaiting reply

Meeting Minutes

1) Discussion of Meeting with Dr. Amariucaí

- Went over presentation feedback

2) Discussion of Google Drive layout

- Video organization - add description of videos

3) Discussion of Bluetooth issue

- Currently sending ASCII
- This overhead can be reduced by sending the float values
- Data can be sent more efficiently to reduce the time of flight log transfer
- Send data strictly at a lower frequency (period of 2ms)

4) Manual Flight Progress

- Work has been done to improve control
- RC sensitivity has been reduced
- Seeing some delay in the control - possibly from RC - more work will be done to figure this out