

EE CprE SE 491 – MAY15-28

MicroCART Senior Design Team

Weekly Report 10

November 3 – 9

Faculty Advisers

Phillip Jones

Nicola Elia

Member	Position	Weekly Hours	Total Hours
Paul Gerver	Key Concept	7	80
Tyler Kurtz	Key Concept	15.25	121.25
Ravi Nagaraju	Webmaster	5	58
Adam Campbell	Webmaster	4	58
Joe Benedict	Communications	14	109
Jacob Rigdon	Communications	5	63
Matt Vitale	Team Lead	8	87

This Week's Progress

- 1) Successfully sending PWM to copter via UART (Bluetooth)
- 2) Finishing stages of regulator PCBs
- 3) More demonstrations of working model took place

Pending Issues

- 1) Done bit not set high after programming FPGA" on Zybo board. Found the problem was with the board package that was selected for the hardware project in XPS was incorrect

Plan of Action

- 1) Characterize Quadcopter
- 2) Order finalized regulator PCBs
- 3) Wi-Fi Communication

Contributions

Paul – 7 Hours, 80 Total

- Worked with Adam to fix problems around bluetooth, and finally got it working. Messages can be sent and received from the device. - 2
- Continued timing latency benchmarks on sensor board. Determined burst reading would be best approach for getting all data from board. - 2
- Helped Tyler with PID testing - 1
- Project Plan v2 - 2

Tyler – 15.25 Hours, 121.5 Total

- Rebuilt my project - 7
- 491 meeting - 1
- Connected the quad/built the PID testing environment - 2
- PID tweaking and testing - 5.25

Ravi – 5 Hours, 58 Total

- Weekly meeting - 1
- Researched best ADC voltage range using Zynq-7000 TRM - 1
- Worked on creating PCB layouts from the schematics (fixing package sizes for resistors, capacitors, & inductors) - 2
- Helped demo (11/4 @ 10 AM) - 0.5
- Updated website - 0.5

Adam – 4 Hours, 58 Total

- Worked with Paul to get uart/bluetooth working at last - 2
- Worked with Tyler on the PID for the quad - 2

Joe – 14 Hours, 109 Total

- Ran demonstrations for the IT-EXPO high school student tours - 3.5
- Troubleshooting issues with demo quadcopter (IP conflict) - 2
- Team Meeting - 1.5
- Shopping for battery connectors - 1
- Taught myself how to solder - 3
- Learning about complementary filters - 3

Matt – 8 Hours, 95 Total

- Libraries installed on Omnicoor's new system - 4
- Began documentation - 4

Jacob – 6 Hours, 63 Total

- Team meeting – 2
- Project Report – 2
- Work on UART communications (PWM) – 2

Meeting Minutes

- 1) Demonstrations for the IT-EXPO high school student tours
 - Members of MicroCART and OmniCooR were present
 - Marginally successful due to issues with running the demo quadcopter
 - Demonstrated how engineering is a continuous process of solving problems as we troubleshoot the system during the session
- 2) Bluetooth
 - Unable to program the Zybo board with the correct UART .bit file
 - a) Process of programming the board via UART is affecting the UART itself and the connection is terminated before the programming is complete
 - b) Troubleshooting will continue this upcoming week
- 3) MicroCART Project Plan v2.0 document
 - Due on Wednesday, November 12
 - Updates to v1.0 will begin this upcoming week
- 4) PID controls
 - Successfully recreated the lost PWM project that was accidentally deleted last week when trying to commit the project to the repository
 - Implemented X configuration for quadcopter engines in PID software
 - Next step:
 - a) Proceed with PID testing and tuning for roll, pitch and yaw
- 5) Chassis and hardware
 - Sensor/Zybo/IR tracker stack has been lowered below the plane of the motor cap nuts
 - 3-axis testing platform is complete
 - a) A few small hardware items are needed for the chassis adapter, then testing the PID controls can begin using the platform
 - Next steps:
 - a) Source a RF receiver (do we still need on if Bluetooth connection is functioning?)
 - b) Source more 2-cell batteries
 - c) Mount batteries and receiver (RF and/or Bluetooth)
- 6) 3-axis sensor

- Testing FIFO and all-burst methods of reading data continued in order to compare the two methods for latency issues and quality of data

7) Modeling

- Learning about complementary filters continues
- Studying online PID tools and literature

8) Battery regulators (motors and Zybo)

- Finishing up schematics for both regulators
 - a) Package sizes have been finalized
 - b) PCB layouts near completion
- For Zybo regulator PCB
 - a) Need to create the package for the component in EAGLE, which is the last step before creating the gerber file used for production
 - b) Voltage range used for ADC has been decided to be 0.0 V – 1.0 V
 - c) Need to find a step-down regulator package that's easily solderable