

EE CprE SE 491 - MAY15-28

MicroCART Senior Design Team

Meeting Minutes - Week 10

November 4, 2014

Attendance:

Team Members:

Paul Gerver
Tyler Kurtz
Joe Benedict
Jacob Rigdon
Matt Vitale
Ravi Nagaraju
Adam Campbell

Advisors:

Paul Uhing

Agenda Items and Discussion

- 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

Deliverables for next week

Joe

- Continue learning about complementary filters
- Learn about PID controllers
- Mount quadcopter on 3-axis test platform
- Learn how to solder
- Develop strategy for mounting batteries, Bluetooth and/or receiver to chassis

Adam

- Programming Zybo board with the UART .bit file using an SD card or JTAG
- Continuing work on the PID controls

Paul

- Determine timing latency for reading all the data (gyros, accelerometers, magnetometer) from the sensor board using FIFO and all-burst read methods
- Calculating attitude angles using accelerometer data
- Complete team Project Plan v2.0

Ravi

- Complete PCB layout for Zybo and motor battery regulators and submitted to manufacturer for fabrication

Matt

- Help OmniCooR team port from Debian system to Red Hat
- Move/copy Tyler's demo videos from YouTube
- Start documenting:
 - sensor board
 - PWM
 - Bluetooth
 - AutoCAD
 - Old Quad Demo
 - Problem shooting section for common issues
 - Charging batteries
 - List of needed supplies
 - Voltage regulators schematics and relevant info

Jacob

- Work on the Bluetooth UART system
- Study the sample code that Dr. Jones sent to the team

Tyler

- Implement the terminal interface to receive diagnostic information off the quadcopter
- Finish roll and pitch PID tuning
- Maybe start yaw PID tuning