

EE CprE SE 491 - MAY15-28

MicroCART Senior Design Team

Meeting Minutes - Week 6

October 7, 2014

Attendance:

Team Members:

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

Advisors: (All Present)

Dr. Phillip Jones
Dr. Nicola Elia

Agenda Items and Discussion

- 1) Reported that PWM signals can be sent to all 4 motors via C code using 4 separate PWM modules using the same PMOD
 - Push buttons on Zybo board used to send signals and activate motors
 - 50 Hz currently used to send the signal.
 - Other frequencies will be tested this coming week
 - Next step is to write C code that will ramp-up the motor speed from 0 RPM to high speed (maximum?) and then back down
- 2) GitLab workshop held last week
 - Repository is now registered with ISU Computer Support Group (CSG)
 - Next step is to set the site public (read only)
- 3) Bluetooth and Wi-Fi communications update
 - Wireless communication to Zybo board via Bluetooth has had some obstacles
 - Bluetooth to Zybo connection was successful
 - Connecting to the Bluetooth wirelessly from another device was eventually successful, but needs more testing to verify it's properly configured
 - Dr. Jones made some suggestions on alternate strategies (details not available)
 - Wi-Fi configuration has not begun
- 4) Dr. Jones emailed the team a link to I2C information for all members to review
 - Team members need to become familiar with code structure

- Learn how to access the registers and then “back out” to high-level perspective
 - Will not have standard UART functions (connections)
- 5) Zybo update
 - Trouble accessing the Master register
 - Currently using asynchronous interrupts in the process
 - Advised to try interrupt polling instead of using asynchronous interrupts
 - Advised to use Bus Pirate tool for trouble shooting (all team members should become familiar with the tool)
 - 6) Need to measure the transient response of the motors
 - Response of the output with respect to the input signal
 - Use oscilloscope between the ESC and the motor
 - 7) Mixer design
 - Need to start looking into documentation
 - Used for RC and autonomous flight
 - 8) Still having challenges communicating with the 3-axis sensor
 - Advised to use Bus Pirate for trouble shooting
 - 9) Need to begin characterization of Flame Wheel 450
 - Review previous team’s documentation on the process
 - Check with Matt Rich for modelling software
 - Payload testing and motor force
 - OmniCooR already working on motor parameters
 - 10) Another Zybo board is needed. One will be permanently mounted on the quad while the other will be used for ongoing testing and development (email Dr. Jones a reminder)
 - 11) Team members need to review the Group Assignments list on the Google Drive
 - At least one person should be in charge of each task
 - 12) Numbers 34 & 35 on the Group Assignments should be chosen by “all” team members
 - Every team member should have a general understanding of the different PID parameters and read the documentation recommended by Dr. Jones
 - Every team member should write a PID using C/C++ or MATLAB within 2 weeks with the assumption: sample rate is constant and timing = sample rate
 - Not necessary to know PID configuration in MultiWii
 - 13) Teams needs to discuss overall file structure for GitLab repository
 - Follow what Dr. Jones described in an email: Create a tasks directory and have each task as a new folder
 - Each task needs to be properly documented

Deliverables for next week

Ravi

- Updating regulator circuit schematic with necessary components (op-amp voltage divider, LED indicator, etc.)
- Working with Joe on characterization of the quadcopter components for controls purposes
- Migrate the Weebly website to the ECE server

Tyler

- Design PWM recorder
- Write software implementation to convert pitch/yaw/roll/throttle into motor drive
- Test upper limits of PWM frequency

Jacob

- Focusing on Bluetooth communication working on the Zybo Board

Paul

- Goals for this week:
- Parse other log files
- Have plots appear after a MicroCART run

Joe

- Begin characterization of the quadcopter for simulations (along with Ravi, Paul Uhing and Matt Rich)
- Continue with online controls course via Georgia Institute of Technology
- Create design file in AutoCAD for the adapter to connect the quad to the test bench
- Refine design of Zybo adapters
- Learn about PID controllers

Matt

- Interrogate sensor board until it talks using basic send receive commands rather than built-in library

Adam

- Work with the Bluetooth module and try to get communication working between it and the processor
- Help Matt work on the I2C communication with the sensor board