EE CprE SE 491 - MAY15-28
MicroCART Senior Design Team

Meeting Minutes - Week 11

November 11, 2014

Attendance:

Team Members: (All Present)
Paul Gerver
Tyler Kurtz
Joe Benedict
Jacob Rigdon
Matt Vitale
Ravi Nagaraju
Adam Campbell

Advisors: (All Present)
Dr. Phillip Jones
Dr. Nicola Elia

Agenda Items and Discussion

1) Bluetooth
   - Able to control all four motors by sending PWM signal from PC to the Zybo board
   - Transmission speed = 15 kHz
   - Next Step:
     a) Set up Bluetooth on base-station PC
2) Wi-Fi communication will begin this week
   - Remember to whitelist any devices needing access to the lab router
3) MicroCART Project Plan v2.0 document
   - Almost complete (due Wednesday, November 12)
   - Table of Contents added to this version
4) PID controls
   - Testing tuning and mixing coefficients after PID software was changed to run motors in the "X" configuration
   - Advised to set mixing coefficients before the PID coefficients
   - 3-axis testing platform (FAQs) will be available after this week
5) Chassis and hardware
   - Source RF receiver (client wants one installed for manual piloting)
   - Source ≥1600 mAh 2-cell batteries for Zybo board
   - Begin mounting strategy for batteries, receivers and power (battery) control boards

6) 3-axis sensor
    - Latency tests determined that the all-burst method is preferred over the FIFO method for capturing data
    - All-burst data capture is at 600 µs (anything faster than 1000 µs is good)
    - Able to calculate angles from accelerometer and gyroscope sensors (individually)
    - Next steps:
        a) Correct gyroscope drift
        b) Implement a Complementary filter to stabilize and optimize accelerometer and gyroscope data
7) Modeling
    - Determine characterization values to begin modeling
8) Power (battery) control boards (motors and Zybo)
    - Ready for production by next week
    - Check with Lee Harker for the cost of using the etch machine in The Machine Shop
9) Matt assisted OmniCooR team with migrating their system from Debian to Ubuntu
10) Client wants an integrated PMUX to serve as remote kill-switch

Deliverables for next week

Joe
- Continue learning about Complementary and Kalman filters
- Help Paul with filtering and stabilizing 3-axis sensor data
- Source 2-cell batteries for Zybo power
- Learn about PWM program
- Develop strategy for mounting batteries, Bluetooth, RF receiver and power controllers
- Gather characterization parameters

Adam
- Sending PID commands via Bluetooth from base-station PC to Zybo board
- Begin setting up Wi-Fi communications with the Zybo

Paul
- Implement Complementary filter on gyroscope and accelerometer
- Implement the magnetometer data into directional readings

Matt
- Interact with the Raspberry Pi Camera (along with Jacob if possible)
- Continuing to build the master documentation sheet

Ravi

- Finish wire routing for both power control boards
- Ask Ian McInerney for feedback.
- Place production order for boards

Jacob

- Work on implementing Wi-Fi communications with the Zybo board

Tyler

- Researching signal mixing while out of town this week