

EE CprE SE 492 – MAY15-28

MicroCART Senior Design Team

Weekly Report 16

January 19 - 25

Faculty Advisers

Phillip Jones

Nicola Elia

Member	Position	Weekly Hours	Total Hours
Paul Gerver	Key Concept	8	143
Tyler Kurtz	Key Concept	5	146.5
Ravi Nagaraju	Webmaster	4.5	85
Adam Campbell	Webmaster	5	88.5
Joe Benedict	Communications	7	178.25
Jacob Rigdon	Communications	5	94
Matt Vitale	Team Lead	5	120.5
Matt Post	TBD	8	20

Progress

- Successfully gathered data for Gyroscope bias and on-board filtering
- Solidified Bluetooth communication and measured latency
- Made strides toward an efficient and accurate (sensor) method of data analysis for use in PID tuning

Plan of Action

- 1) Manual flight demonstration is the highest priority milestone at this time
- 2) Develop data capture from sensor board and camera system for comparative analysis
- 3) Develop data capture of PID coefficients, input signals and motor output (maybe) for plotting and analysis

Pending Issues

- None Reported

Contributions

Paul – 8 Hours, 143 Total

- Gyroscope bias correction - 5
 - Obtained multiple runs of sensor board readings on the quad while on the stand at different motor speeds: none, 50%, and 75%
 - While the reading ranges were more erratic with the motors going, the average biases were similar across all runs
 - All test data is in repo, but documentation needs to be added explaining procedure
- Analysis of on-board gyroscope low-pass filtering - 3
 - Once bias was accounted for, several runs were conducted to observe the effect of using the sensor board's digital low pass filter for the gyroscope.
 - We were able to identify a drastic improvement with the use of the filter from single readings having a range of +- 30 degrees per second to +- 4 dps at a moderate level and delay

Tyler – 5 Hours, 146.5 Total

- Helped Paul on sensor board data gathering and interpretation

Ravi – 4.5 Hours, 85 Total

- Updated website - 0.5
- Contacted Aaron and learned about in progress GUI - 1
- Played with and understood Rohit's script - 1
- Worked with Matt V. on writing shell script to interact with MATLAB script - 1
- Spent time in lab understanding Tyler's current script - 1

Adam – 5 Hours, 88.5 Total

- Worked on Bluetooth characterization - 5
- Got consistent reliable bulk data transfer at ~17KB/s, 140kbps data rate (using C on the base station)
- Measured Bluetooth latency at ~50-75ms round trip

Joe – 7 Hours, 178.25 Total

- Client meeting - 1.5
- Checked and tested new connectors with Paul. Tested voltage on ESC receiver connectors with motors on and off - 1.5
- Read manual for receiver to check power requirements, learn about failsafe mode and antenna configuration - 0.5
- Tested Pmod power levels while sending data via Bluetooth (with Adam) to verify the Bluetooth issues are not related to the Zybo power output through Pmod - 0.5

- Reviewed team documentation sent from Matt Vitale - 3.0

Jacob – 5 Hours, 94 Total

- Client Meeting - 2
- Research into SPI - 2
- Weekly Report - 1

Matt V. – 5 Hours, 120.5 Total

- Started documenting the GUI - 2
[Code is in c++, and isn't commented well, this may take some time]
- Made the shell script end connection with bluetooth nicely and other fixes - 1
- Looked through Rohit's Matlab scripts to understand log files, will look into accuracy later if needed - 1
- Extended shell script to incorporate Tyler's Matlab graphing script with Ravi
[previously made logs, now graphs] – 1

Matt P. – 8 Hours, 20 Total

- Helped with sensor board biasing and characterization -2
- Researched general Quad control and PID tuning -2
- Started digging into MultiWii Code -3
- Spent time looking through and understanding Rohit's data acquisition script -1

Meeting Minutes

1) New team goals - task groups

2) Bluetooth

- Baud rate was increased to ~1Mbps
- data is still dropping - latency tests will be performed to debug this issue
- New connectors/wires have been placed on the quad
 - Possible issue with ESC power - Joe will look into it
- Discussion of memory reads/writes and how the 512MB of RAM can be used to store then send collected data to base station.
 - Linux could be used to allow for writes to SD card filesystem

3) Revisiting Sensor Board

- Matt P and Paul will be looking into how the output can be more reliable and corrected over time
- 4) Data logging is a high priority
- Rohit has put work into making a set of data logging scripts
 - Ravi and Tyler will take the lead on working our data into this system
- 5) Reminder that documentation is important to make our work relevant to the future of MicroCART
- 6) Task Groups
- Data Logging - Ravi and Tyler
 - Bluetooth – Adam
 - Base Station Automation - Matt V
 - Sensor Board - Matt P, Paul, and Tyler
 - Documentation - Joe and Jacob