

sdmay18-17 MicroCART (Microprocessor Controlled Aerial Robotics Team)

Week 24 Report

Reporting Period: 4/9/2018 - 4/16/2018

Team Members

Blake Pries -- Communications Lead

Dane Larson -- Ground Station Lead

Matthew Kelly -- Documentation Lead and Webmaster

Tyler Imboden -- Quad Software Lead

Jakub Hladik -- Test Lead

Kyle Trost -- Team Lead

Peter Thedens -- Repository Lead

Austin Rohlfing -- Controls Lead

Summary of Progress this Report

Generals Tasks for entire team:

- Poster Presentation Planning

Quad Software - Tyler and Kyle:

Summary for progress this report:

- I spent a lot of time trying to get valid UART out of a PMOD to no avail.
- Correctly removed problematic vfp-unit that was causing issues in the vivado build.
- Got old XSDK build working and tried running on new quad.
- Got USB fixed and properly working on old quad
- We flipped the IMU on the new quad to the right side up.

Pending Issues:

- Vivado build is failing in runtime due to MALLOC returning null values, causing strange and unpredictable failure points within pre-flight hardware checks

- Could be that our hardware is not properly updated? Running into a memory address that is not writable on new hardware.
- Need to obtain offsets for IMU to properly fly new quad.

Plans for upcoming reporting period:

- Fix malloc issue in Vivado build
 - And resolve issues that I am bound to run into once I solve this
 - Goal is to have vivado properly flying on both quads by Friday
- After vivado is flying get how to use vivado documentation out
- Remove XPS workspace and old XSDK workspace
 - Add gitignore for new vivado project
- Get old quad offsets and attempt autonomous flight

Controls - Austin and Blake:

Summary for progress this report:

- Finished initial LQR controller
- Created MATLAB script for tuning weighting matrix
- Discussed results with Matt C.
- Tested results on non-linear Simulink model
 - (Works reasonably well with noise and time-delay)
- For manual assist mode, focused on how fast the quad can travel based on the pilot skill level.
 - Pilot skill defined as beginner, novice, intermediate, advanced, or expert

Pending Issues:

-

Plans for upcoming reporting period:

- Move MATLAB implementation to C code
- Test on quad if possible
- Work on design of controller with non-diagonal weighting matrices

Testing - Peter and Jakub:

Summary for progress this report:

- Simple quad model with altitude PID working, see screenshot (Jake)

- Converted more documentation to markdown (Peter)
- Wrote matlab script and bash script to connect portions of DataAnalysisTool to ground station (Peter)

Pending Issues:

-

Plans for upcoming reporting period:

- Get simple quad working with our controls (Jake)
- Visualization using FlightGear (Jake)
- Finish converting documentation to markdown (Peter)
- Test integration with ground station (Peter)

Ground Station - Matt and Dane:

Summary for progress this report:

- Manual Assist Mode is now working and waiting to be merged (Dane and Matt)
- Wifi portion of script is working and dhcp needs to be tested (Dane)
- Further updates to Wifi directory (Matt)

Pending Issues:

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Plans for upcoming reporting period:

- Test script fully (Dane)
- Testing latency (Dane and Matt)
- Integrate all multiquad code on GS side (Dane and Matt)
- Update GUI (Dane and Matt)
- Take some videos on how to work with new features of Ground Station (Dane and Matt)

Name	Role	Contribution	Hours worked	Total
Peter Thedens	Repository Lead	Wrote matlab and bash script to integrate with ground station	9	127

Austin Rohlfing	Controls Lead	Finished, tuned, and simulated LQR	17	176
Kyle Trost	Team Lead	USB Fixed Tried to get UART working of PMOD Vivado debugging VFP unit removal	17	214
Matt Kelly	Documentation Lead	Manual Assist mode and Wifi contributions	10	213
Dane Larson	Ground Station Lead	Manual assist mode and some testing of script	8	149
Jakub Hladik	Test Lead	Finished simple quad model and completed altitude only flight with simple PID	10	139
Tyler Imboden	Quad Software Lead	Assisted kyle with vivado build. Troubleshooting new quad and its software	10	176
Blake Pries	Communications Lead	Manual assist mode (separate from Matt and Dane)	7	100

