Senior Design May 22, 43

MicroCART Senior Design Team

Week 12 Report

January 16 - January 22

Faculty Advisor: Philip Jones

Members:

Ryan - System architect

Zach - Groundstation lead, co system architect

Reid - GUI team lead, Test station sub-team

Ellissa - GUI sub-team

Colton - Git manager, Firmware lead

Carter - Web Master, OptiTrack Lead

Brandon - Project Lead, Test Station lead

Summary of Progress over Break

- Test Stand (Reid & Brandon)
    - Tested MA3 sensor for noise
    - Prototyped new design with Trinket M0 microcontroller (voltage divider)
    - Designed PCB(s) to connect test stand electronics
    - Sent tilt/roll mount to ETG for printing (printing in progress)
- Firmware (Colton)
    - Commented important variables / functions in source code
    - Wrote documentation for major functional areas in the GitLab Wiki (stabilizer, flashing, logging, and parameters)
    - Created sequence diagram that describes the student controller
    - Investigated flashing crazyflie over USB by putting booting into DFU mode, needs further development
- Gitlab Repository (Colton)
    - Updated docker version on CI/CD server (was having issues building)
    - Updated repository READMEs to link to the wiki

Pending Issues

- <<DR. JONES ATTENTION REQUIRED>>
  No longer need temp_crazyflie_repo
  (https://git.ece.iastate.edu/danc/temp-crazyflie-repo), but don't have permission to delete it. Jones needs to delete it, settings > general > advanced > delete. I created this repo while troubleshooting.

  MicroCART_Crazyflie_Firmware repo can also be deleted
  (https://git.ece.iastate.edu/danc/MicroCART_Crazyflie_Firmware), this was a pre-existing repo that was blank and unused, currently only has a copy of the stock Crazyflie firmware and will not be used - Colton

Individual Contributions

Team Member	Contributions	Hours over break + First week of class	Total Hours
Brandon Cortez	- Completed basic Arduino trainings - Tested MA3 sensor for noise with drone running - Tested prototyped circuits for control boards - Finished and sent side mount to ETG for printing	20	70
Reid Schneyer	Test Stand control boards design & prototyping	24	69
Colton Glick	- Wrote several wiki pages - Investigated flashing crazyflie over USB with DFU mode - Cleaned up student controller source code consolidated if statements	24	81
Ellissa Peterson	Reading through and exploring GUI Pruning GUI to work with CrazyFlie	8	44
Ryan Hunt	- started storyboarding document - added to wiki page	10	56
Carter Irlmeier	- Met with Fan to discuss alternative to current OptiTrack data streaming method	4	50

	- Began installing and testing alternative		
Zachary Eisele	- Bluetooth research - Fixed adapter callback - Set up "logging"	24	93

Itinerary for 1/24 meeting with Jones

- Go over break progress presentation

- Discuss which PCB design to use and pros/cons of both

- Discuss how much lab students should rewrite crazyflie controller

    - higher level, just rewrite top level student controller

    - medium level, rewrite student controller and attitude / attitude rate controller

    - low level, rewrite above and base PID functions

- Define main lab objectives & student takeaways from the lab

- Discuss how many crazyflies & other components need to be purchased for lab use

- Solidify deliverable timelines, when will the crazyflie lab be held?

Plans for coming Week

- Finalize the PCB design and create BOM for ETG to order parts

- Potentially remove position and velocity controller used in student controller - Colton

- Design test stand legs and submit for printing

- Design the test stand control board housing

- Connect test stand to ground station software

Summary of Weekly Advisor Meeting

- 01/24 meeting to do notes
    - Firmware: remove position & velocity controller for lab usage, add documentation to allow students to potentially add it back in later
    - Test stand: test sensor jitter again with at hover thrust amount, might add more noise
    - test stand: Amount of current drawn by microcontroller? voltage divider concerning amount of current through sensor?
    - Optitrack: review CSV file, how consistent is the data logging rate? Email CSV and analysis data to Jones

- Test stand purchase: 10 setups for lab, 10 drones & 10 test stands + backup buffer
- lab structure: Controller outputs desired attitude. full level, student will create the base PID functions, intermediate controllers, and high level student controller
- lab schedule: Crazyflie lab takes place around spring break, two weeks, two lab sessions
- lab grading demo: flying crazy with manual control off test stand