EE CprE 491 – sdmay20-50
MicroCART Senior Design Team
Weekly Report 1

Sept 20th - Sept 29th
Client & Faculty Advisors: Phillip Jones, Matt Cauwels, James Talbert

Team Members:

Evan Blough -- Technical Team Lead, Embedded Software Lead
Kynara Fernandes -- Ground Control Station Lead
Aaron Szeto -- Controls Lead
Joe Gamble -- Embedded Hardware Lead
Shubham Sharma -- Crazy Fly Implementation Lead, Website Manager
Jacob Brown -- Physical Hardware Lead

Summary for Progress this Week

This is a summary of the progress we have made on this project since the start of the class. Most of our work on the project has been in the form of increasing our background knowledge of the drone's systems. We learned more about the possible areas of development on the drone, and we elected focus areas to work on. We assigned formal team roles to everyone this week. We also assigned some auxiliary scheduled work times outside of our weekly entire group meeting. There are some minor things that were developed on the drone systems and documentation this week.

Past Week Accomplishments

- Scheduled small group work meetings
    - All team members: Sundays at 12pm
    - Joe, Evan & Kynara 12PM - 4PM Saturday
    - Shubham & Aaron: Tuesdays and Thursdays 5pm- 7pm
    - Jacob: TBD
- Updated Demo readme
    - Evan
    - I merged in a branch that had some edits to the readme to show the actual computer password.
- Rescheduled weekly meeting
    - Sundays 12:00 PM - 2:00 PM
- Assigned technical roles
    - All team members
    - Technical Team Lead (Evan)
        - Responsible for communicating between focus groups
        - Organize Tasks
        - Remind the team of events
        - Generate weekly reports

- Ground Control Station Lead (Kynara)
  - Responsible for all GUI development
  - Setting up a network interface with the drone on client-side
  - Porting GCS functionalities to Crazy Fly's and second drone
  - Answering software questions and guiding in software decisions
- Embedded Software Lead (Evan)
  - Responsible for developing embedded C code running on the quad app
  - Responsible for networking with the GCS
- Embedded Hardware Lead (Joe)
  - Responsible for embedded Verilog development on FPGA
- Crazy Fly Implementation Lead (Shubham)
  - Responsible for coordinating the crazy fly project
- Controls Lead (Aaron)
  - In charge of researching controls algorithms
  - Modify C code to implement modular controls algorithms on drone
- Website Manager (Shubham)
  - Updates project webpage with documentation
- Physical Hardware Lead (Jacob)
  - Assemble physical robot architecture
  - Install board components
  - Debug hardware
- Refitted Zybo Board
  - Joe Gamble, Evan Blough
  - Cut off header pins from Zybo Board
  - Brought to ETG to solder on vertical headers
- Researched Drone infrastructure
  - All Team members
  - Evan Notes
    - https://docs.google.com/document/d/1hiULwv869WlkpEujzp-9oxzTDpIoklca9Lw-uUz3D3M/edit?usp=sharing
    - Took notes on embedded C running on quad as well
  - Kynara Notes
    - Looked into the software architecture of the ground station as well as the quad-software and the control loop.
  - Joe Notes
  - Aaron Notes
    - Looked into control systems documentation on gitlab.
  - Shubham Notes
    - Looked into the documentation.
    - Studied the algorithms used for communication with the drone.
  - Jacob Notes
- Updated Website
  - Shubham

- - Filled out about section
    - http://sdmay20-50.sd.ece.iastate.edu/team.html
  - Git crash course
    - Kynara
    - Made a Git repository for a tutorial for the EE's on the team
    - Guided EE's through a lifecycle of repo and branches
    - This will help with the maintenance of embedded hardware and software and documentation in MicroCART repo.

Pending Issues

- - Getting current draw from motors
    - Evan and Jacob
    - We looked into the motors power draw. In the datasheet for the motors and ESC it says the recommended lipo battery is 3 cells. I wanted to still try to run the current draw regardless, but I don't know how to access the current draw from the ESC. The wires are thickly soldered on and have a protective coating. I wanted to attach an ammeter in series to the 5V connection on the ESC, but I couldn't access the wire and I didn't want to break the one working drone.
    - We would appreciate your thoughts on this issue.
    - Could the batteries be being killed by anything else of the drone?
  - Soldering Components to shield board
    - Jacob
    - Very time consuming
    - Will be done at some point then we can move on to assembly of the second drone
  - Clearance to work with crazy flies in the lab!

Individual Contributions

Team Member	Contribution	Week 3 Hours	Total Hours
Evan Blough	Project Planning, Research current draw on motors, Took Zybo Board to ETG,	9	9
Kynara Fernandes	Project plan, reading and created an abridged version of documentations and project architecture.	6	6
Joe Gamble	Read the documentation, discussed project with old users, learned git techniques, modified zybo board for powerboard interface	6	6
Jacob Brown	Project plan, CLI	5	5
Aaron Szeto	Read control systems documentation, learned to demo quadcopter	6	6
Shubham Sharma	Research into communication systems and worked on improving the website	5	5

Plans for Coming Week

- Get started with crazy flies - Whole team
- Figure out/fix calibration so quadcopter origin point is in the center of camera system instead of up and to the right - Kynara
- Program wi-fi chips, and ready presentation on Vivado - Joe
- Resolve battery issue - Jacob

Summary of Weekly Advisor Meeting:

This week we met with Dr. Jones and Matt. We had a scheduling conflict, so we had low attendance at the meeting. Dr. Jones gave us some recommendations on things to do to avoid scheduling conflicts and improve productivity. We implemented most of the things he recommended. Matt described some things that could be modified on the drone. He told us to measure current draw on the motors, remount pins on the Zybo board, and start soldering components to the shield board. We developed the website because Dr. Jones told us to update it at this meeting. We outlined some future goals and a timeline for implementing them. We hope to implement multiple autonomous crazy flies, then construct another drone. After we have swarm flight implemented for the crazy flies we will make two of the big drones fly.