

# Weekly Status Report 9

## Quadcopter Cameraman

sdmay19-42

November 6 – November 12

**Aamid Ahabab (Lead Engineer) & Client**

**Zhengdao Wang (Team Advisor)**

**Alex Nicklaus (Lead Test Engineer)**

**Isaac Holtkamp (Web Manager)**

**Nate Allen (Report Manager)**

**Luke Rohl (Meeting Facilitator)**

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### *This week's accomplishments*

#### *Summary*

- Alex
  - Met with Amid and Nate over the weekend to construct the drone
    - Construction revealed several unanticipated issues with the physical design we had not planned for (See Roadblocks)
    - Got the physical drone layout figured out with the exception of one component (Again see roadblocks)
      - We will need to build mounting jigs for the sonar and camera as we currently do not have a good way to mount them to the frame
        - We had considered this from the start of the project
      - I will be finishing up my laser cutter training in the coming week so we will have access to that resource
      - We will also be looking to get some help from ETG
    - Built RTOS following directions from tutorial we now have a .bin file ready to be flashed on to the Pi
    - Pi is able to run off the portable power source we purchased for it
- Nate
  - Integrated facial recognition with human recognition
    - Detect humans
    - if a human is detected, look for a face
    - if a face is detected, check if it is the target's
  - Setup environment on Pi
    - Installed numpy and matplotlib
    - Tried installing opencv with pip or apt-get (failed)
    - Tried manually building and installing opencv (failed)
    - Found a pre-built image with raspbian and opencv pre-installed

- Luke
  - Git repo issues
    - Due to being new to Android studio within git there was some difficulty determining which files were required to be pushed and which were not necessary. Unfortunately we were too heavy handed and it was causing us issues pushing to the master branch for the android repo.
    - This has been resolved. The solution was to compress the android app on the android\_app branch, remove the entire android project on the master branch, and uncompress the android app on the master branch.
  - Android App
    - Target DB now complete. Can store multiple targets, edit and delete existing targets.

### *Planned to accomplish next week*

- Alex
  - Test ChibiOS on the Pi
  - Work on Laser Cutter Training
  - Begin working on safety protocols
- Nate
  - Install the pre-built image on Pi
  - Setup virtual environment on Pi
  - Setup python environment on Pi's virtual environment
- Luke
  - Bluetooth socket communication
    - Drone and pi have already been paired. The next step is to create sockets for communication and to send data between the two
    - Pi
      - Receive commands and act upon them. I.e. arm drone, disarm
      - This will require receiver code (socket code) as well as action code (what to do with the commands once they have been received).
    - Android
      - Send commands
        - This will craft commands and send them over the bluetooth socket.
  - Pi OpenCV
    - Continue to diagnose issues with running OpenCV on raspberry pi.
- Aamid
  - Get the integrated PDB to work
    - if yes, redesign the drone's hardware layout
    - if no, research and purchase a new pdb
      - Likely will need to consider if the pi power supply is still needed
      - recalculate battery life with a pi attached to the battery
  - Work on solutions for hardware roadblocks

Roadblocks

- We do not have our flight controller in yet, this is a critical section of the build both for physical construction and programming
- The power distribution board was lost by a group member, he has offered to pay for a new one and we are taking this time to better understand the needs of our current hardware and possibly purchase a better fitting board
- Pi did not include a power cord, USB to micro USB, or micro SD card both of which are needed for operation
  - The power source purchased for the Pi did include the power cord
  - Right now we are using personal micro SD card and are working to order one exclusively for this project
- We encountered several problems while attempting to finish off drone construction but we came up with several solutions for both
- Weight distribution
  - Weight distribution on the drone is important as an off center, center of mass will cause the drone to tilt when attempting to hover which will cause undesirable motion
    - We can have an uneven distribution of power to the engines but that presents its own set of issues
  - We are working to distribute weight evenly across the surface of the drone
- Limit real estate
  - Our current build has every part (including those we don't physically have yet) able to fit well on the drone except the Pi's power source
  - These are our currently proposed solutions
    - Run the Pi off of the main power source
      - Reduces power available to the engines and overall run time
      - May require additional hardware which is counterproductive
    - Crack open the power source to get it to fit better as the outer shell is oddly shaped and weighted
      - Might not reduce the needed real estate greatly
      - May expose power cells
    - Expand the available real estate on the drone's body
      - Add another level to the drone's body
      - Mount boards on top of each other using spacers
        - Will either make the drone top heavy or force us to land on the central body rather than the tips of the arms
      - Will add weight to the drone
- How the engine will be mounted
  - Currently the engines can fit to the arms like we originally planned however it is not as solid as a fit as we would like
  - We can adjust the engines' orientation to get a better fit but it is still not perfect
  - Another solution is to use mounting plates to get a better fit
- Android App (**Resolved**)
  - Saving image to android app file system
  - Edit existing target in database
- Pi OpenCV

- install the proper dependencies for the pi to run OpenCV, face\_recognition, and other libraries.
- Git repo issues (**Resolved**)
  - Due to being new to Android studio within git there was some difficulty determining which files were required to be pushed and which were not necessary. Unfortunately we were too heavy handed and it was causing us issues pushing to the master branch for the android repo.
  - This has been resolved. The solution was to compress the android app on the android\_app branch, remove the entire android project on the master branch, and uncompress the android app on the master branch.

Hours Spend

<b>Team member</b>	<b>Hours This Week</b>	<b>Hours Total</b>
Nate Allen	6	53
Alex Nicklaus	7	45
Luke Rohl	9	49
Mir Ahbab	7	31.5
Isaac	8	40