sdmay19-35: Implementing a Web Portal System for Drone Simulation and Control
Biweekly Report 3
February 26th - March 12th
Client: Ali Jannesari
Faculty Advisor: Ali Jannesari

Team Members
Bansho — *Test Engineer. Sensors Hardware Developer.*
Ian — *Scrum Master. Full Stack Developer.*
Li — *Test Engineer. Back-end Developer.*
Jawad — *Meeting Manager. Embedded Systems Developer.*
Mehul — *Project Lead. Computer Vision Developer.*
Sammy — *Report Manager. Lead Front-end Developer.*

Summary of Progress this Report
- Embed the drone camera output in the flight web-page to show the drones view
  - Broadcast the output of the camera from the Raspberry PI on the drone
  - Set up an endpoint in the API to retrieve the URL for the server serving the camera feed from the drone
  - Use an IFrame to load the output of the camera in the web-page
- Made progress on integrating the Erle-Copter simulator with Gazebo
  - Attempted to install ArUco on a testing VM
  - Worked around defunct documentation to install OpenCV, one of the dependencies to ArUco
  - Documented workaround on the wiki
  - Switched to a newer version of ArUco (3.1.0) to bypass some compatibility issues
- Set up the throttle deadzones, throttle will now have 3 positions.
  - 0-25%: reduces altitudes or lands
  - 25%-75%: maintains the current altitude.
  - 75%-100%: raises altitude
- Computer Vision: Environment Generation
  - A python script sends requests to the NodeODM server (hosted on the server hosting CyDrone) and uploads several drone images in geotiff format.
  - The service then generates several different drone-imagery files which can be processed to be loaded into the Gazebo simulator.
- Configured Erle Copter and setup controls from APM Planner
  - Updated the keys from Erle Robotics
  - Built and compiled APM from its sources

- - The official documentation on the Erle Robotics page is wrong, so had to debug and figure out how to fix that
    - Connected the drone with APM planner
  - Set up the RC pins and debug check every pin and values set well

Pending Issues

- There is a slight delay in the camera feed that could probably be improved by tweaking some configurations or improving the process in which video is being served and received.
- Generating a gazebo world based on the 3d files generated from ODM by using the files to make one superfile that can be read inside gzweb.
- ArUco won't build due to compile errors. Some constants are missing from the expected scope; suggests a dependency-related issue.
- The motors would not move due to compilation errors. Something is wrong with the configuration file for APM.
- ROS can neither arm nor set the mode for the drone.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Bansho	Worked on the Video feed system on drone machine, create local server to hosting the video stream.	22	120
Ian	Worked on integrating the Erle-Copter simulator. Installed OpenCV and ArUco.	20	118
Jawad	Configured Erle Copter and setup controls from APM Planner	22	125
Li	Improved joystick controls, set the RC with a receiver, researched how to arm drone through RC and researched Motor Power Up Test	21	112
Mehul	Wrote python script to automate the generation of 3D files from drone imagery using ODM. Used other softwares to manipulate 3d files	22	121
Sammy	Built the API endpoint to retrieve the drone video url. Embedded the output of the drone video broadcast in the web-page.	22	132

Plans for Upcoming Reporting Period

- Establish communication between the drone and the web-client. Give the user a terminal through which they can communicate with the drone.
- Fix compile errors for ArUco.
- Control the drone with APM.
- Arm drone with Radio control.