

CprE / EE 492 - Sdmay18-25

Bi-Weekly Report 1

Autonomous Health Monitoring of Civil Infrastructure using UAV

Start Date - End Date: Jan. 12 - Jan. 26

Faculty Advisor: Dr. Halil Ceylan

Team Members:

Nathan Conroy - Software Lead

Kevin Yen - Hardware Lead

Quade Spellman - Meeting Facilitator

Isaac Bries - Test Engineer

Molly Hayes - Meeting Scribe

Rishab Sharma - Report Manager

Past Week Accomplishments

Drone Parts:

- We identified the issue that caused our propeller incident. The propellers were advertised as 9 inches and our frame specified it could support 18 inch propellers so we thought they would fit. However, the propellers were actually given by radius and the frame specified diameter so the propellers were twice as big as we needed.

Research:

- We each spent some time researching more about the remaining parts left to order, and are reaching the final stages of purchasing.
 - Parts left to purchase:
 - 1) Thermal Camera
 - 2) Image Camera
 - 3) Power Distribution
 - 4) Standard Electrical Cable
 - 5) Motor Propellers
 - 6) Battery Mounting
 - 7) Gimbal
 - 8) Video Transmitter
 - 9) Video Receiver
 - 10) Video Switch

11) PWM Extender x 8

12) Any additional mounting hardware

- A lot of parts depend on other parts so purchasing them is trickier than expected, but we will be able to figure it out through thorough research.
- Had a meeting with a UAV flight, visual, and imaging detection expert, Dr. Ahmad Siddique and learnt a lot of information. Here are a few questions and answers that we learnt from Dr. Siddique that will help us going forward with our project:

1) What drone accessories do you have (Anything that is not camera equipment or flight hardware). How many battery chargers? Carrying case?

- Sun shade around display
- Batteries
- Manual focus on controller is helpful
- Strap to hold flight station
- Zoom controls on controller
- Separate controllers for camera and drone itself
- FPV drone goggles (GLAXXES)
- Extra propellers
- Propellor guards (might have to self design)
 - Look into commercial pre built rone with one already integrated
 - In-frame propeller design?

2) What realtime processing are you doing? What are you trying to process and recognize?

- Create model of the forest, to try to find people
- Record and post-analyze (not ideal)
- Identify potential issues for further pilot investigation

3) How are you transferring video to the pilot? (drone image preview capabilities) streaming in HD?

- [Erle brain](#) on a raspberry pi (drone side, stream to laptop)
- Dji lightbridge
- [Dragon link](#) (36 km and not HD video)

4) How far away from you do you fly your drone? What is the range of your drone?

- 100 to 200 meters (within sight)
- Phantom pro 5-7km? (autonomous flight)
- S1000 canon 5d mark 3 with zenmuse gimbal, can't fly it far or fast because of the expensive payload

5) When you fly it far away you should stay on autopilot

- Using mission planner
- Can always interrupt mission if necessary

Flight Controller setup

- Set up the flight controller to see how it functioned.
- Was able to have it communicate with a ground station over a USB cable.
- Successfully was able to do initial setup of the flight controller
- Could not connect to receiver, as we did not have the right cable to connect the two. Will need to order that part

Pending Issues

Selecting remaining parts:

- We wanted to order our final parts this week but we still need to reach a decision about the HD camera and other parts.
- It is not possible to purchase a camera that has zoom capabilities that our client wants

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Nathan Conroy	Explored how to setup and integrate the flight controller. Prepared for meeting Mr Siddique.	5	69
Kevin Yen	Returned incompatible parts. Looked into power distribution and wiring between various parts.	7	63
Quade Spellman	Researched gimbal options for Flir Pro R thermal cameras. Assisted in preparing questions about UAVs and discussing the current state of our project with UAV expert Dr. Siddique. Did light investigation into part and accessory recommendations from Dr. Siddique.	7	42.5

Isaac Bries	Explored the setup and integration of the flight controller and GPS modules with Mission Planner. Prepared for and participated in discussion with Mr. Ahmad Siddique to gain new perspectives on UAV design.	8	63
Molly Hayes	Researched suggestions from Mr. Ahmad Siddique about video transmission and HD cameras.	3	43.5
Rishab Sharma	Researched thermal gimbal, and camera to find the best fit for our project. Also tried to figure out FAA drone rules	5	54

Plans for Upcoming Week

- Decide on a camera to order
- Get scheduled for FAA drone certification, and figure out cost
- Finish the ordering of the remaining drone parts before next weekly report
- Have set goals to try and finish building our drone by the beginning of March and begin testing in the month of March and April