

CprE / EE 492 - Sdmay18-25

## Bi-Weekly Report 2

### Autonomous Health Monitoring of Civil Infrastructure using UAV

Start Date - End Date: Jan. 26 - Feb. 9

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

This week we were ready to send an order to ETG for the next set of parts ready to be ordered. This list of parts fulfills almost all of our goals, except for the camera and some parts that involve the camera. Here is the list of the parts that we sent an order to purchase at ETG:

Part	Name	Cost	Website
Thermal Camera	Flir vue pro R, 30hz, 640x512, 13mm lens	\$4,699.00	
Motor	Motor - U7-V2.0 KV420	\$149.9	<a href="http://store-en.tmotor.com/goods.php?id=320">http://store-en.tmotor.com/goods.php?id=320</a>
Thermal Gimbal	Tarot TL03FLIR	\$225.00	
Motor Propellers	Tarot 1755 Carbon Propellers	\$31.90	<a href="http://www.helipal.com/tarot-1755-1-carbon-propellers-two-holes-cw-and-ccw.html">http://www.helipal.com/tarot-1755-1-carbon-propellers-two-holes-cw-and-ccw.html</a>

Power Module+BEC	4-14S HYB-BEC / 5.30V DF13-4P	\$36.00	<a href="http://www.craftandth eoryllc.com/store/ma uch-hyb-bec-power-supply-for-4s-14s-lipo-batteries/">http://www.craftandth eoryllc.com/store/ma uch-hyb-bec-power-supply-for-4s-14s-lipo-batteries/</a>
Additional Flight Control Cable	HS Adapter Cable for Pixhawk 2	\$5.00	<a href="http://www.craftandth eoryllc.com/store/ma uch-kit-for-single-battery/#additional-flight-controller-cable-optional">http://www.craftandth eoryllc.com/store/ma uch-kit-for-single-battery/#additional-flight-controller-cable-optional</a>
Long Range telemetry	jD-RF900Plus Longrange	\$259.95	<a href="http://store.jdrones.com/jD_RD900Plus_Telemetry_Bundle_p/rf900set02.htm">http://store.jdrones.com/jD_RD900Plus_Telemetry_Bundle_p/rf900set02.htm</a>
Connectors	XT150 Charge lead w/6mm Gold Connectors	\$4.06	<a href="https://hobbyking.com/en_us/xt150-charge-lead-w-6mm-gold-connectors-red-and-black-1pc.html#">https://hobbyking.com/en_us/xt150-charge-lead-w-6mm-gold-connectors-red-and-black-1pc.html#</a>

The most expensive part was the thermal camera at about \$4,600, but our client has approved this and this part is very imperative to our project.

We discussed with our client and decided to use the GoPro that they have for now so that at least we have something to test with and see how imaging works with a drone. If there is a need to purchase one we will, but for now we will use the GoPro and see how that works out.

The main concerns that have been brought up with GoPro Cameras is the post processing of images. The GoPro camera has a fish eye effect when taking pictures. While this is great for wide angle shots, this negatively affects the ability to process these images, as all straight lines will be slightly curved. While algorithms exist to try to fix this issue, they are not reliable. It is better to go with a new camera that can take better photos.

One option that has been looked into are mirrorless cameras. Mirrorless cameras function similar to a DSLR camera, though come in a much smaller footprint. Gimbals do exist that will accept many common footprints for mirrorless cameras. Research is currently going on looking for different types and cost for the gimbals, which we will present to our advisor. One issue we have is that we do not have a set budget for this camera. Because of this, we will need to present multiple options at multiple different price points.

#### 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.

## Pending Issues

Purchase remaining parts that were not ordered because the camera was not finalized till now

- Video Transmission, Power distribution, and camera gimbal parts were not ordered
- It is not possible to purchase a camera that has zoom capabilities that our client wants, so we will have to find another way for this function to work

We need to keep researching for cameras, and while we are waiting for our parts to come we need to figure out how to build the drone, which is very doable.

## Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Nathan Conroy	Researched camera options, and video transmissions options.	10	79
Kevin Yen	Finished creating BOM. Continued browsing additional accessories to be purchased at a later date	2	65
Quade Spellman	Researched camera pros and cons. Signed up for a webinar about how to use Flir thermal products and software.	3	42.5
Isaac Bries	Double checked compatibility between parts so we don't order incorrect parts again	2	65
Molly Hayes	Worked on researching camera options	2	45.5
Rishab Sharma	Researched camera and	3	57

	thermal options		
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## Plans for Upcoming Week

- Get scheduled for FAA drone certification, and figure out cost and set date for each member
- While we wait for the parts, we will start researching on how to fly and use the sensors so once the parts come we will have an easier time setting it up.
  - How are we transferring video to the pilot? (drone image preview capabilities) streaming in HD?
  - What environments do you operate your drone in? For example have you ever tried light rain? How do you protect the drone?
  - What do you view your live video feed on? What device?
- Start building the drone, attaching sensors, and other parts as they come.
- 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
- Solidify camera options
- Solidify video transmission option