

CprE / EE 492 - Sdmay18-25

## Bi-Weekly Report 3

### Autonomous Health Monitoring of Civil Infrastructure using UAV

Start Date - End Date: Feb. 9 - Feb. 23

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

During these past weeks we have completed almost all our parts requirement to build a UAV for health monitoring of civil infrastructure. We started out by sending the parts order to ETG, but we received a message that said some of the parts we wanted to order were being marked as fraudulent. This was due to the fact that the sellers were not from the States and thus cannot be 100% trusted. This is one of the many lessons we learnt as buying parts for drones is a hassle, especially with all the parts that we require. So to correct this problem, we found better potential sellers and have now sent all of our parts to be ordered. The only part left is the thermal camera gimbal, which we should be able to purchase by next week.

Here is the list of all the parts that we have ordered so far this semester and are now waiting for them to arrive. This includes the first order that we made at the very beginning and the most recent one that we just put in:

First Order							
Name	Description	Supplier	Units	Qty	Cost (each)	Cost Total	
Tarot T960	Frame	robotsh	1	1	\$299	\$299	

		op.com					
Tarot T810 T960 T1000 Multi-Rotor Foldable Landing Gear	Landing Gear	hobbyking.com	1	1	\$68.40	\$68.40	
Tarot T810 T960 Gimbal Mount Kit	Mounting Rail	hobbyking.com	1	1	\$16.95	\$16.95	
Here GNSS/GPS for Pixhawk 2.1	GPS	robotshop.com	1	1	\$48.00	\$48.00	
Pixhawk 2.1	Flight Controller	robotshop.com	1	1	\$198	\$198	
HKPilot Transceiver	3DR Radio Telemetry	hobbyking.com	1	1	\$32.67	\$32.67	
FrSky Transais Qx7	Radio Transmitter	hobbyking.com	1	1	\$104.99	\$104.99	
FrSky X8R	Radio Reciever	hobbyking.com	1	1	\$36.80	\$36.80	
Tiger Motor Flame 80A	Electronic Speed Controller	tmotor.com	1	7	\$119.99	\$839.93	
P80 Kv100	Motor	tmotor.com	1	8	\$199.90	\$1,599.20	could not return these items
T-Motor G29x9.5	Propellers	tmotor.com	2	4	\$270.90	\$1,083.60	
Venom 13000mAh 22.2V	Battery	venompower.com	2	1	\$413	\$413	
Venom Pro Touch Screen HD 45A RC	Battery Charger	venompower.com	1	1	\$239.99	\$239.99	
					<b>Subtotal</b>	<b>\$4,981</b>	
<b>Second Order</b>							
Name	Description	Supplier	Units	Qty	Cost (each)	Cost Total	
jD-RF900Plus Longrange	Long Range telemetry	JDrone s	1	1	\$259.95	\$259.95	

Flir vue pro R, 30hz, 640x512, 13mm lens	Thermal Camrera	Flir	1	1	\$4,699.00	\$4,699.00	
Tarot TL03FLIR	Thermal Gimbal	Alibaba	1	1	\$176.00	\$176.00	
HS-200-HV 14S	Power Module	Craft&Theory	1	1	\$27.00	\$27.00	
4-14S HYB-BEC / 5.30V DF13-4P	Power Module BEC	Craft&Theory	1	1	\$36.00	\$36.00	
HS adapter cable for Pixhawk 2	Power Module cable	Craft&Theory	1	1	\$5.00	\$5.00	
Tarot 1755 Carbon Propellers	Motor Propellers	GetFPV	2	3	\$71.90	\$215.70	
U7-V2.0 KV420	Motor	GetFPV	1	6	\$149.90	\$899.40	
XT150 Charge lead w/6mm Gold Connectors	Connectors	Motion RC	1	1	\$4.06	\$4.06	
					<b>Subtotal</b>	\$6,322.11	
					<b>Sum of Both Orders</b>	\$11,127	
					Cost of unusable parts	\$2,682.80	

There was a mixup with our propellers order which is highlighted in red. 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. We tried to return them but the seller would not take the parts back because they only way they would take them back is if the parts malfunctioned and not because the measurements were not correct. We are now thinking of either having our client keep them or selling it somewhere else.

## Pending Issues

All we have left to do, as we wait for our major parts to arrive, is to find a proper buyer for our thermal camera gimbal, and to study up for the FAA drone certification. Our client decided that it is imperative that at least two or three of us should take the certification test so we can fly our drone anywhere, including on-campus.

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.

## Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Nathan Conroy	Market research on gimbal for camera system. Looked further into mirrorless camera options.	8	87
Kevin Yen	Aggregated previous BOM for client. In addition, created another BOM with more reliable suppliers. Researched about video transmission and gimbal related mounting apparatus.	3	68
Quade Spellman	Continued looking for alternative solutions for thermal gimbals, also watched a webinar on how to use flir thermal cameras	5	50.5
Isaac Bries	Investigated FAA drone regulations/certification. Compared camera options to our performance requirements.	2	67
Molly Hayes	Helped with confirming parts orders and inventory lists.	3	48.5

Rishab Sharma	Researched camera options, video transmission, and the FAA certification options	3	60
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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 mid March and begin testing in the month of March and April
- Solidify camera options