Final Presentation-Team ALBOE

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Jacob Hernandez
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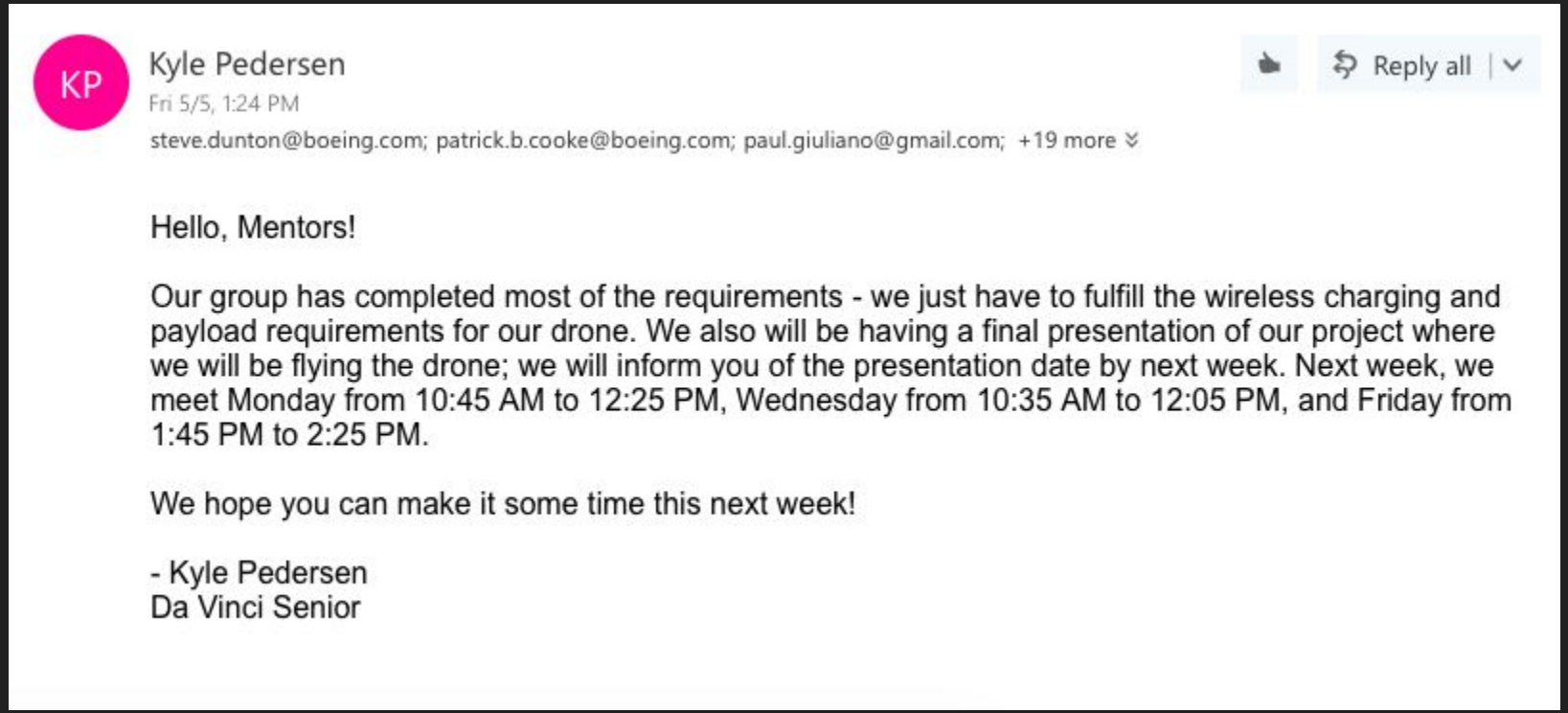
Objectives

1. The vehicle shall be controlled wirelessly
2. The vehicle shall be able to control and monitor yaw, pitch, and roll
3. The vehicle shall dock to a charging interface
4. The vehicle shall deliver a 1 lb. payload ½ mile away within 3 ft. of its destination
5. The charging station shall utilize clean energy
6. The charging station must charge wirelessly

Action Items

- Finalize detailed Mass and Monetary Budget
- Define all 3 axes of flight (Yaw, Pitch and Roll)
- Adjust Gantt Chart Colors
- Remote switch for electromagnet release
- Itemize all Parts in Mass Budget; just don’t give a summary

Weekly Emails



KP

Kyle Pedersen

Fri 5/5, 1:24 PM

steve.dunton@boeing.com; patrick.b.cooke@boeing.com; paul.giuliano@gmail.com; +19 more

Reply all

Hello, Mentors!

Our group has completed most of the requirements - we just have to fulfill the wireless charging and payload requirements for our drone. We also will be having a final presentation of our project where we will be flying the drone; we will inform you of the presentation date by next week. Next week, we meet Monday from 10:45 AM to 12:25 PM, Wednesday from 10:35 AM to 12:05 PM, and Friday from 1:45 PM to 2:25 PM.

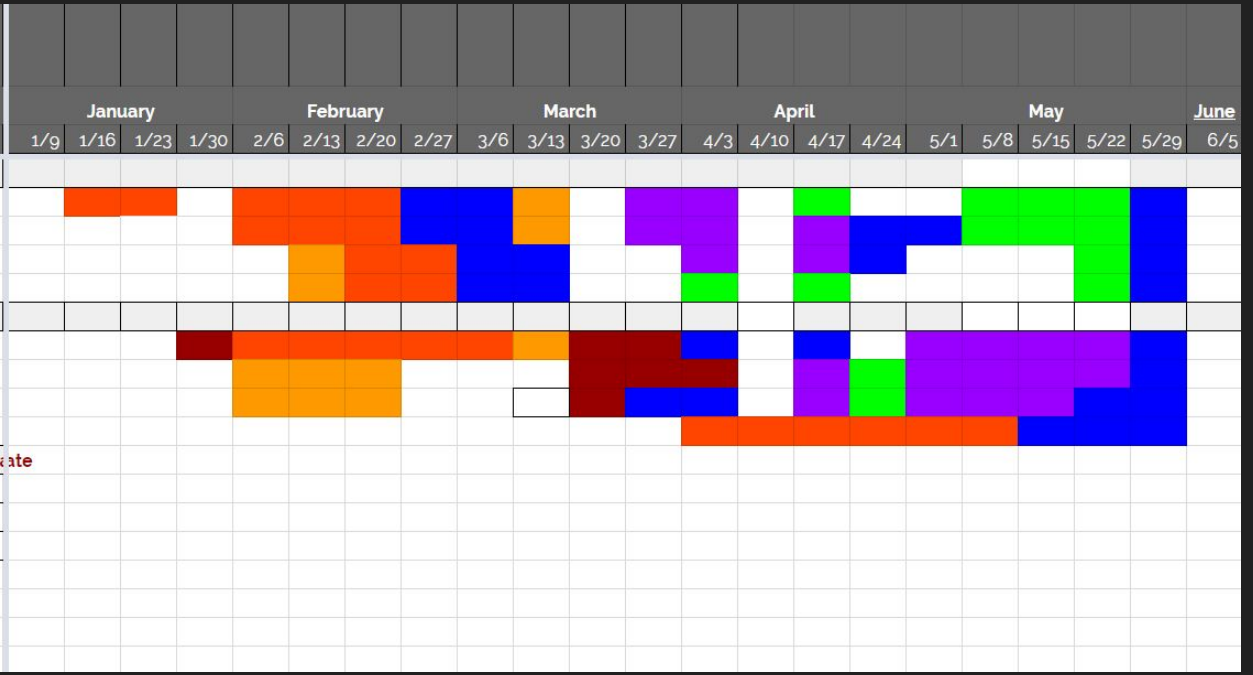
We hope you can make it some time this next week!

- Kyle Pedersen
Da Vinci Senior

Gantt Chart

ERD Gantt Chart

Semester 2 (1/9- 6/5)



		Presentation Date	Actual Presentation Date
PUP 1	February	2/1	
PUP 2	March	3/1	
PUP 3	April	4/1	

Build Plan
Build Actual
Build Both
Test Plan
Test Actual
Test Both

Updated Cost Budget

Date	Item Category	Item Name/Description	Quantity	Unit Cost	Overall Cost
11/14/2016	Supplies	Rosin Core Solder	1	$10.02	$10.02
1/18/2017	Supplies	uxcell 10 Pcs Molded Plastic Case 1000V 10A Rectifier Diodes 10A10	1	$3.94	$3.94
1/23/2017	Tools	13 pc metric hex key set	1	$11.81	$11.81
1/9/2017	Renewable Energy	HQST 100 Watt 12 Volt Polycrystalline Solar Panel Kit with 20A PWM Charge Controller with LCD Display	1	$167.99	$167.99
12/14/2016	Renewable Energy	12v 10Ah SLA Rechargeable Battery - F2 Terminals	1	$26.99	$26.99
1/18/2017	Renewable Energy	Uxcell 10 Pcs Molded Plastic Case 1000V 10A Rectifier Diodes 10A10	1	$3.94	$3.94
3/1/2017	Renewable Energy	SNAN 300W Car Power Inverter DC 12V to AC 110V with Dual AC Outlet and 4.8A Dual USB Charging Port	1	$24.99	$24.99
11/14/2016	Vehicle Design	DJI Naza-M Lite	1	$79.00	$79.00
11/14/2016	Vehicle Design	Drone Body: Wototoy HJ-H4 Reptile	1	$114.98	$114.98
11/14/2016	Vehicle Design	Drone Motors: Quantum MT Series 4108 700KV	4	$29.03	$116.12
11/30/2016	Vehicle Design	ESC: Turnigy MultiStar 30A BLHeli-S Rev16 V3 ESC 2~6S (Opto)	4	$17.01	$68.04
11/14/2016	Vehicle Design	Racers Edge LP4S6400100C 6400mAh 100C 4S LiPo Battery	1	$124.08	$124.08

Updated Cost Budget

11/14/2016	Vehicle Design	HJ 12X3.8 Propellors	4	$10.99	$43.96
11/30/2016	Vehicle Design	3.5mm Male Female Banana Plug Bullet Connector Replacements 20 Pairs	1	$7.99	$7.99
11/14/2016	Vehicle Design	Drone Power Distribution Board: Hobby King Quadcopter Power Distribution Board	1	$5.53	$5.53
11/16/2016	Vehicle Design	Femal Dean Connectors for battery	4	$8.95	$35.80
11/16/2016	Vehicle Design	Male Dean connectors for battery	4	$8.95	$35.80
	Vehicle Design	Bullet Banana Connectors	1	$6.89	$27.56
2/27/2017	Vehicle Design	Parallel Y-Harness - Deans-type Connector	1	$8.95	$8.95
12/7/2016	Vehicle Design	Green Body Lights	1	$5.75	$5.75
2/27/2017	Vehicle Design	Controller and Reciever: FlySky FS-T6	1	$53.99	$53.99
11/14/2016	Charging Dock	Wireless Charging PCB Module 5-12V	2	$11.99	$27.78

Updated Cost Budget

3/2032017	Charging Dock	Booster Converter	1	$7.99	$7.99	Amazon
11/28/2016	Payload Arm	DC 12V 0.07A 3.5RPM High Torque Gear Box Electric Motor 37mm	1	$16.19	$16.19	Amazon
11/28/2016	Payload Arm	Motor Shaft coupler	3	$5.89	$17.67	Amazon
1/18/2017	Payload Arm	Uxcell a13120300ux0142 DC12V 50N 2 Wired Connector Electromagnet Solenoid Lift Holding, 0.33 Amp	1	$8.94	$8.94	Amazon
5/5/2017	Payload Arm	AGT 12V Waterproof Wireless Remote Control DC Universal 2-Channel Output Works LED Lights	1	$19.99	$19.99	Amazon
Total Cost:						1075.79

Power Budget

Item	Rating	50%	75%	100%
Motors	30A@22V	15A@11V	22.5A@16.5	30A@22V
V-Sen Regulator	3A@5V	1.5A@5V	2.25A@5V	3A@5V
ESC	0.001@14.8V	0.001@14.8V	0.001@14.8V	0.001@14.8V
Lights	0.001@1.5V	0.001@1.5V	0.001@1.5V	0.001@1.5V
Switch/Magnet	0.035@12V	0.035@12V	0.035@12V	0.035@12V
Battery specs		Full Charge		
amp hours	6.4	6.4		
Volts	14.8	16.4		

Testing

(5/3/2017-5/22/17)

Power Budget

- Research Power Consumption of each part
- Establish if the power consumption is constant or variable
- Test lost charge over 5 minutes at hover

Item	Rating	50%	75%	100%
Motors	30A@22V	15A@11V	22.5A@16.5	30A@22V
V-Sen Regulator	3A@5V	1.5A@5V	2.25A@5V	3A@5V
ESC	0.001@14.8V	0.001@14.8V	0.001@14.8V	0.001@14.8V
Lights	0.001@1.5V	0.001@1.5V	0.001@1.5V	0.001@1.5V
Switch/Magnet	0.035@12V	0.035@12V	0.035@12V	0.035@12V
Battery specs		Full Charge		
amp hours	6.4	6.4		
Volts	14.8	16.4		

Power Loss Test

- Tested at hover stabilized with my hand

Battery Loss Tests				
Test #	Hover 5 minutes		Charge Used +/-V	
1	16.8	15.95	0.85	
2				
3				

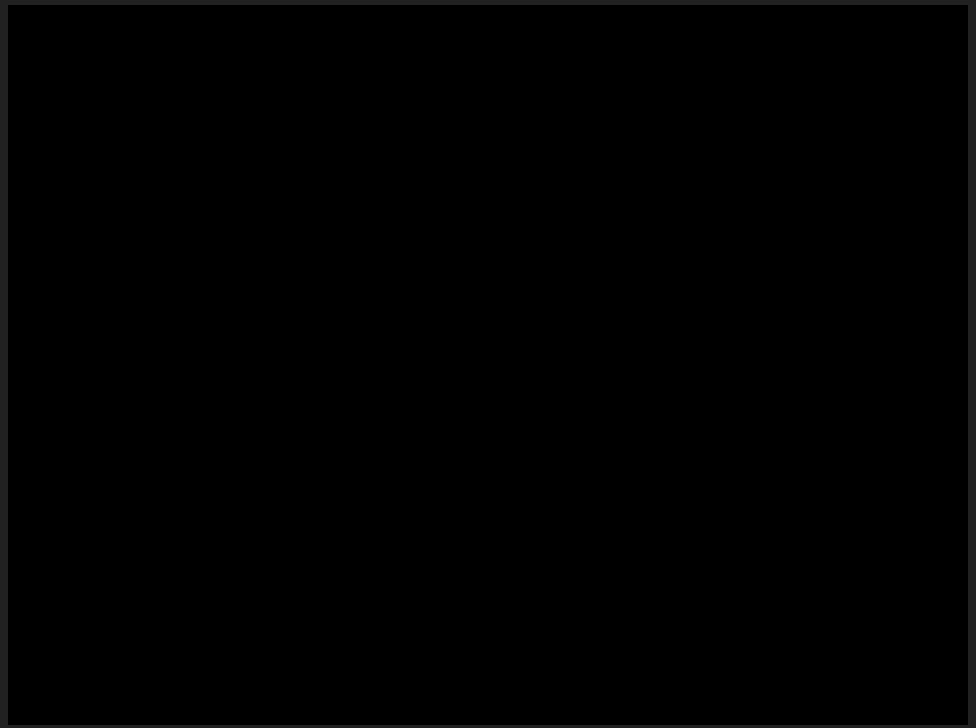
Renewable Energy Test

Renewable Energy Test

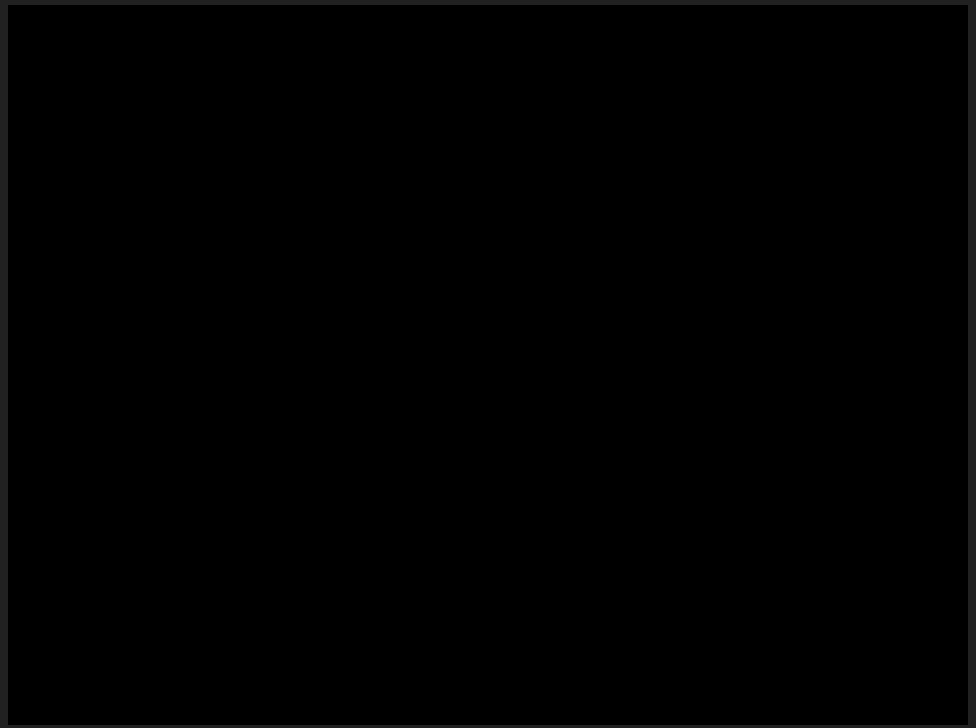
Testing Procedure:

Test Number	Observations	Future Steps	Successful?
1	Volts:12.5 Amps:4-5 Bright Weather Energy was easily collected	Attach power to drone	Yes

Payload Test-5/8/17



Wireless Charging Test-5/10/17



Wireless Charging Test-5/10/17

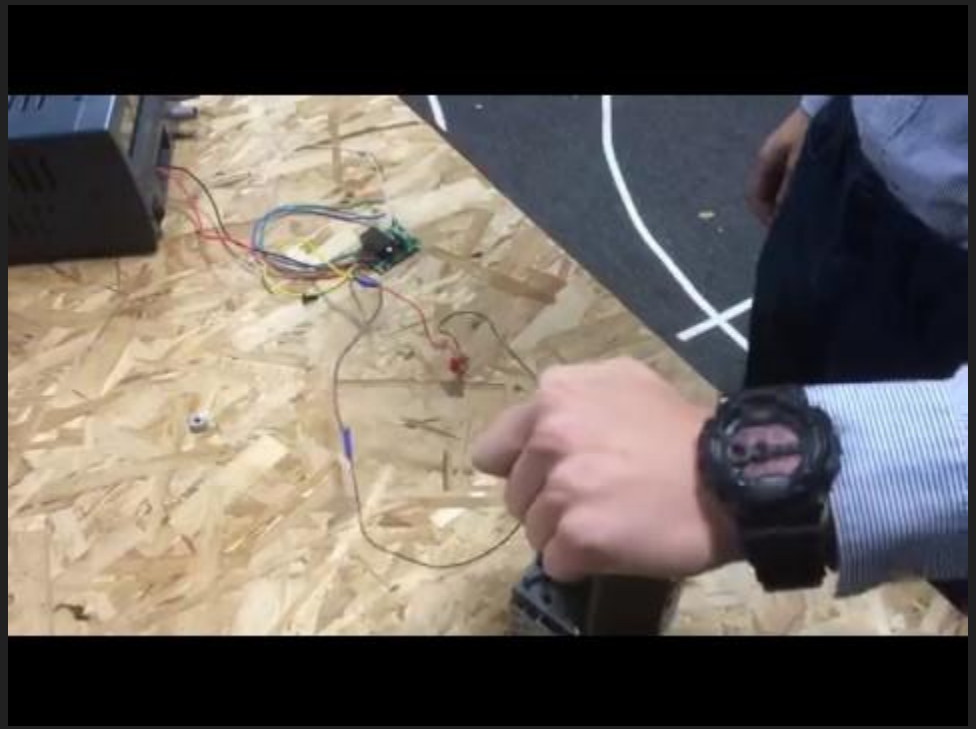
Wireless Charging Test

Testing Procedure: Wireless Charger can charge Drone Battery within one day

Test Number	Observations	Successful?
1	Volts: 12 V Max. Distance before power loss: 5 mm Magnet was very strong when receiver transmitter were close	Yes, Wireless Transmitter/ Receiver worked and could transfer current

Payload Test (Integration Test)

Payload Test-5/15/17



Drone Flying Test

Testing Procedure: Drone is able to fly ½ mile without any problems.

Test Number	Observations	Future Steps	Successful?
1	Carries 1 lb. well and is able to drop payload with ease	None.	Yes

Full Integrated test

Full Integration Test

- Obtain and attach voltage regulator
- Attach voltage regulator to battery and magnet and test

Drone Flight and Payload Test # 1 - 5/22/17

Documentation

(5/3/2017-WIP)

Day 26-5/8/2017

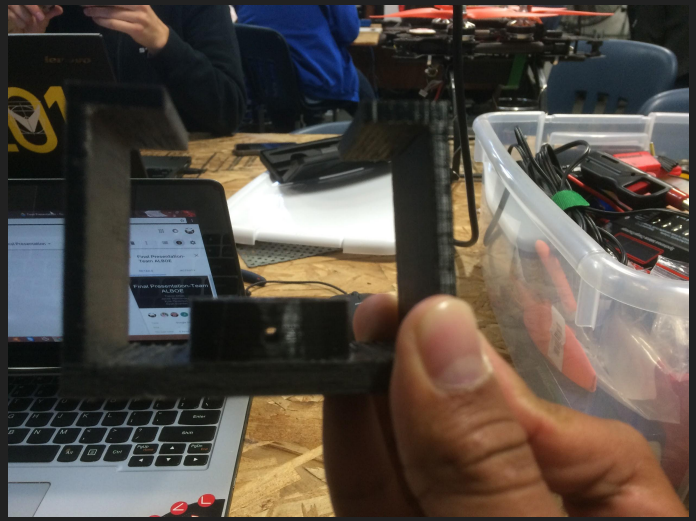


Figure 1.1:3D Printed Electromagnet Holder-Mk 3-Side View

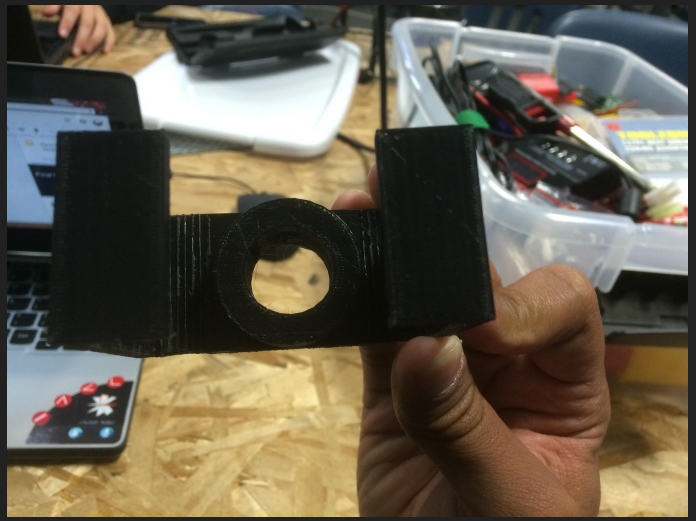


Figure 1.2: 3D-Printed Electromagnet Holder-Mk 3-Top View

Day 26-5/8/2017

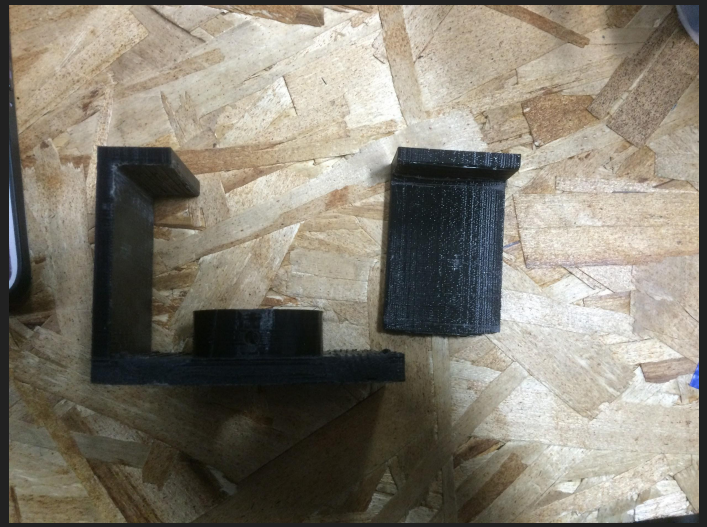


Figure 2.1: 3D-Printed Electromagnet Holder-MK 3-Broken

Day 26-5/8/17

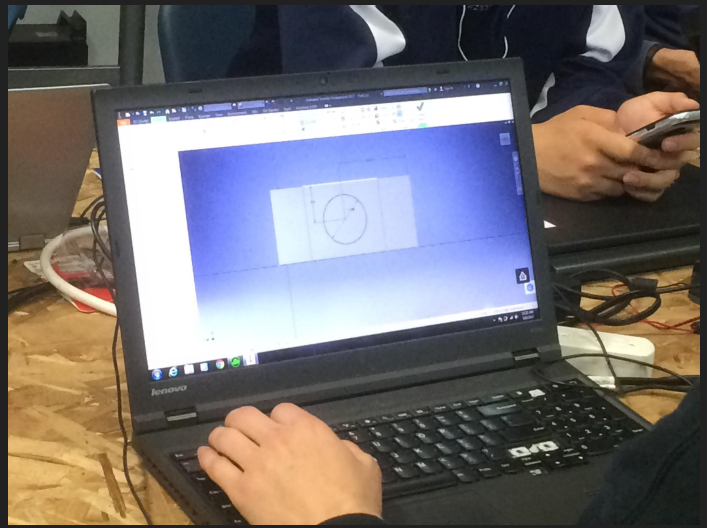


Figure 3.1: Creating new model for Electromagnet carrier-Top View

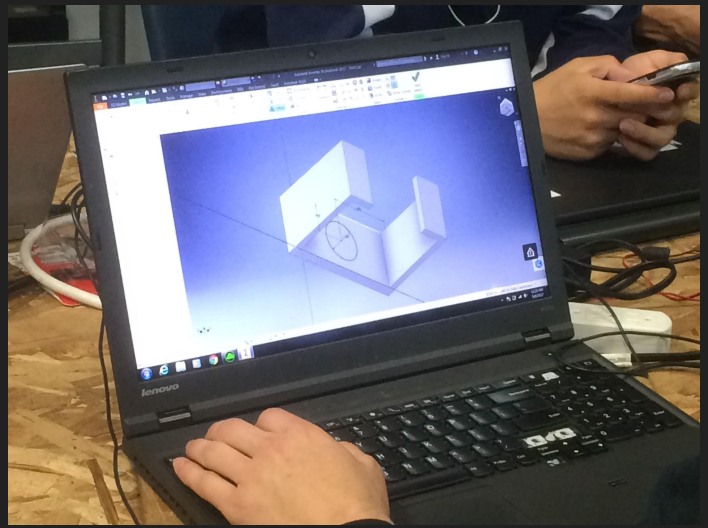


Figure 3.2: New Model for Electromagnet Carrrier-Iso View

Day 27-5/10/17

Figure 4.1: Remote Clicker to turn on/ off electromagnet

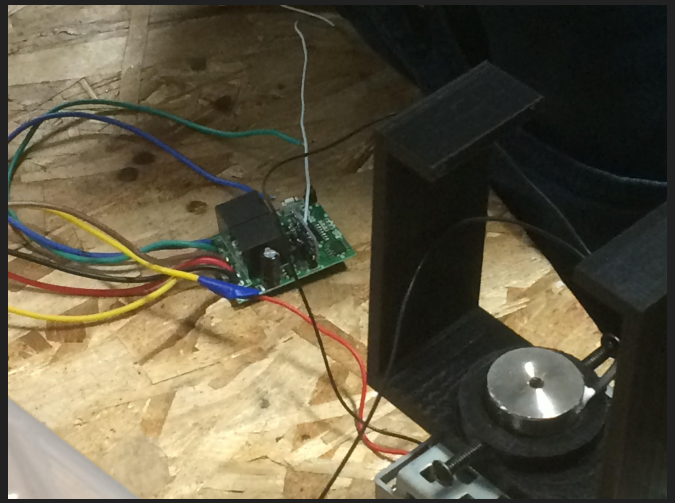


Figure 4.2: Electrical Component to control Electromagnet

Day 28-10/12/2017

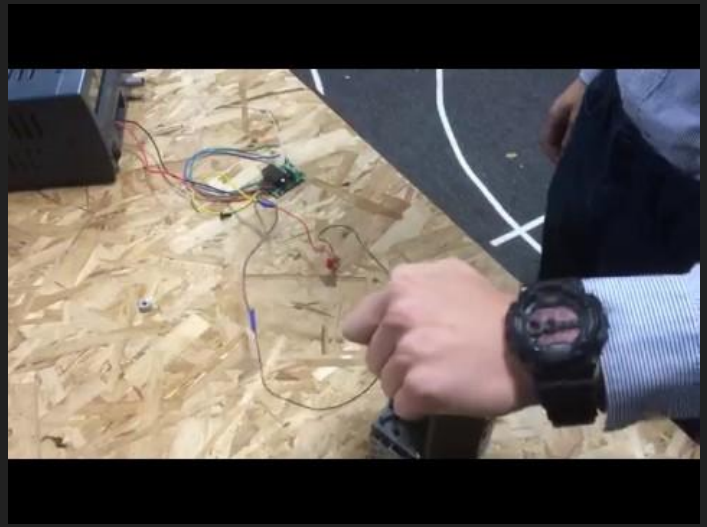


Figure 5.1: Test of Lifting Ability of the Electromagnet

Day 29-5/15/17

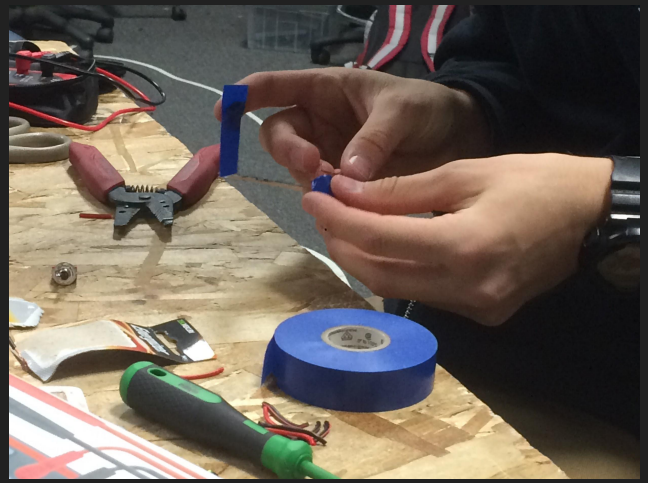


Figure 3.1: Jacob attaching electrical tape to Drone Components

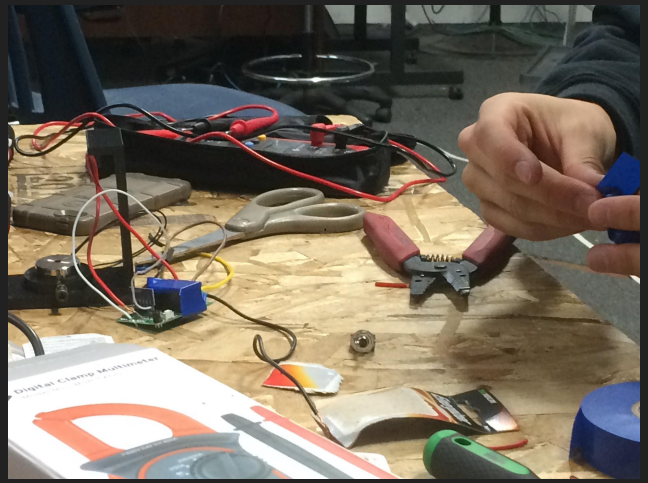


Figure 3.2: Jacob finishing up work on Drone Component

Day 30-5/17/2017

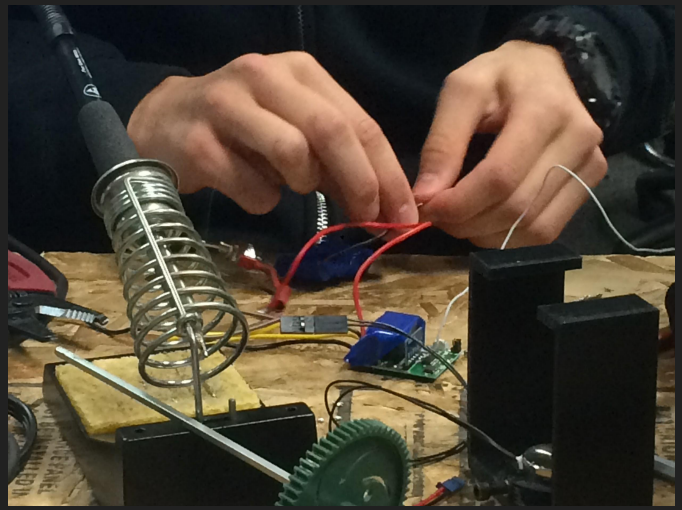


Figure 4.1: Jacob soldering on stronger gauge wires to boost Converter

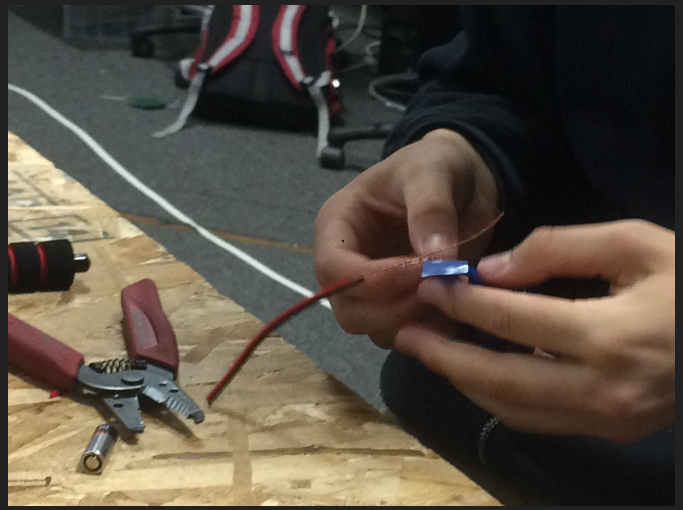


Figure 6.2: More soldering for the wires

Day 31-5/19/17

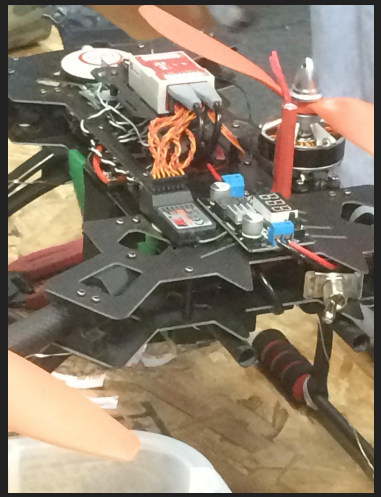


Figure 8.1: Frontal View of Final Drone Build

Figure 8.2: Top Frontal View of the Drone Build

Day 32-5/22/17

Figure 9.1: Side View of Drone Build

Figure 9.2: Side Top View of Drone Build

Day 33-5/24/17

Figure 10.1: New Electromagnet holder-Front View

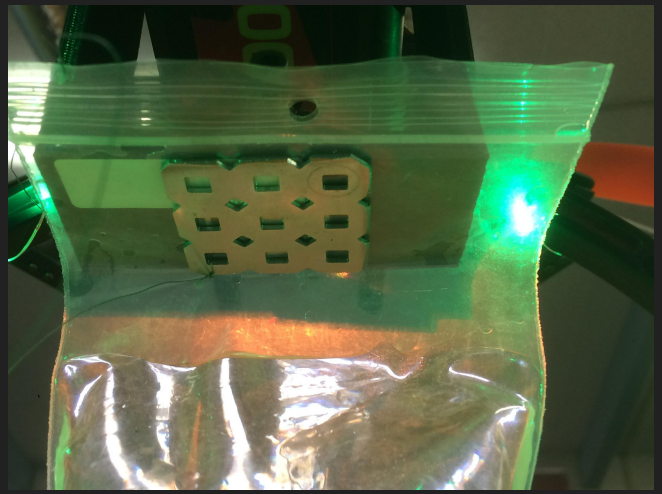


Figure 10.2: New Electromagnet Holder-Bottom View

Requirements Completed

1.The vehicle shall be controlled wirelessly 😊
2.The vehicle shall be able to control and monitor yaw, pitch, and roll 😊
3.The vehicle shall dock to a charging interface 😊
4.The vehicle shall deliver a 1 lb. payload ½ mile away within 3 ft. of its destination 😊
5.The charging station shall utilize clean energy 😊
6.The charging station must charge wirelessly ☹️

Thank You