



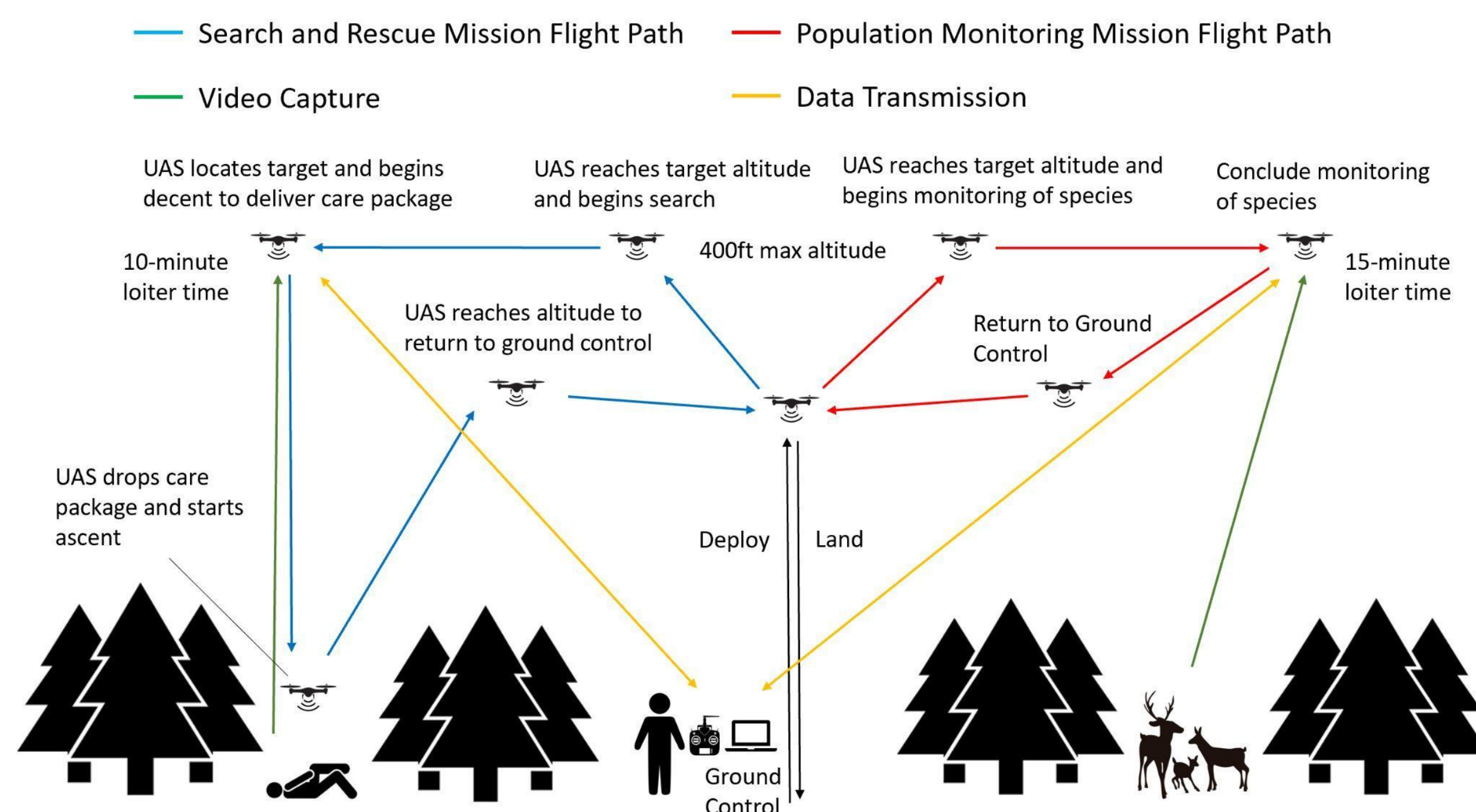
Unnamed_Drone

Aerospace Engineering Capstone Senior Design 2021 - 2022
SpeedTapeFTW

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Concept of Operations

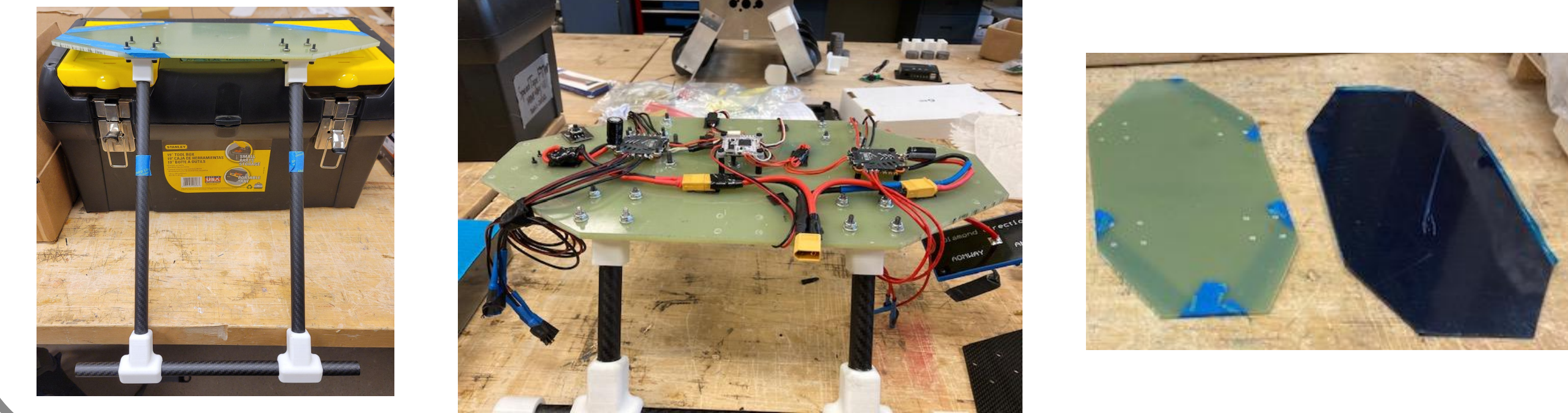


Mission Overview

- Provide a modular UAV capable of performing two missions:
 - Wildlife Observation
 - High quality video feed is recorded and able to be viewed in real-time using a smartphone app
 - Footage can be processed after return of the vehicle
 - First Aid Delivery
 - With the aid of the onboard FPV camera, the target is able to be located
 - First aid in the form of a small, customizable care package is then rendered using the payload deployment system

Manufacturing

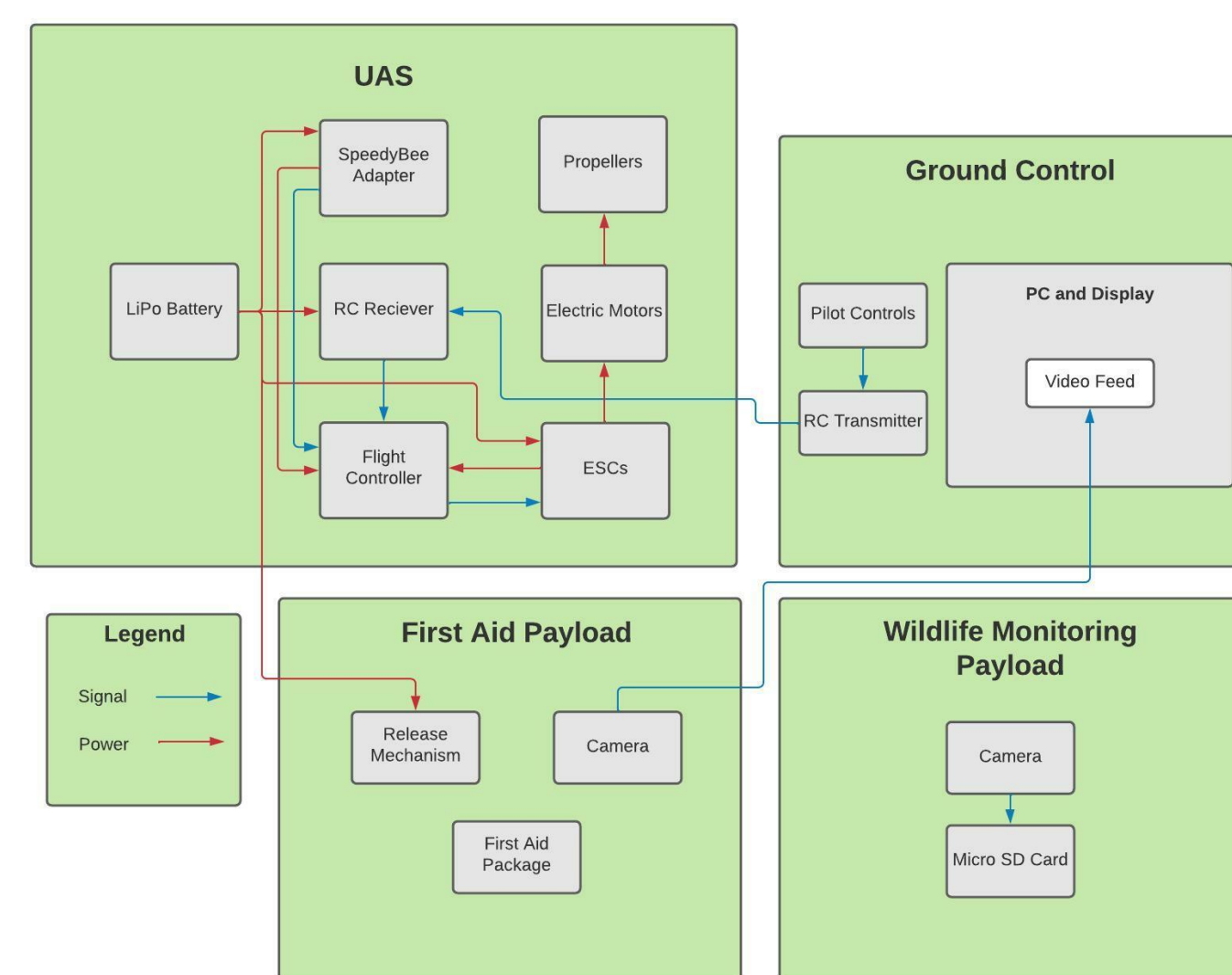
The UAS was manufactured during the months of February and March. The three primary materials used for the UAS were Carbon Fiber, G-10 Garolite, and 3D-printed PLA.



Testing

Test	Objective	Results	Video
Payload Release Structural Test	Test the weight capacity of 3D-printed structure	3D-printed structure was able to hold at least 8.5 lbs	
Iron Bird Test	Test the functionality of the flight system	The motors, ESCs, flight controller, and wiring were fully functional	
Static Thrust Test	Test the thrust capabilities of our multicopter's motors	The thrust:weight ratio was about 3 at full throttle	
Cooling Test	Test the motors had adequate cooling	The motors remained cool throughout the duration of testing	
Dynamic Drop Simulation	Test the strength of the landing gear and airframe	The legs of the landing gear were shorten due to the simulation results	

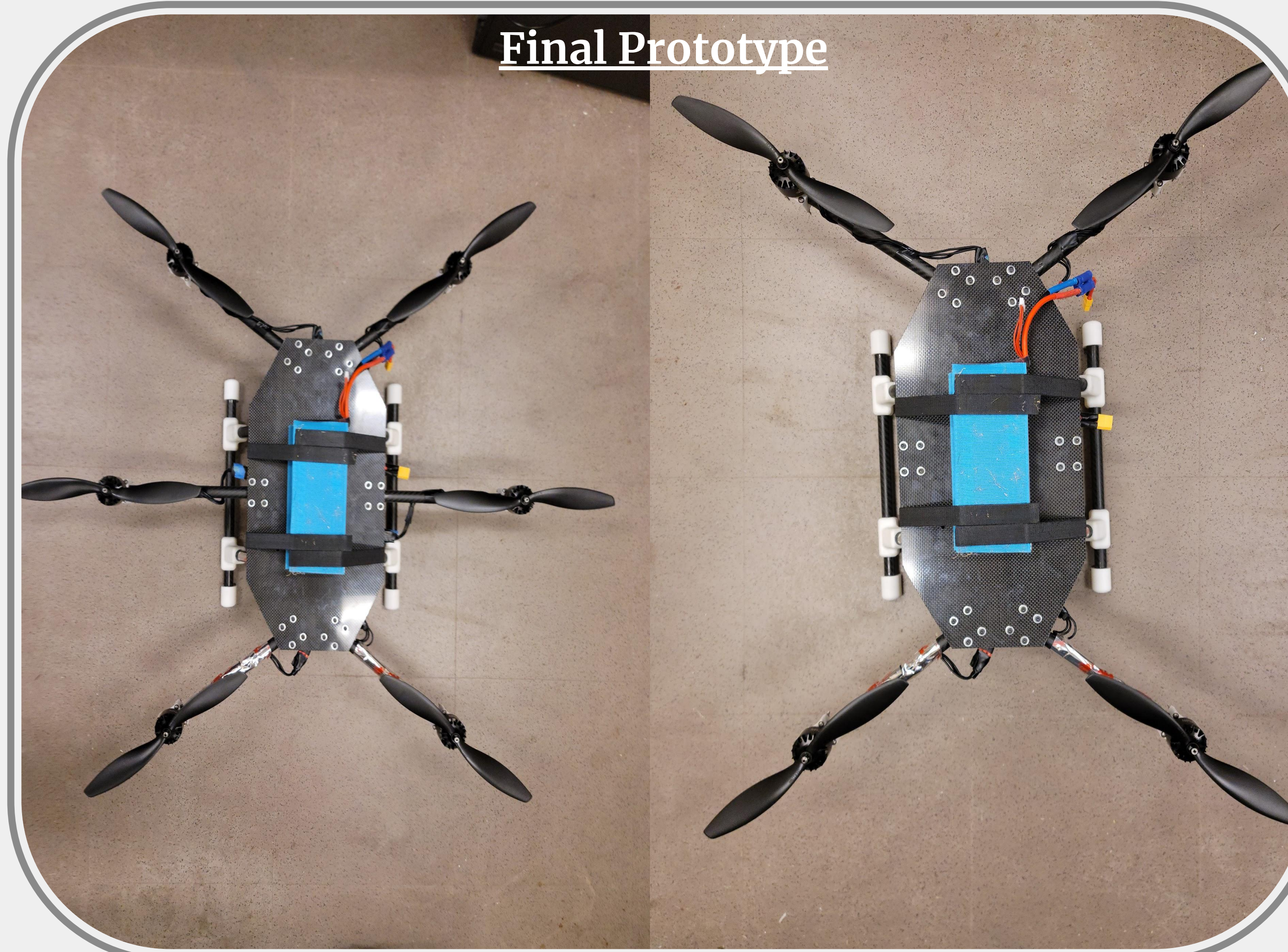
Functional Block Diagram



This figure depicts Unnamed_Drone's various components, power distribution between these components, and the signals sent throughout the system.

*The SpeedyBee Adapter is a separate component which is attached to the vehicle only when grounded. This is used for altering the vehicle's control scheme.

Final Prototype



CAD Renderings



6-Rotor Configuration (First Aid Delivery)

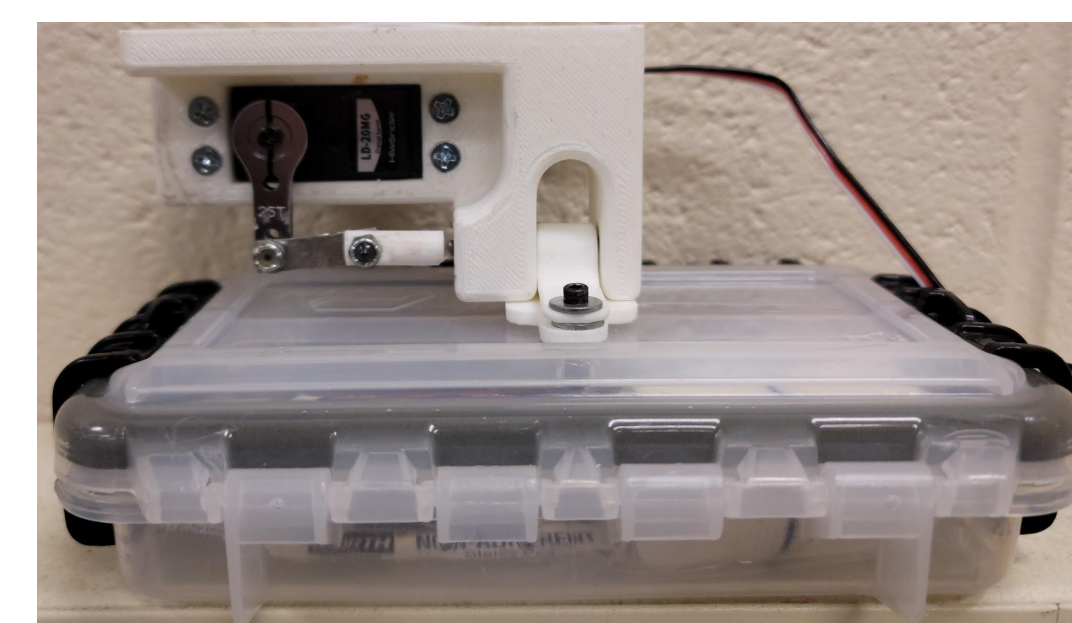


4-Rotor Configuration (Wildlife Observation)

Payload Overview

First Aid Payload Release

- Servo and linkage retract pin and release package



Wildlife Observation Camera

- 4k Camera capable of 30 fps footage



The payload system is easily swapped using the same bolt holes and hardware for each payload option

Unnamed_Drone Flight Test



SpeedTapeFTW

