

# Team AIRWARY UAS

Aerospace Engineering Capstone Senior Design 2022 - 2023

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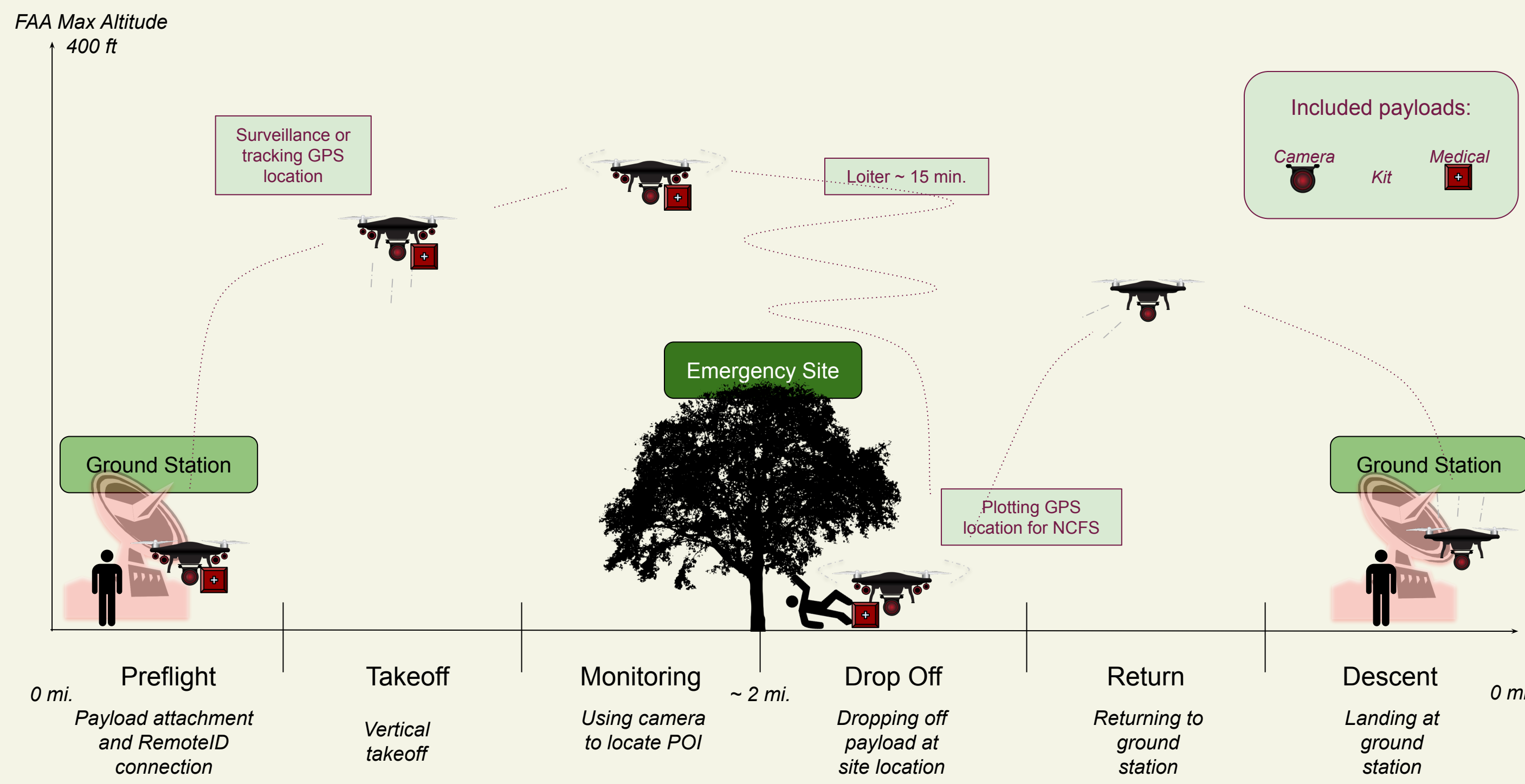
**Team Members:** Carter Hawkins, Will Hitchcock, Pedro Mattos, Ruthvik Pedibhotla, Stephen Sabo, Hunter Valentine

**Sponsor:** Engineering Trust Fund

**Customers:** Tom Freeman, Kevin Gitushi, Michael Hughes



## Concept of Operations



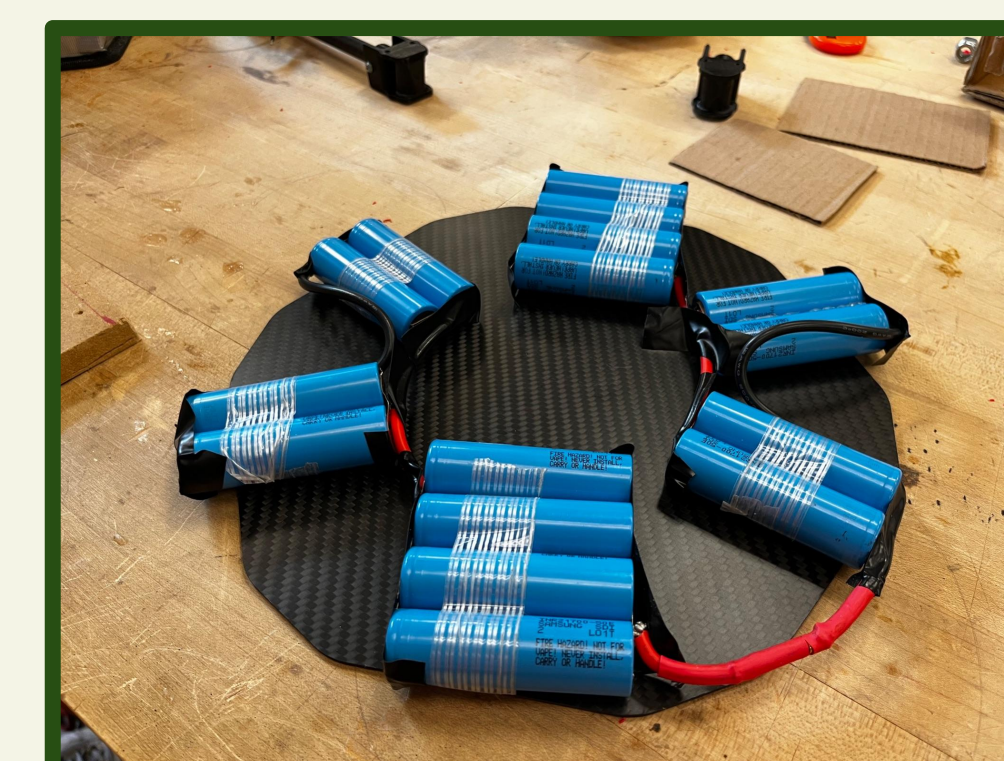
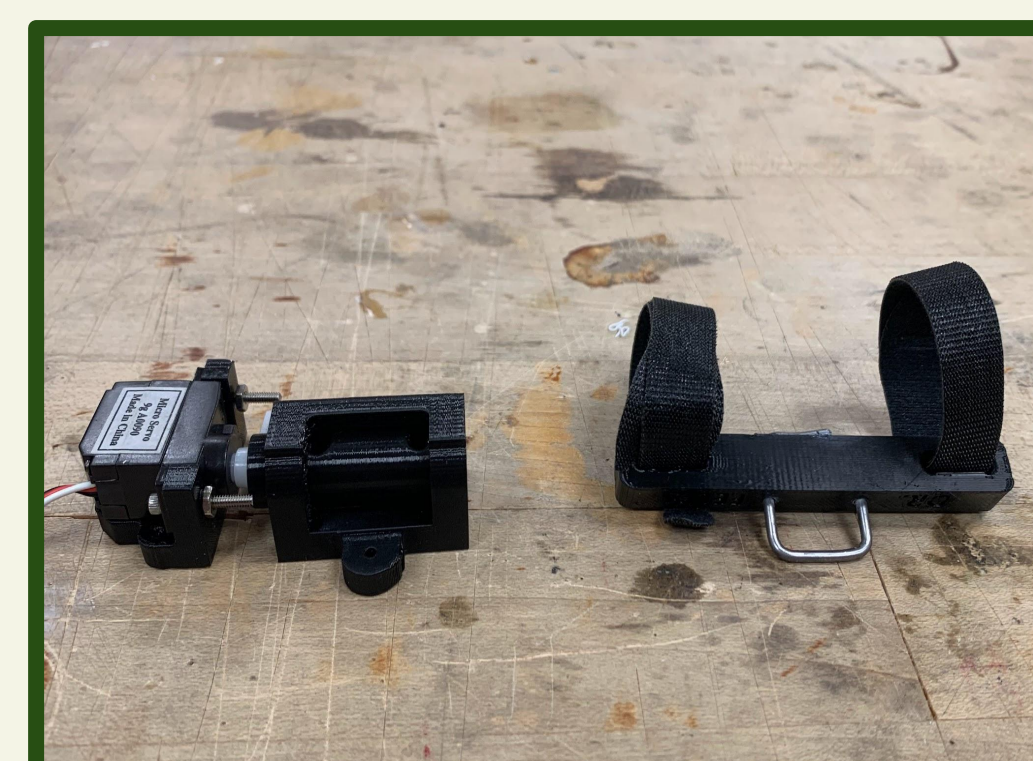
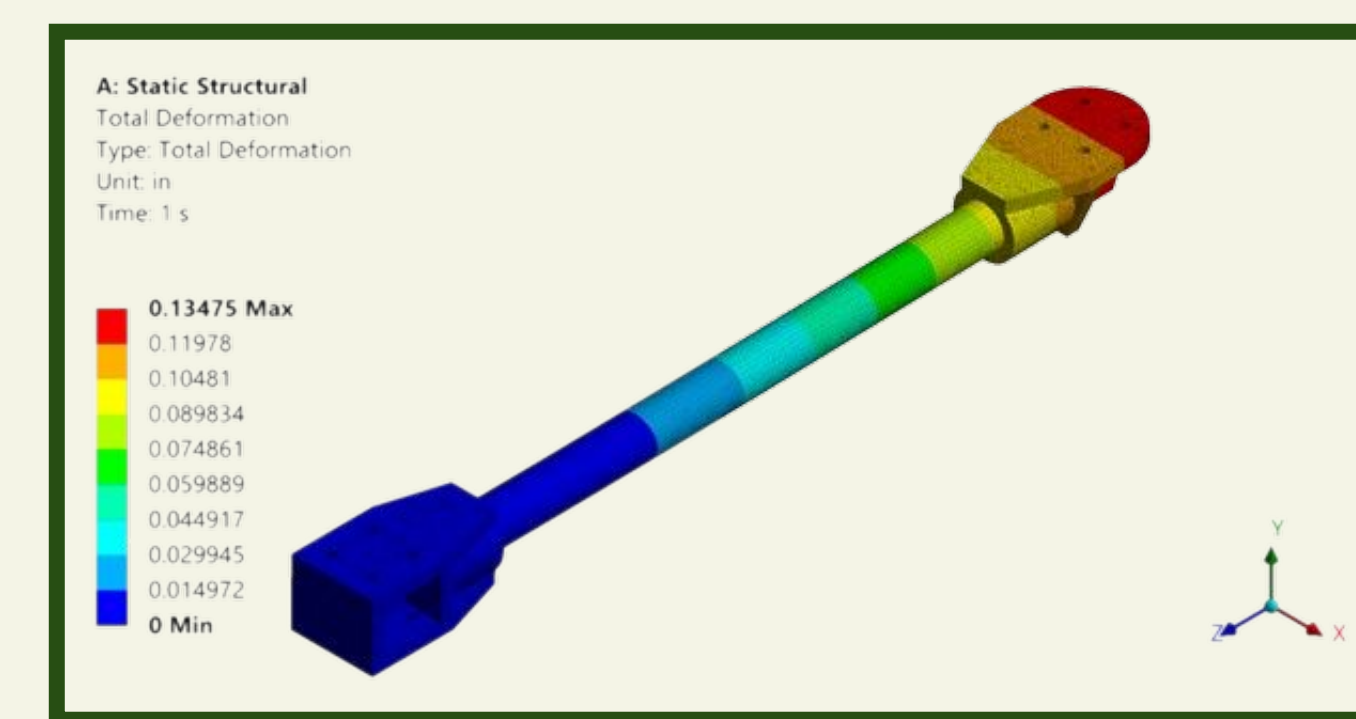
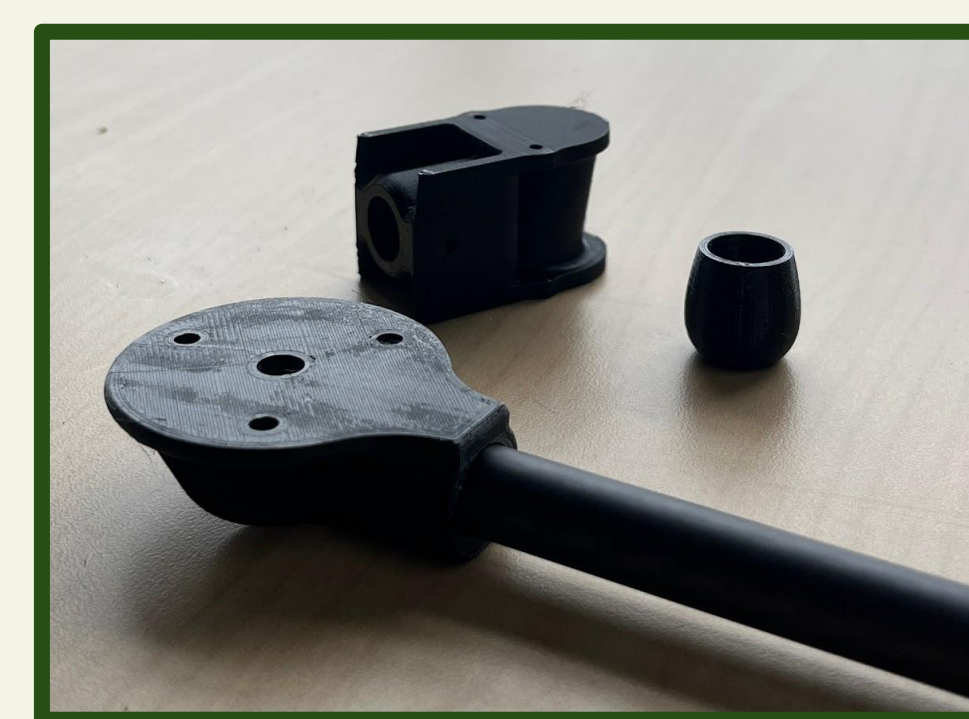
## Project Overview

**Mission Statement:** Team AIRWARY will develop a cost-effective, high range hexacopter capable of aiding in emergency response by providing first aid and surveillance capabilities in hard to reach areas.

**Need Statement:** The North Carolina Forest Service (NCFS) is in need of a cost-effective UAS that supports search and rescue safety efforts.

## Manufacturing

- Manufacturing took place from January to early March
- 3D printed mounts optimize weight & strength to maximize mission length and durability
- Strength testing of mounts verified max load on arms

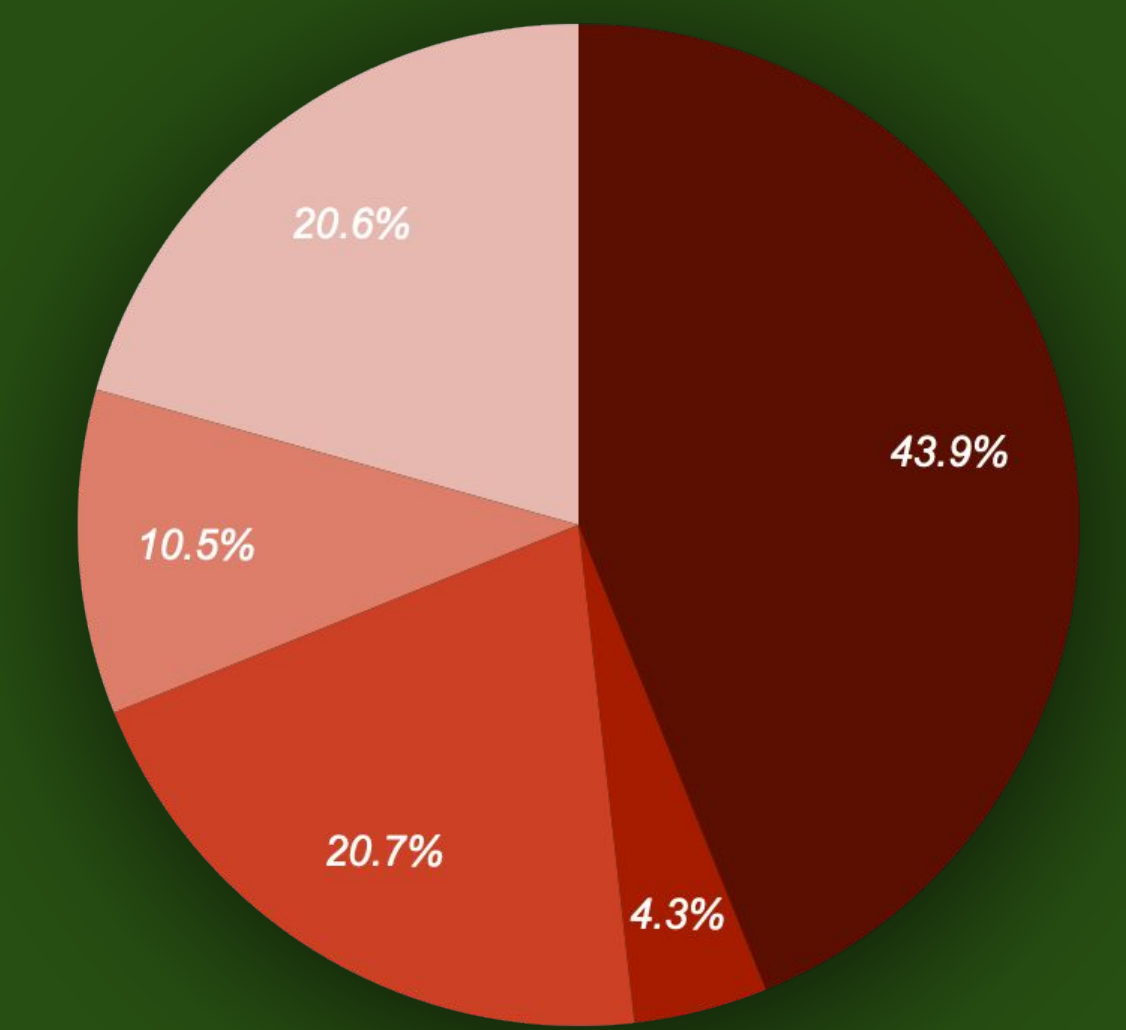


- The battery was designed for long-endurance flight opting for custom-made lithium-ion over lithium polymer
- The battery pack was spot-welded and protected using a battery management system allowing for high modularity

- Custom 3D-printed servo latch mechanism allows for payload release capabilities within 1U Cubesat Standards

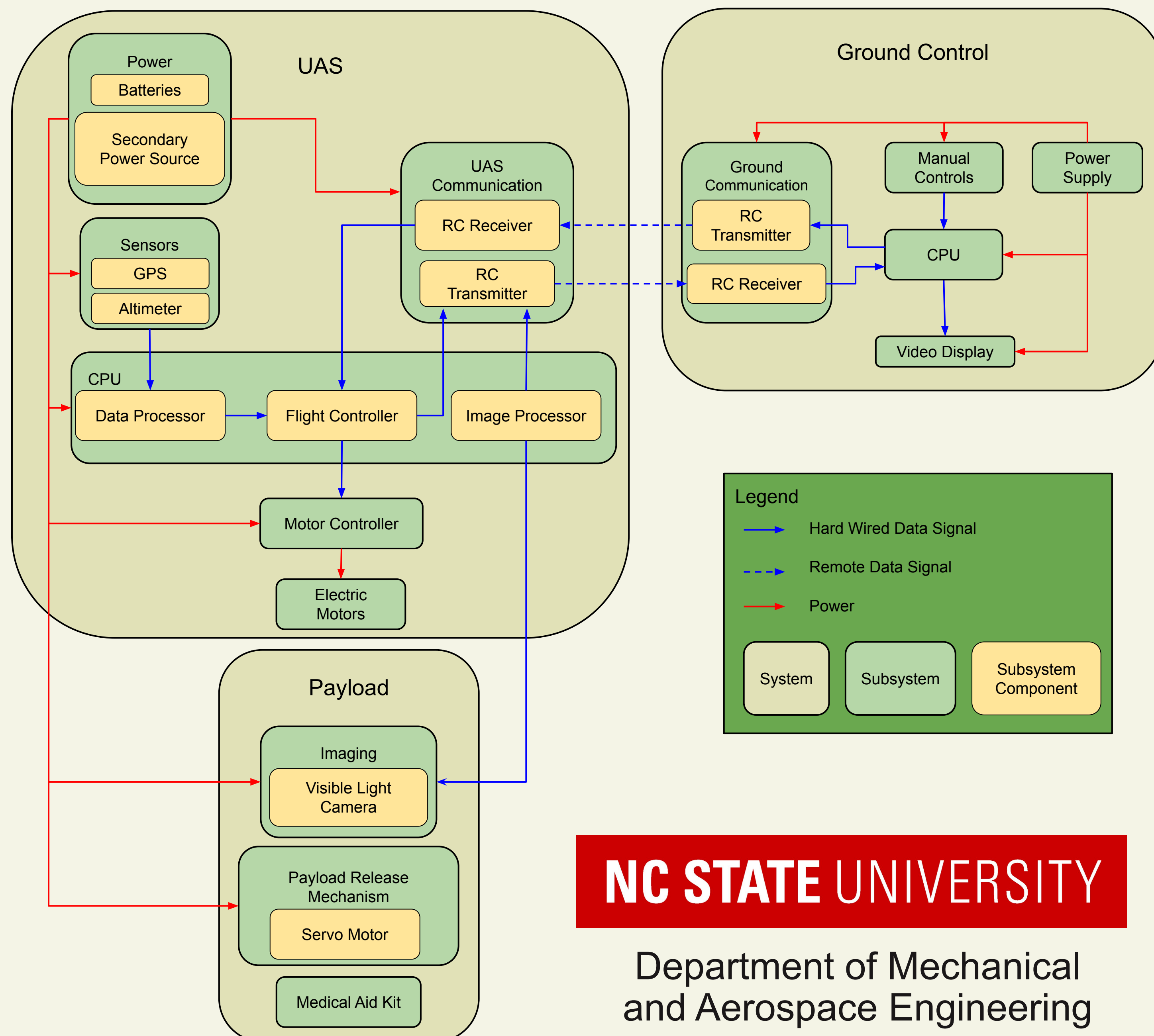
## Unit Cost Breakdown

Subsystem	Cost
Propulsion	\$314.37
Payload	\$30.94
Structures	\$148.05
Avionics	\$74.99
Power	\$147.83
<b>Total</b>	<b>\$716.18</b>



## Functional Block Diagram

- The mission is made up of three main systems: the UAS, the ground control, and the payload
- The UAS will be controlled by a pilot with power and data signals as traveling as shown below



**NC STATE UNIVERSITY**

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## Final Prototype



Height	7.5"
Diameter	23"
All-Up Weight	6.40 lbs

## Flight Testing

- February 28: First hover and basic maneuvering demo
- March 24: Mission successful flight test at Mid-Pines Farm
- April 3: Full endurance test, 32 minutes of safe flight time

