

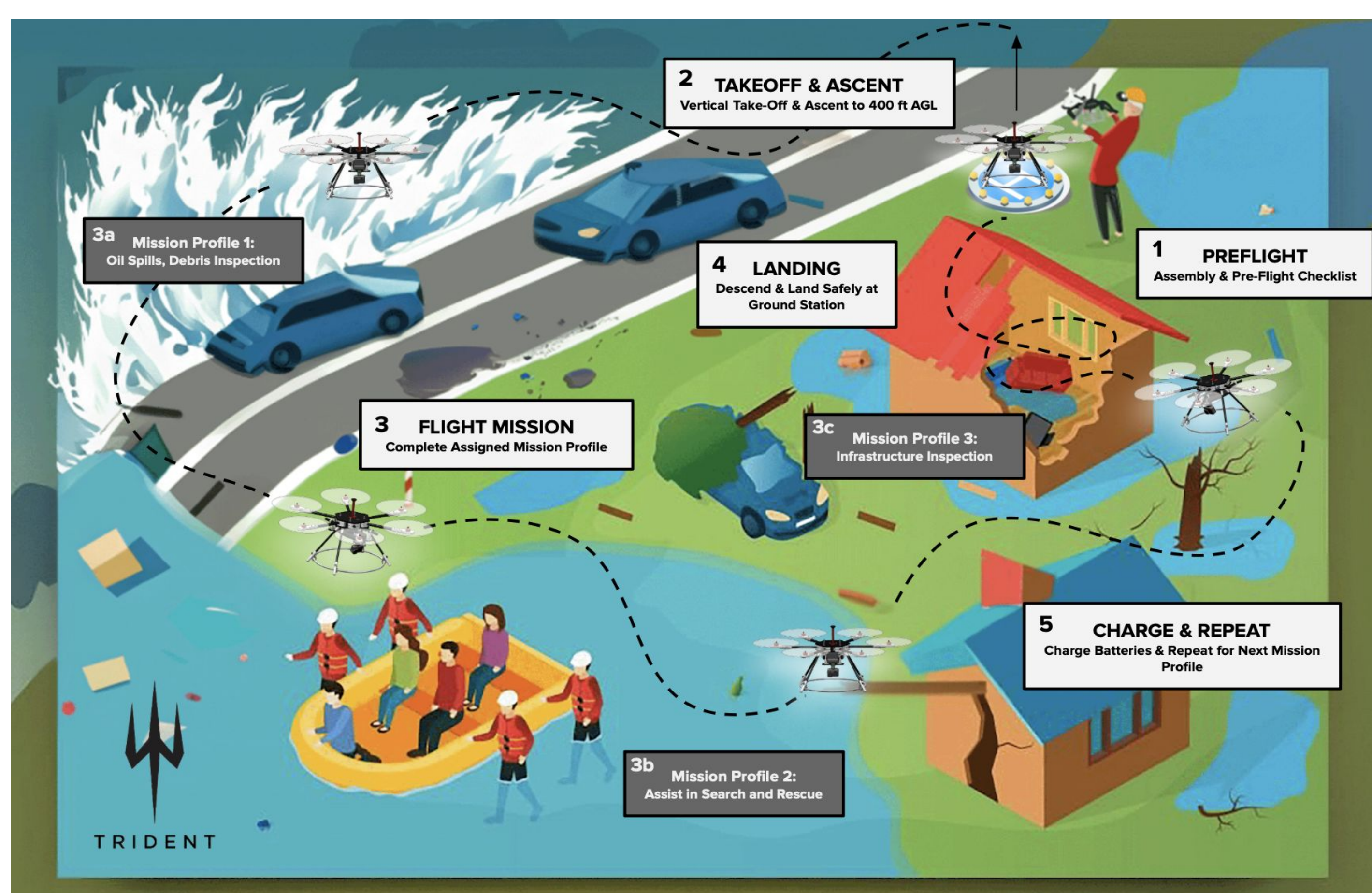
# TRIDENT's Poseidon

*Triple Response for Identification of Damages and Expedited Neutralization of Tragedy*  
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## Project Description

**Purpose:** Design a multi-rotor flight vehicle to assist with natural disaster and hurricane response and mitigation  
**Mission Statement:** "In order to meet the natural disaster and hurricane response goals, our team proposes a multi-rotor vehicle, *Poseidon*, to utilize computer vision, adaptive control, and a novel recharging to maximize effectiveness in assisting the public in three phases"

## Concept of Operations



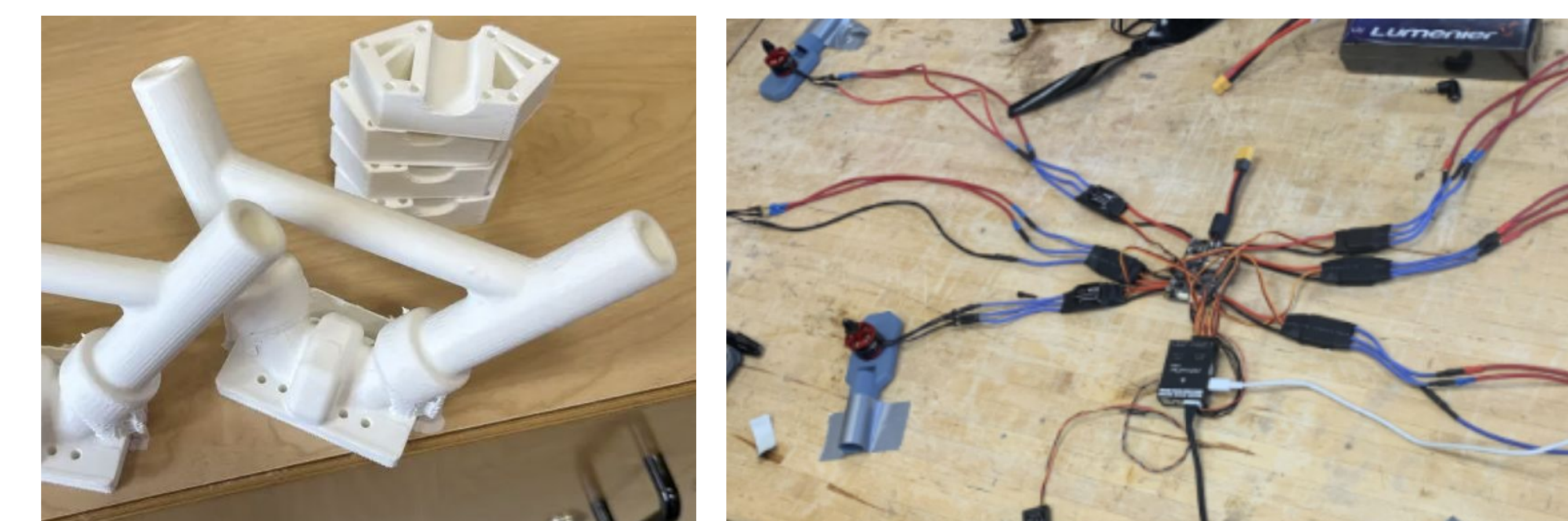
## Design Solution



- Poseidon is a hex-rotor aerial vehicle, equipped with an on-board camera fitted with our computer vision software, an ultrasonic anemometer, and a novel landing gear system capable of hands off recharging.
- The electrical system of Poseidon is comprised of 30 amp ESCs, 920 kv BLDC motors, a Raspberry Pi, and a Pixhawk 6c mini flight computer. All electrical components powered by a 12000 mAh LiPo battery.

## Physical Tests

- Thrust Capability:
  - Max single motor: 2.67 lbs
- Iron Bird:
  - Ensured operational nervous sys.
- Drop Test:
  - Introduced new landing gear

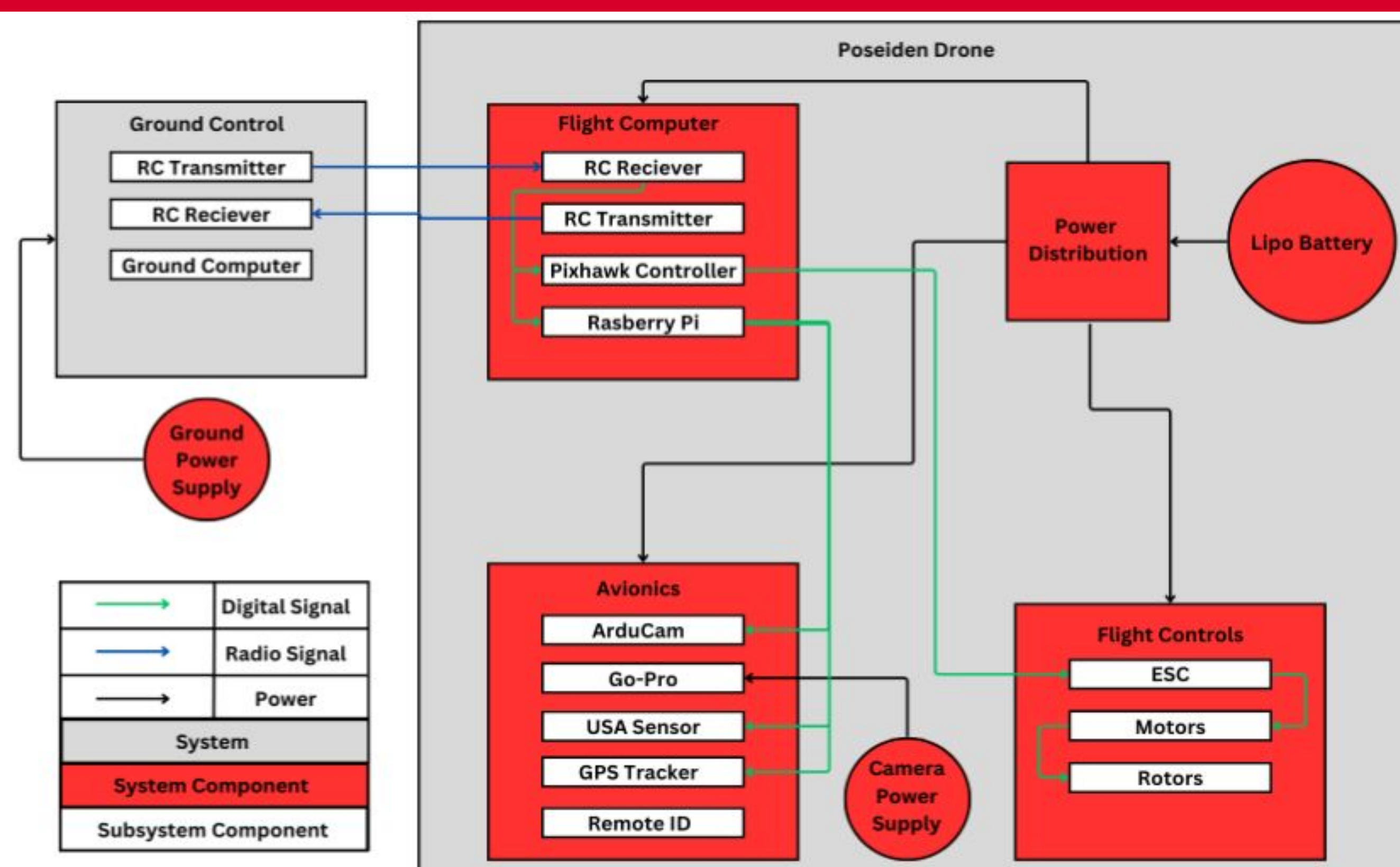


## Realization

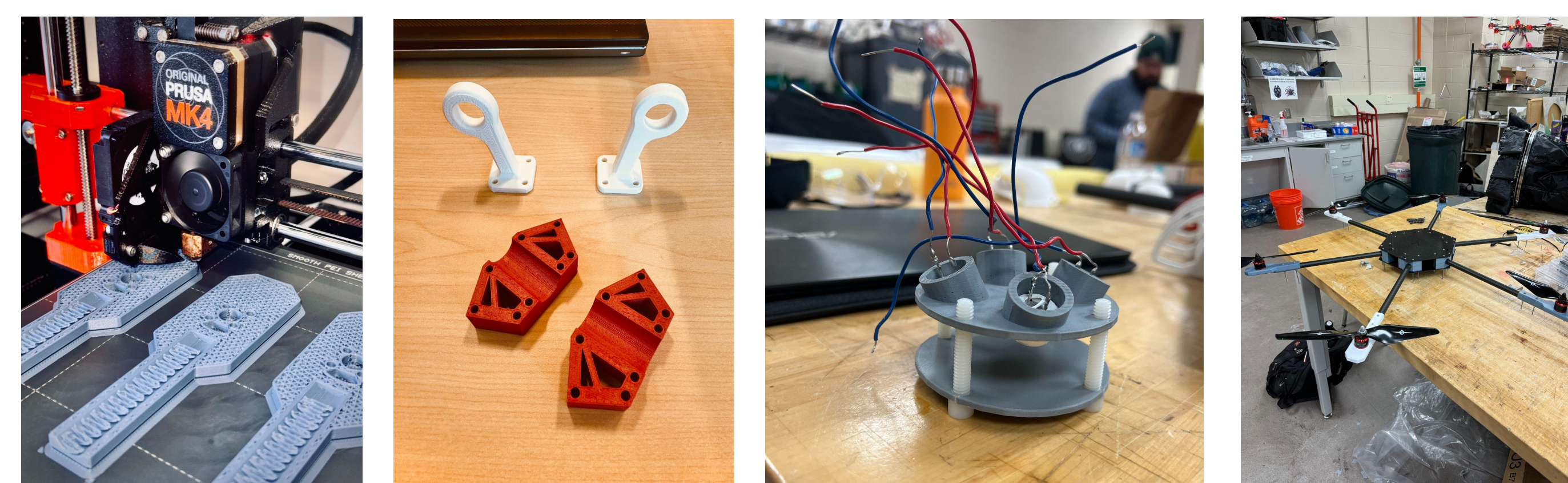
- Computer Vision Integration: Utilizes OpenCV, YOLOv8 and RoboFlow for real-time detection of specific colored landing platforms.
- Optical Odometry: Enhances motion tracking and spatial awareness using visual data. 3D pose estimation.
- IoT and 4G LTE Compatibility: Enables remote operation from a phone as well as live streaming capabilities
- Autonomous Landing: Empowers Poseidon to autonomously navigate and land on preselected colored targets.
- Controlled Flight: Utilizes the Pixhawk flight computer along with motor calibration for stable flight that is repeatable.



## Functional Block Diagram



## Manufacturing



- The physical body of Poseidon is comprised of carbon fiber on all high loading areas, and 3D printed components for any mounts or connections.
- The carbon fiber components were manufactured in the MAE senior design labs and the MAE machine shop. 3D printed components were manufactured in the NCSU E-garage.