

M1.03 - Airogistic

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Project Purpose

The purpose of this project is to use innovative technology to advance the future of air traffic for unmanned aerial vehicles (UAVs). UAVs are growing in demand, while the market for these items is exponentially growing. The use of UAVs can range from gathering information for disaster management to geographic mapping of areas that are inaccessible by human contact, and it does not stop there. We plan to help facilitate the designing, building, standardization, and automation of UAVs to allow for commercial and personal use applications.



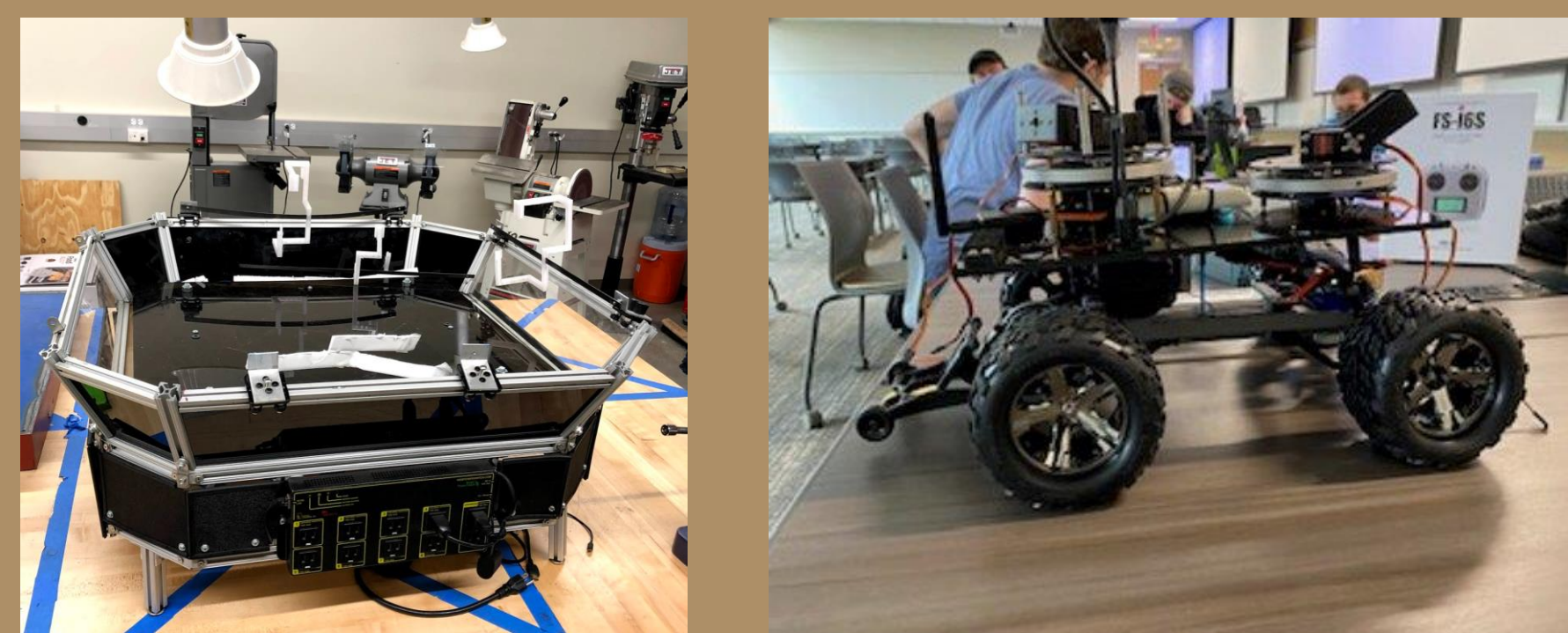
Problem Statement

Landing Pad

When a drone is ready for flight, there needs to be sufficient pre-flight diagnostics in place to ensure the drone will not fail while in the air. Since drones are autonomous, there must also be an autonomous way of taking sensor readings.

Rover

The current state of the drone retrieval process requires a person to retrieve the drones should a crash occur. The solution would be to have a drone retrieving rover. The rover would have to be fully automated in order to cut out the person control aspect.



Customer Requirements

Landing Pad

- Temperature sensor actuator must retract upon loss of power and be able to account for XY position variations
- Manual force sensor coupling must be able to withstand 3.7 N of force and variable XY positions

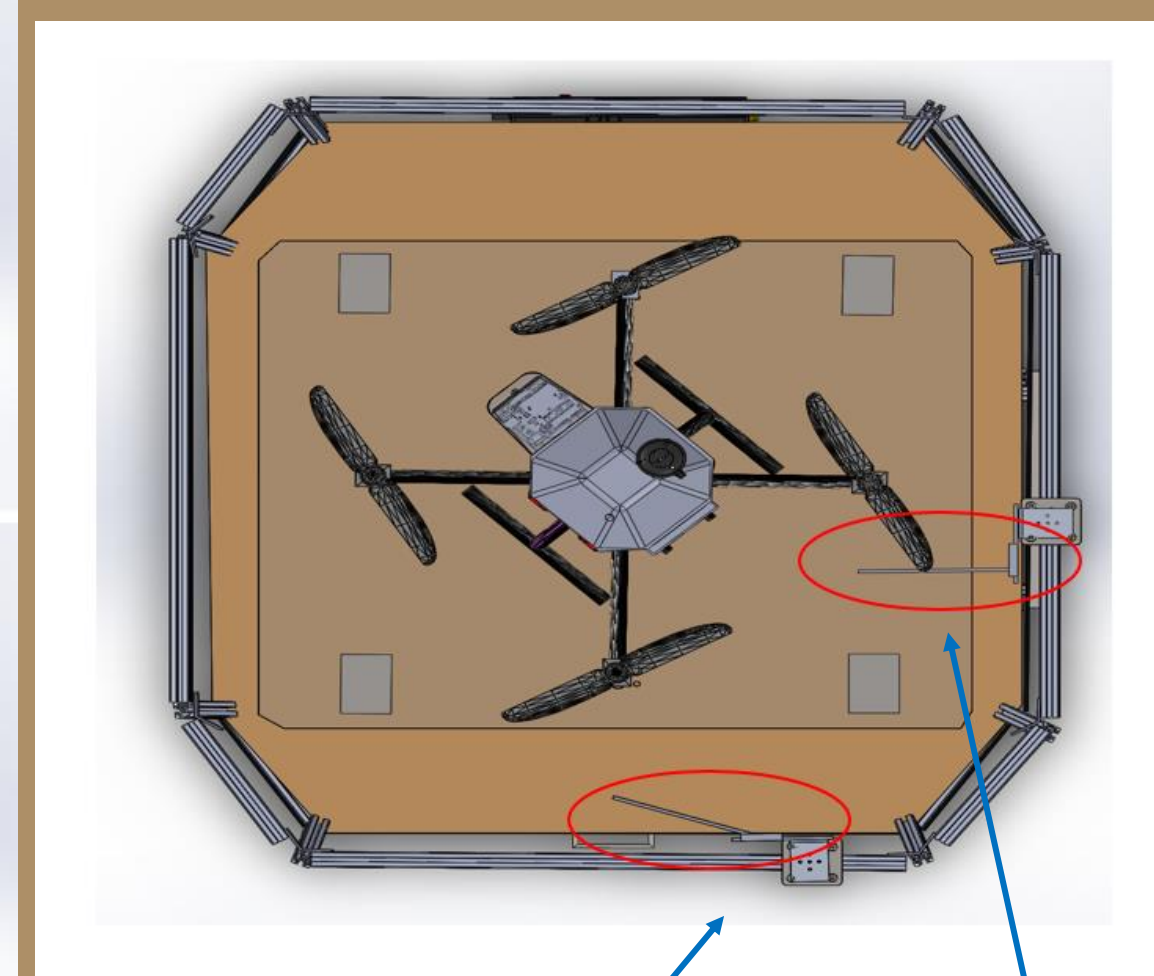
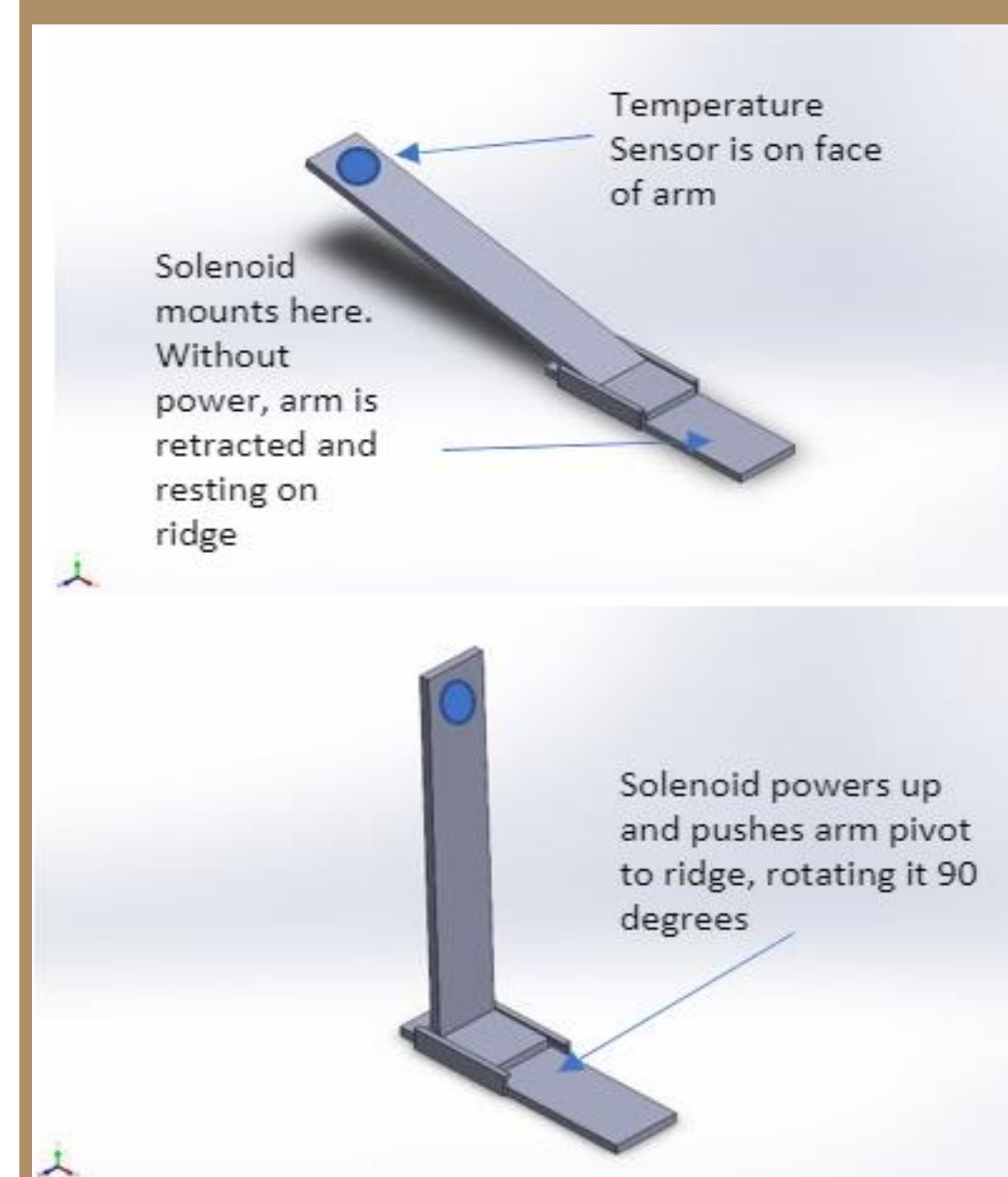
Rover

- Be able to carry the weight of all its components, be leveled, and be able to retrieve the drone and return it to its operator.

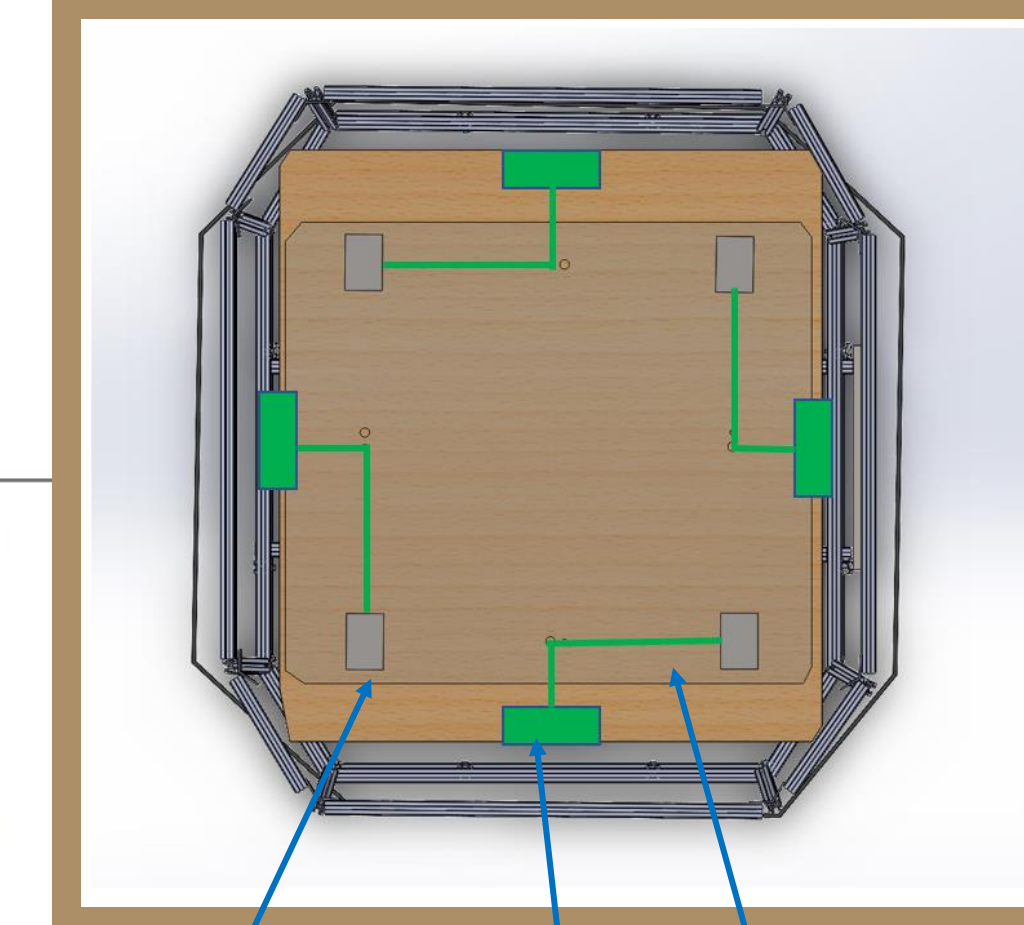
Pre-Flight Diagnostic Landing Pad

The pre-flight diagnostics for the drone landing pad including information gathered from various sensors

Temperature Sensor Actuator
measure motor heat during operation

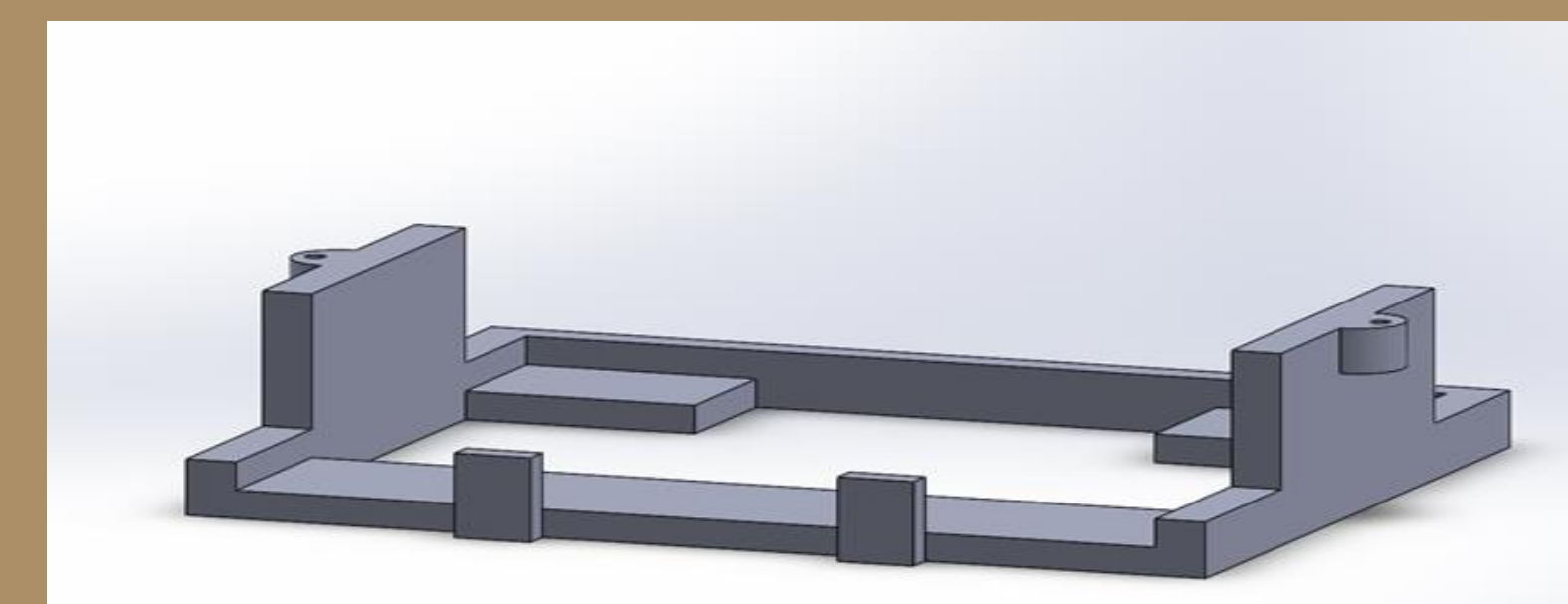
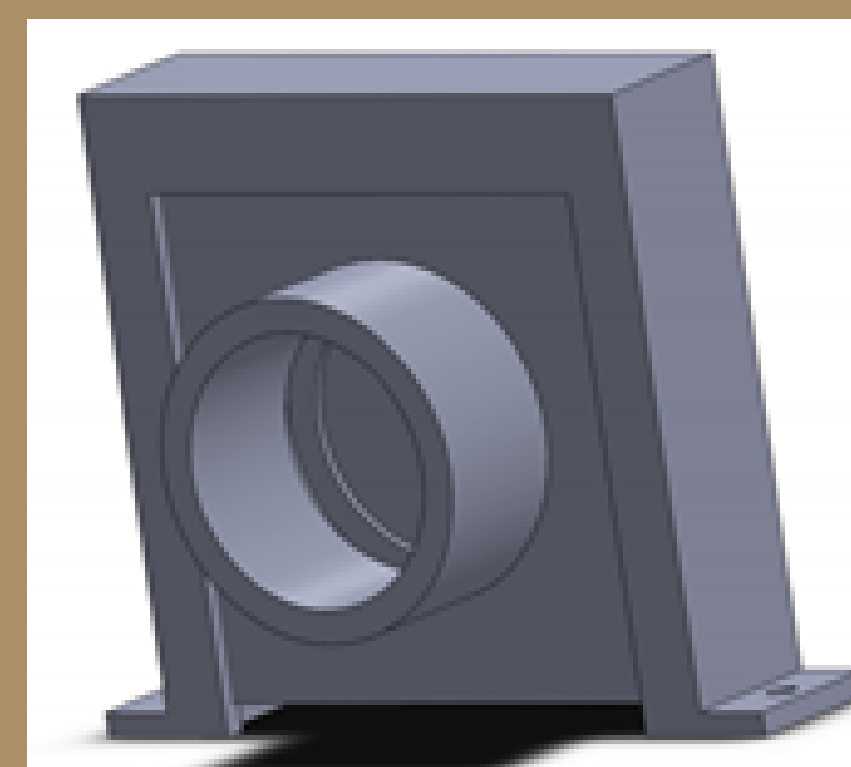
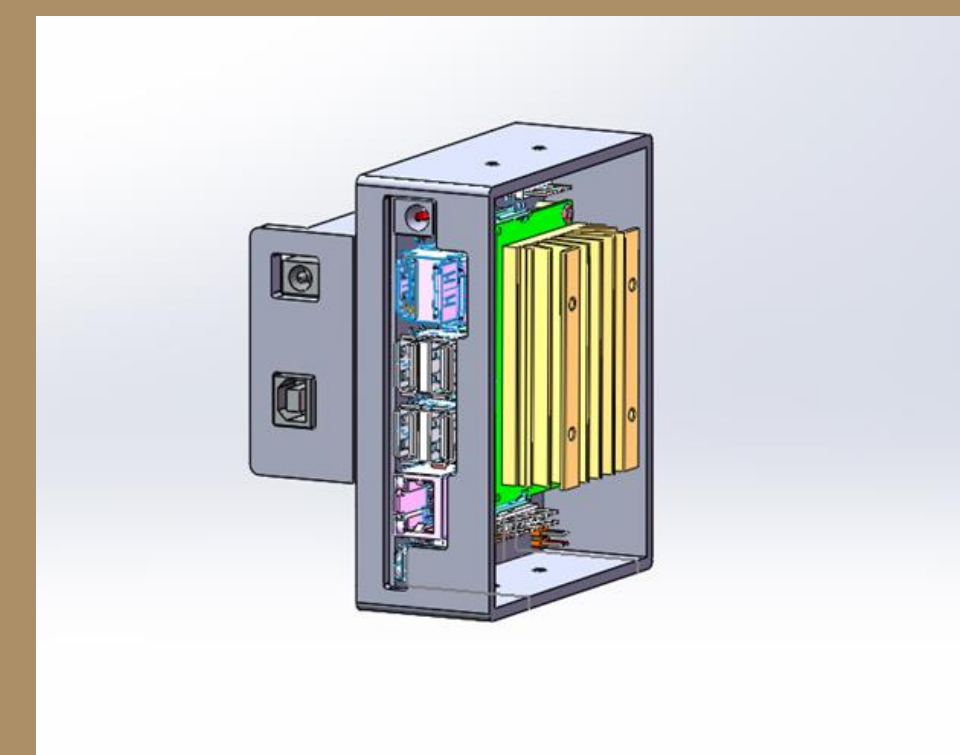


Force Sensor Coupling
measure the lift each motor provides through tension



Extended sensor arm reads motor from underneath propeller

Drone Recovery Rover



Future Plans

- Automation of drone recovery
- Fabricate racer drone cage
- Reduce footprint of the sensor arm
- Automate and improve pivot motion of sensor arm
- Automation of force sensor coupling
- Geometric and mathematical models
- Material selection
- Prototyping
- Testing

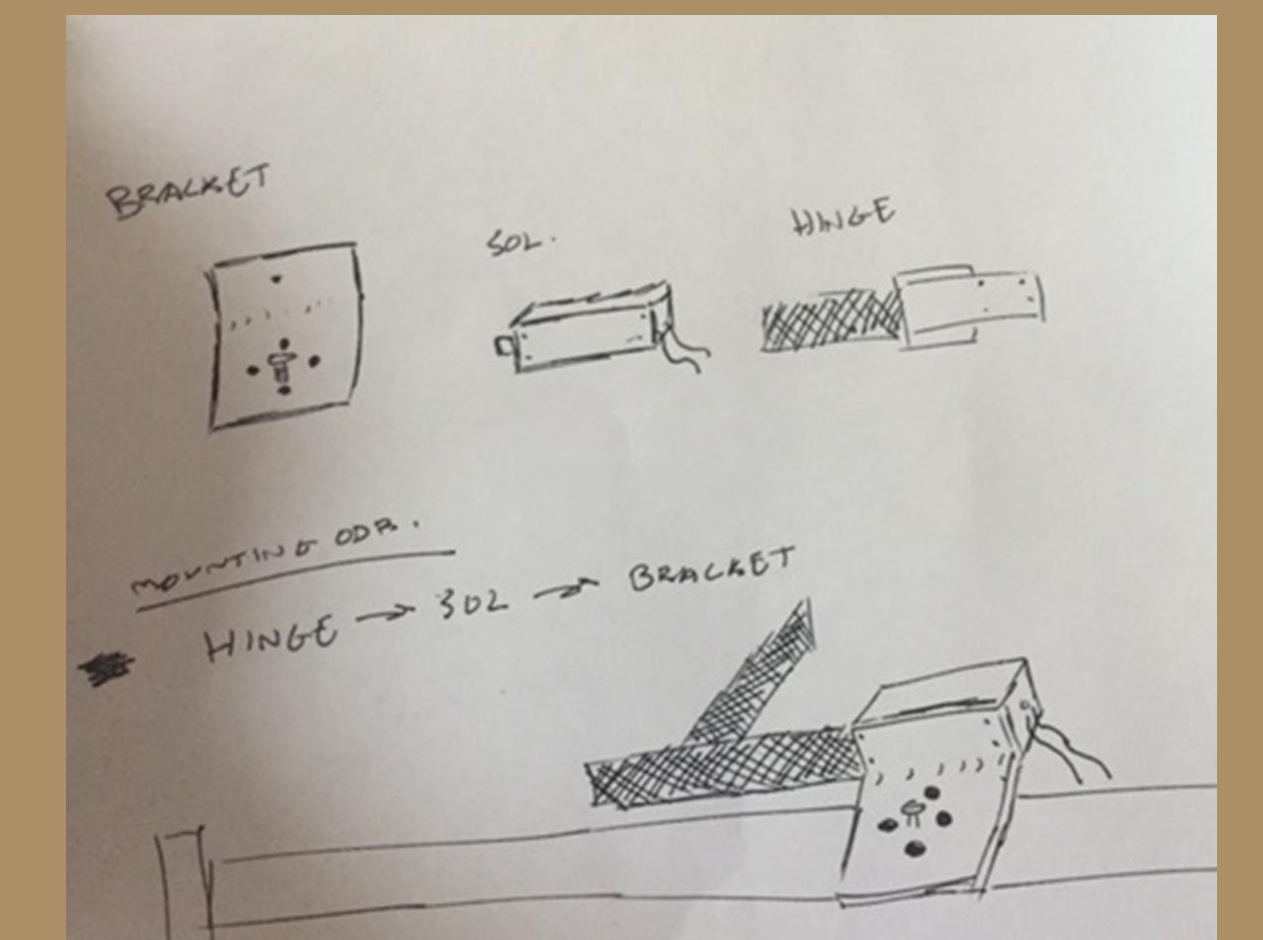


Photo: www.drone-cage.co.uk

Team Members



Left to right: Jordan Smesny, Katherine Ausanka, James Smetzer, Victor Ekwuribe

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