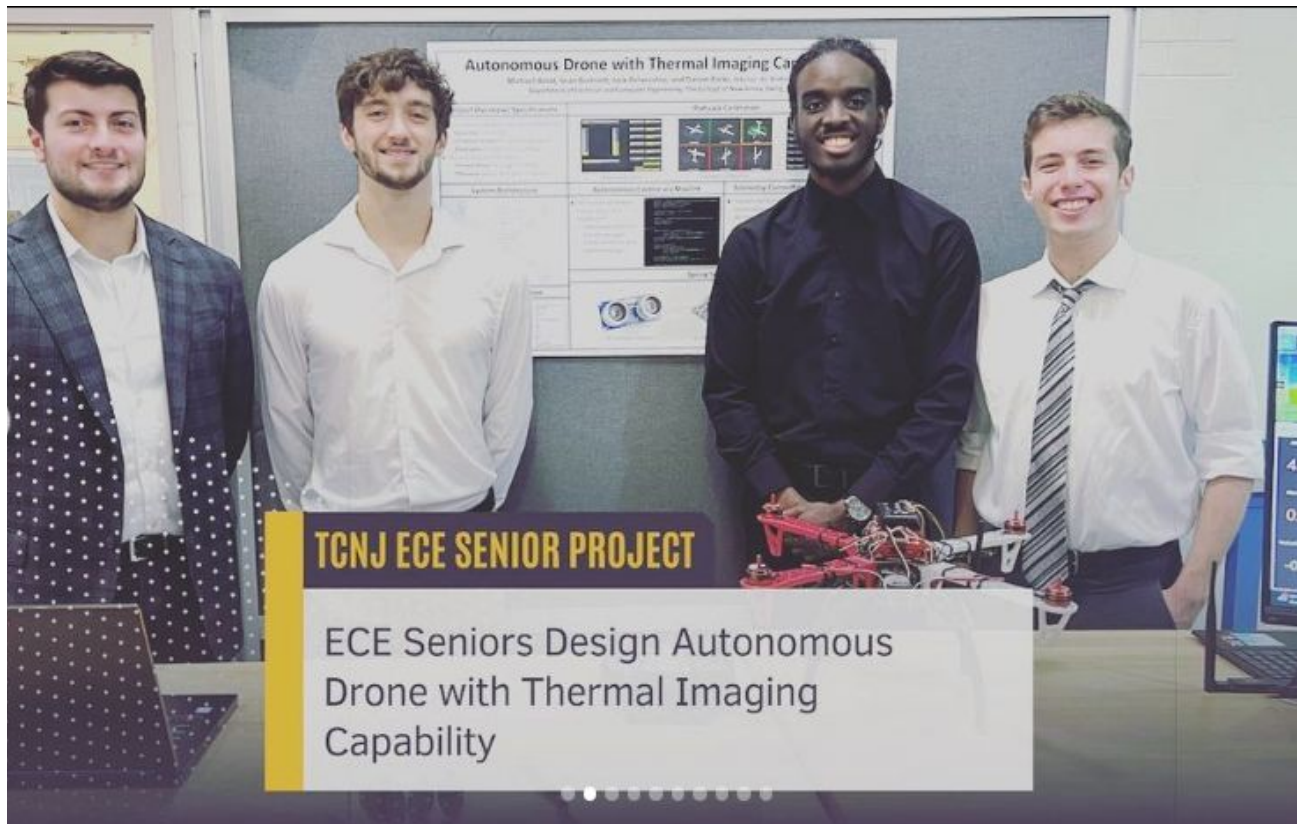


Autonomous Drone with Thermal Imaging Capabilities



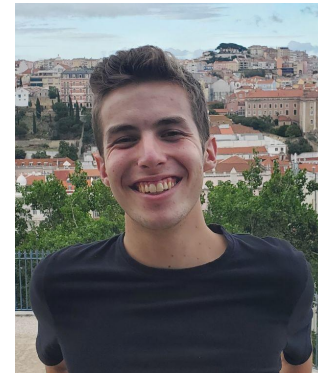
Spring Semester 2023

Advisor: Dr. Deese

Team Members



Sean Burtnett



Michael Bond



Jack Delvecchio

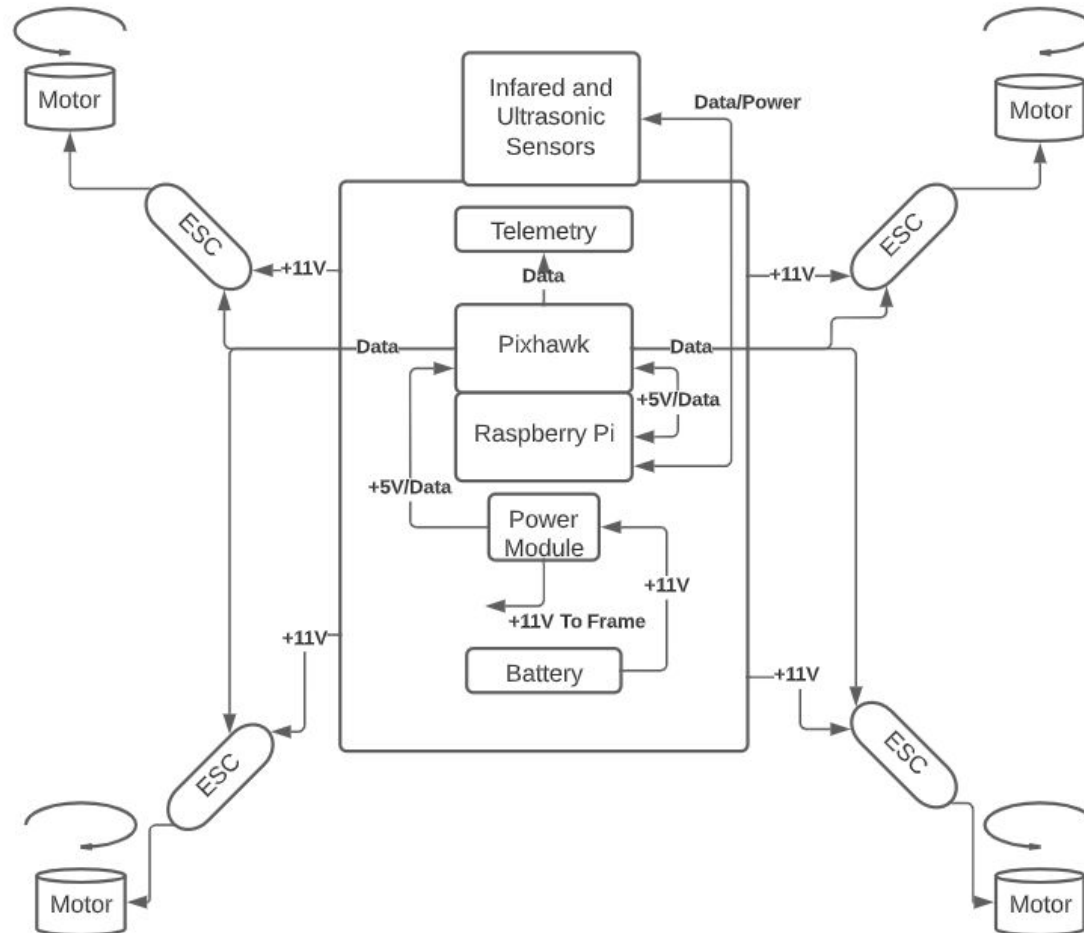


Darion Parks

Goals/Detailed Specifications

- Goal
 - Build a quadcopter for the purpose of autonomously maneuvering in an indoor environment to relay data on thermal recognition to the user
 - Proof of Concept for Search and Rescue Applications
- Detailed Specifications
 - A run will be deemed ‘successful’ if the drone can:
 - Search a room of at least 100 sq. feet
 - Export a live thermal visual to a computer screen
 - Avoid collisions with objects along the route

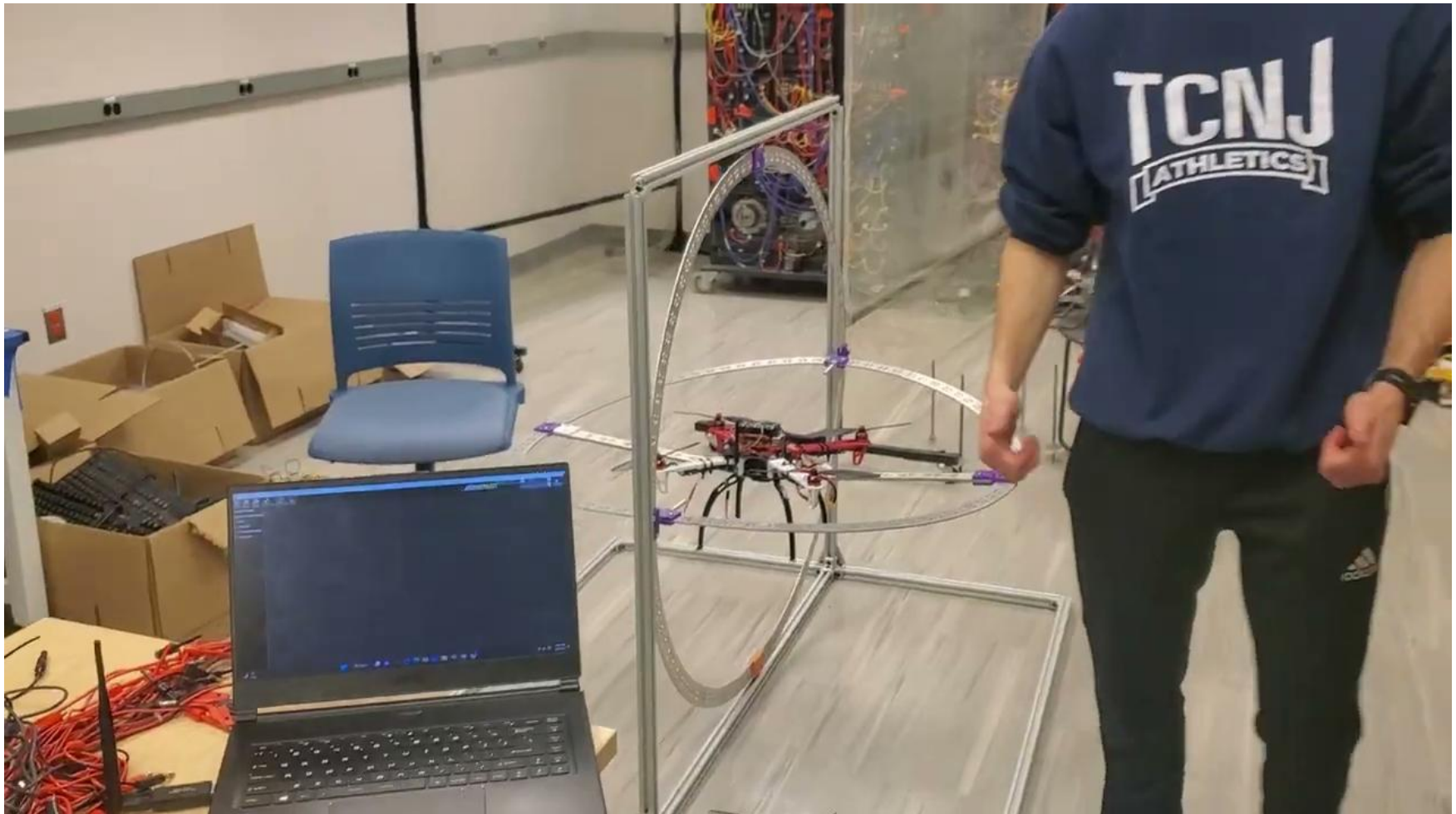
System Architecture



Assembled Drone



Drone Stability Testing

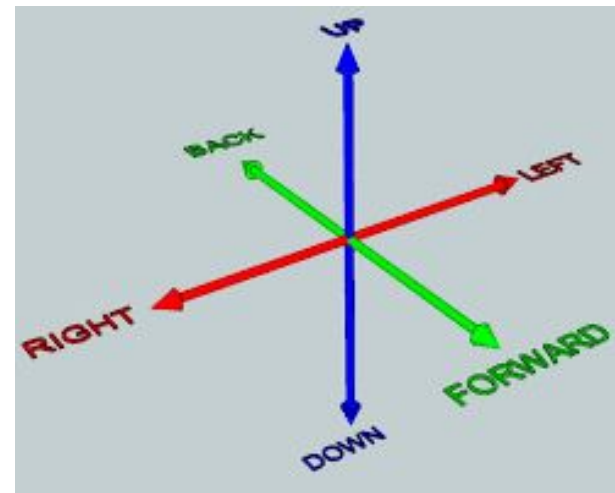


Sensor Types

1 Thermal Sensor



3 Proximity Sensors



Sensor Design

- Cages to hold the sensors in place will be needed
- These will fit between the legs of the drone to hold sensors



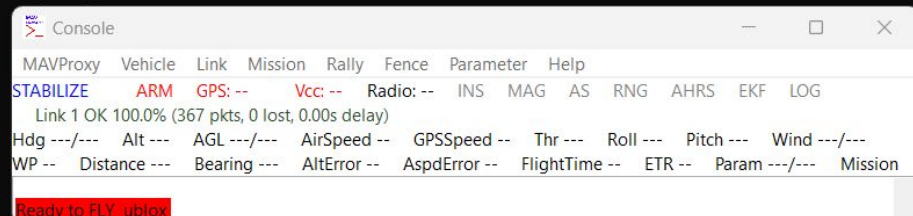
- Cages will be created using 3D printing
- Final sketches are being worked on

Drone Simulation

- Dronekit-SITL (Software in the loop) allows for simulated drone models
- This can be set up to work with Mission Planner and test Python Scripts

```
C:\Users\Owner>dronekit-sitl copter --home=40.26,-74.79,0,0
os: win, apm: copter, release: stable
Downloading SITL from http://dronekit-assets.s3.amazonaws.com/sitl/copter/sitl-win-copter-3.3.tar.gz
Download Complete.
Payload Extracted.
Ready to boot.
Execute: C:\Users\Owner\.dronekit\sitl\copter-3.3\apm.exe --home=40.26,-74.79,0,0 --model=quad -I 0
SITL-0> Started model quad at 40.26,-74.79,0,0 at speed 1.0
SITL-0.stderr> bind port 5760 for 0
Starting sketch 'ArduCopter'
Serial port 0 on TCP port 5760
Starting SITL input
Waiting for connection ....
bind port 5762 for 2
Serial port 2 on TCP port 5762
bind port 5763 for 3
Serial port 3 on TCP port 5763
```

```
C:\Users\Owner>mavproxy.exe --master tcp:127.0.0.1:5760 --sitl 127.0.0.1:5501 --out 127.0.0.1:14550 --out 127.0.0.1:14551
1
Connect tcp:127.0.0.1:5760 source_system=255
Loaded module console
Running script (C:\Users\Owner\AppData\Local\.mavproxy\mavinit.scr)
Loaded module help
Unknown command 'graph timespan 30'
Log Directory:
Telemetry log: mav.tlog
Waiting for heartbeat from tcp:127.0.0.1:5760
Detected vehicle 1:1 on link 0
STABILIZE> |
```

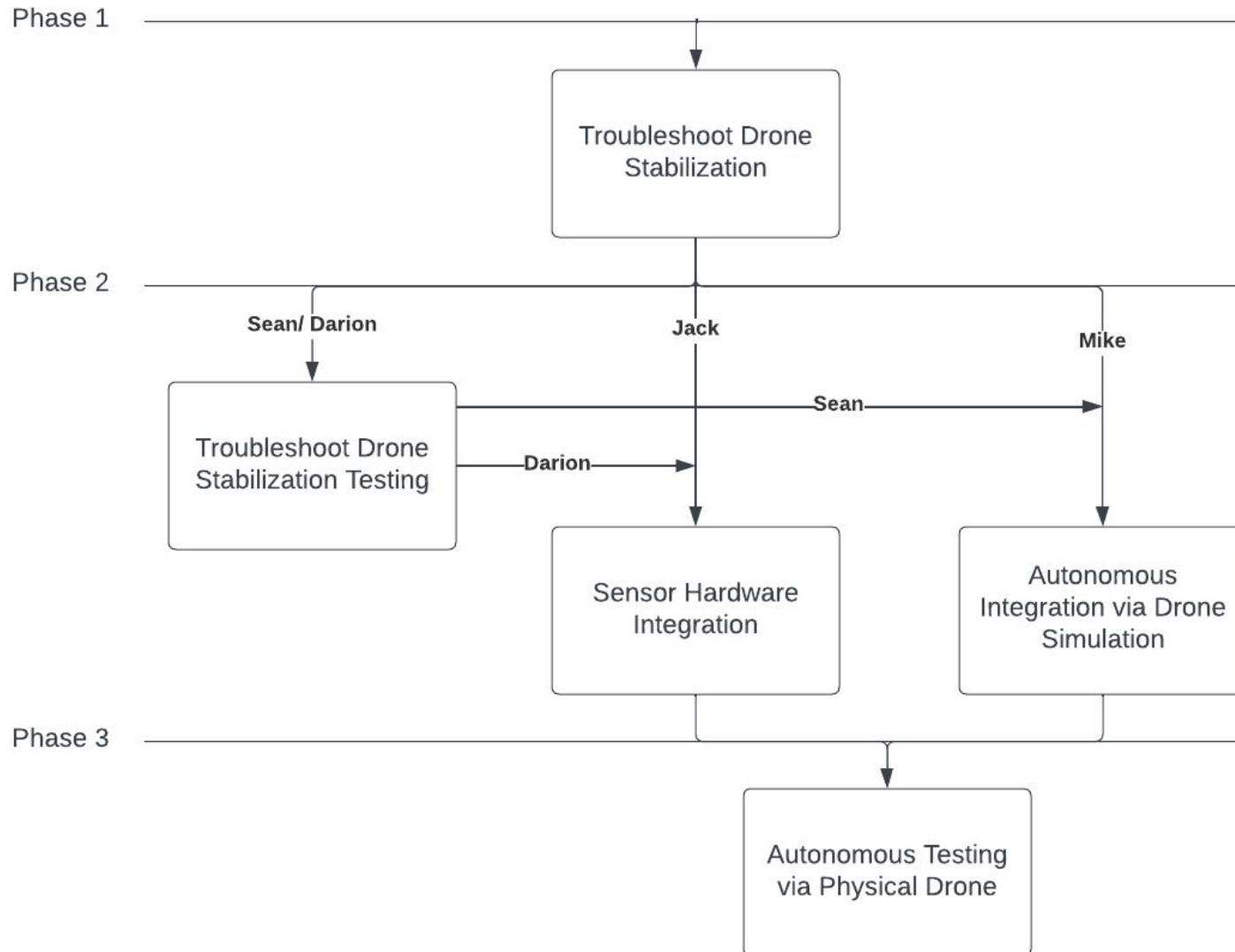


Drone Simulation

- Simulated Drone acts as a model to allow for the development of Python scripts
- The Simulated Drone uses GPS and doesn't have the sensors we will use
 - Scripts will be adapted for our drone



2nd Semester Plans



Questions?

