



TEC-V

MILESTONE 6

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CLIENT

- DR. Wood
 - Professor | Ocean Engineering and Marine Sciences
 - Program Chair for Ocean Engineering



MILESTONE 6:

Tasks	Completion%	Michael	Zealand	To Do
Multi Fild Upload	80%	80%	0%	Testing
Styling	70%	70%	0%	Gain user Feedback
Forward Facing Sonar	30%	30%	0%	Review File Types and API
Autonomy	80%		80%	



MILESTONE

TASKS

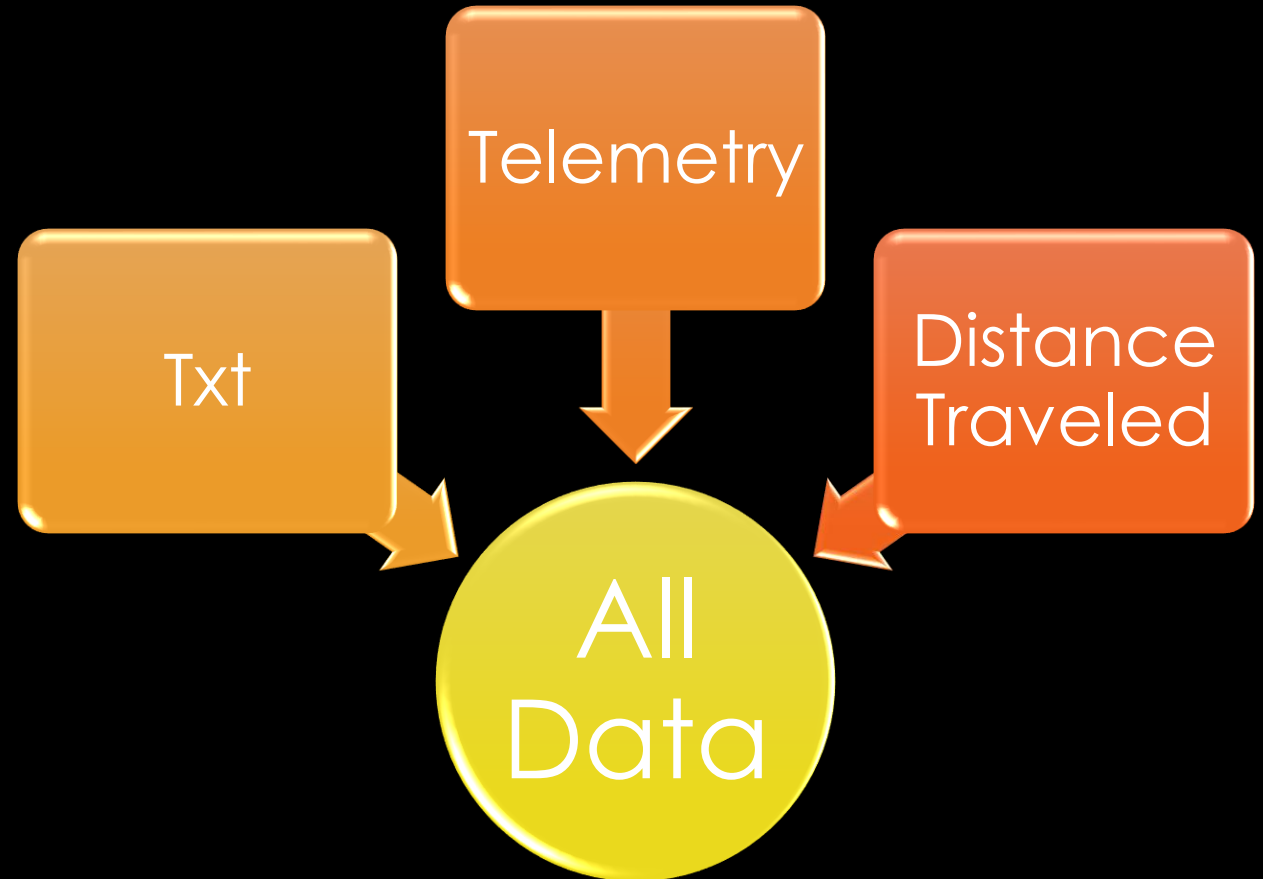


MULTI FILE
UPLOAD

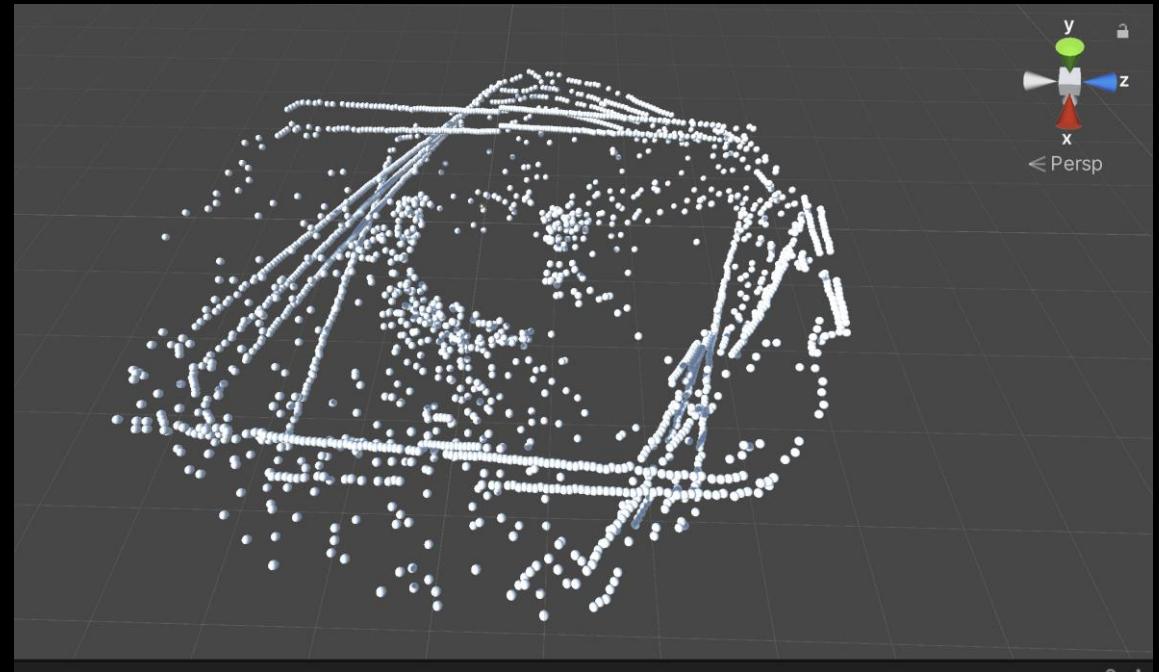
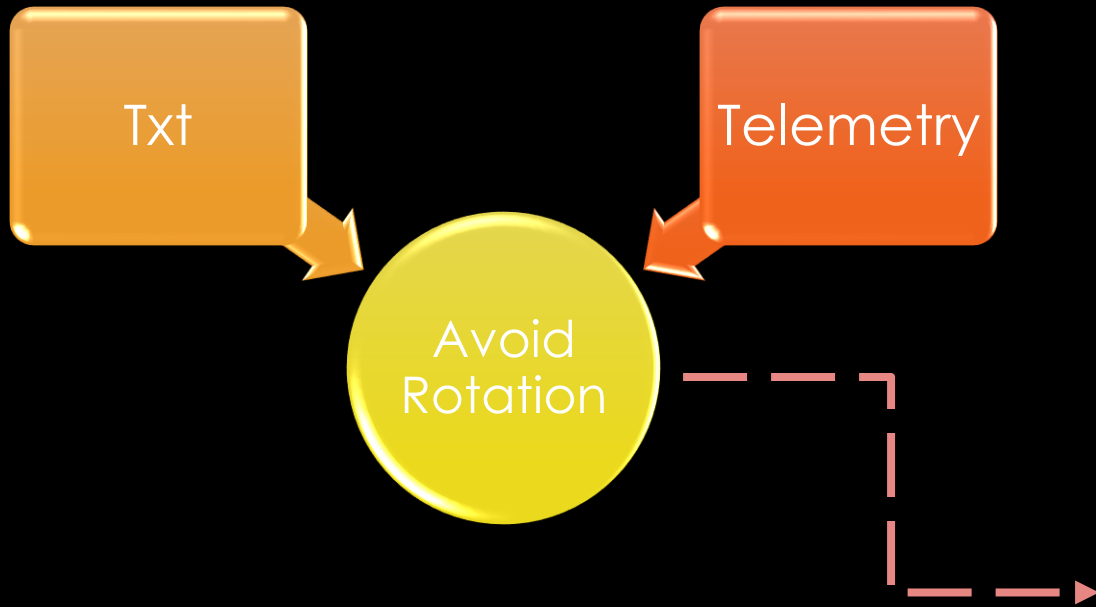
UPDATED FUNCTIONS


Load Coordinates

- Three different possible files:
 - Txt – Holds collected data from sonar
 - Telemetry- outputted by Q-Ground
 - Distance traveled – onboard IMU



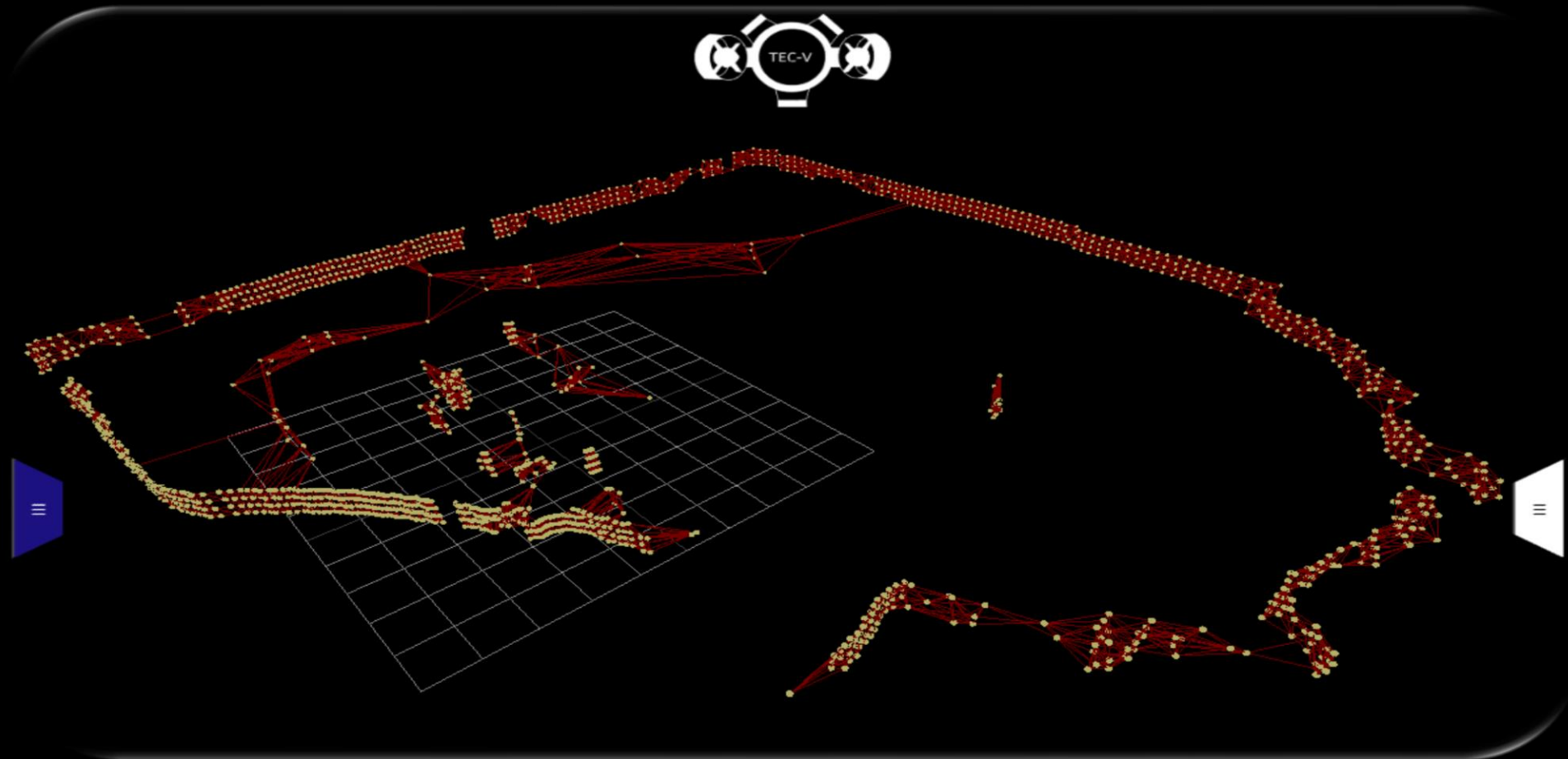
MAIN ISSUE





STYLING

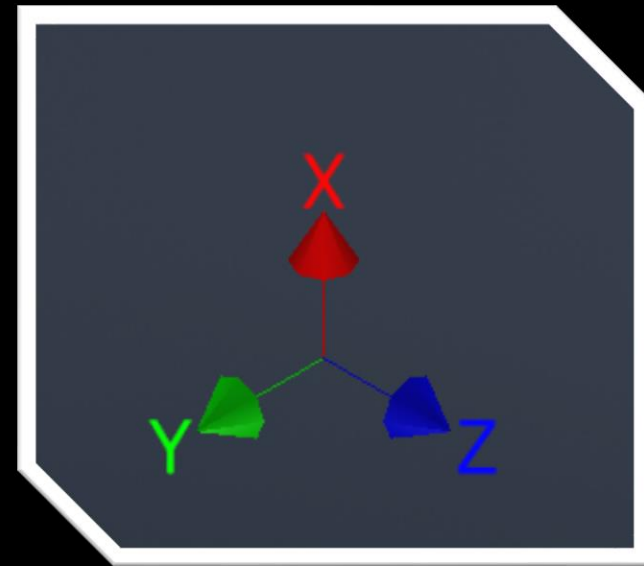
UPDATED UI



ATTEMPTED NEW FEATURES

Coordinate Layout

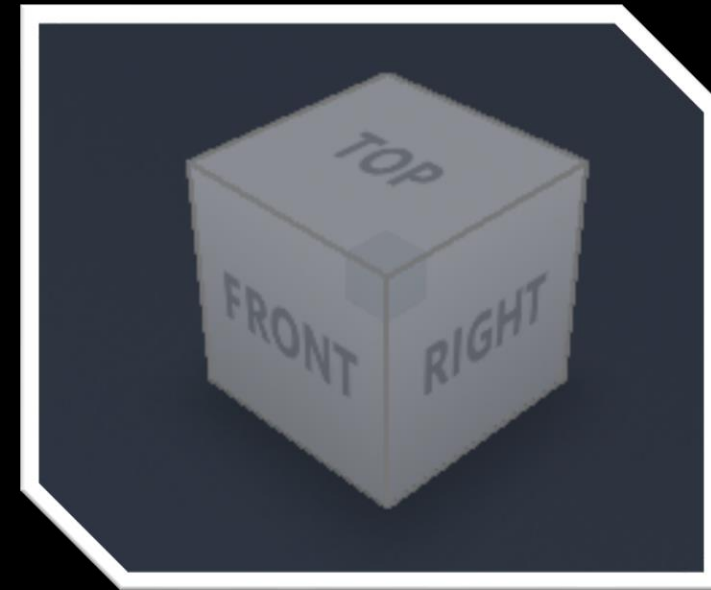
- Allow users to understand orientation of the object



PLANNED FEATURES

View Model

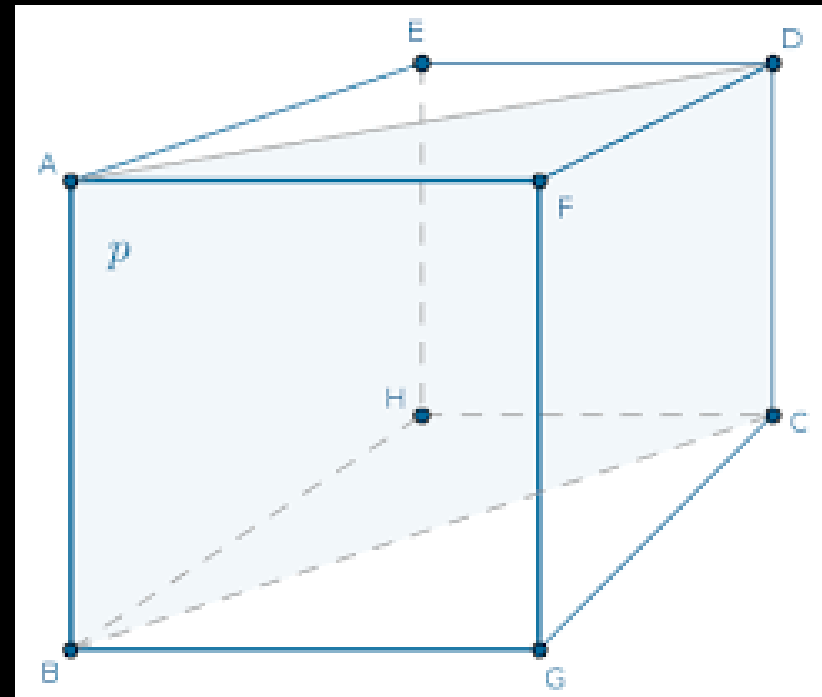
- Allow users to quickly focus on the model and choose a viewing location.



DELETE SPHERES

Create Cage

- Delete Multiple spheres: Function
 - Show cube with grid
 - Drag points to location
 - Delete: Will remove all points within zone





NEW SONAR

+ TESTING

MAIN ISSUES

Direct SSH

- Directly connect to sonar
 - Retrieve only the required Data
 - Does not work

```
Test.py > send_command
1 import socket
2 import json
3
4 IP_ADDRESS = '192.168.2.92' # Replace with your sonar's IP address
5 PORT = 51200 # Replace with your sonar's port
6
7 def send_command(command):
8     with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as sock:
9         try:
10            sock.connect((IP_ADDRESS, PORT))
11            print("Connected to OmniScan 450.")
12            sock.sendall(command.encode('utf-8'))
13            print("Command sent.")
14        except Exception as e:
15            print(f"An error occurred: {e}")
16
17 if __name__ == "__main__":
18     # Example command to set start_mm to 0, adjust pulse_len_percent a
19     command = json.dumps({
20         "id": 2197,
21         "params": {
22             "start_mm": 0,
23             "pulse_len_percent": 10, # Adjust as needed
24             "filter_duration_percent": 10 # Adjust as needed
25         }
26     })
27     send_command(command)
```

TESTING DAY

Goal Map floor of pool

- Code functioning and newly mount for sonar was placed on stern of ROV.
- Ethernet tether was broken causing network issues. No data collected



SHOWCASE

SHOWCASE POSTER



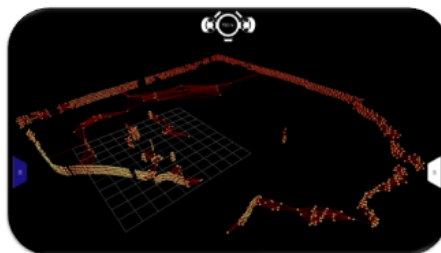
Topographic Exploration Cave Vehicle (TEC-V)
 Michael Dowling, Zealand Brennan, Stephen Coster, Gabor Papp, Henry Hill
 Faculty Advisor: Marius Silaghi, Dept. of Electrical Engineering and Computer Science, Florida Institute of Technology



Introduction

- TEC-V is a project intended to advance the capabilities of underwater exploration.
- Specializing in submerged cave mapping and navigation.
- Our team tackled several major challenges, including the development of a software interface for data visualization and the integration of sonar technology for environmental scanning.

CloudPlot: Webpage



Mechanical

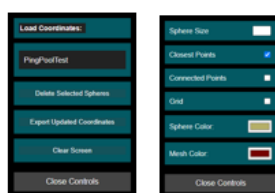


- Integration of the Omniscan450 FS sonar, enhancing ROV's scanning precision and depth.
- Custom-designed mechanical components for optimal mounting of sonar equipment and improved hydrodynamics.

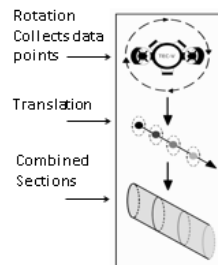
Software Architecture

- Utilized Python for sonar data acquisition, translating raw data into a processable format.
- Implemented Java for 3D visualization and user interface, enabling interactive data rendering and analysis.
- Employed Gazebo for virtual testing of AUV autonomy through simulated underwater environments.

Functions



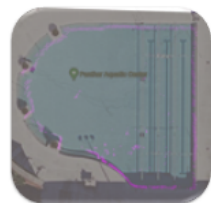
Mapping Process



Future Improvements

- Cloud Plot Application Upgrades:**
- Introduce rotational adjustments for accurate data representation.
 - Enhance data integration with support for multiple file formats.
- Omniscan 450 FS Integration:**
- Deploy the Omniscan450 FS to refine sonar scanning precision.
 - Optimize sonar positioning for comprehensive area coverage.
- Autonomous Navigation:**
- Improve AUV autonomy using refined sonar data.
 - Enhance the navigational algorithms through simulation testing.

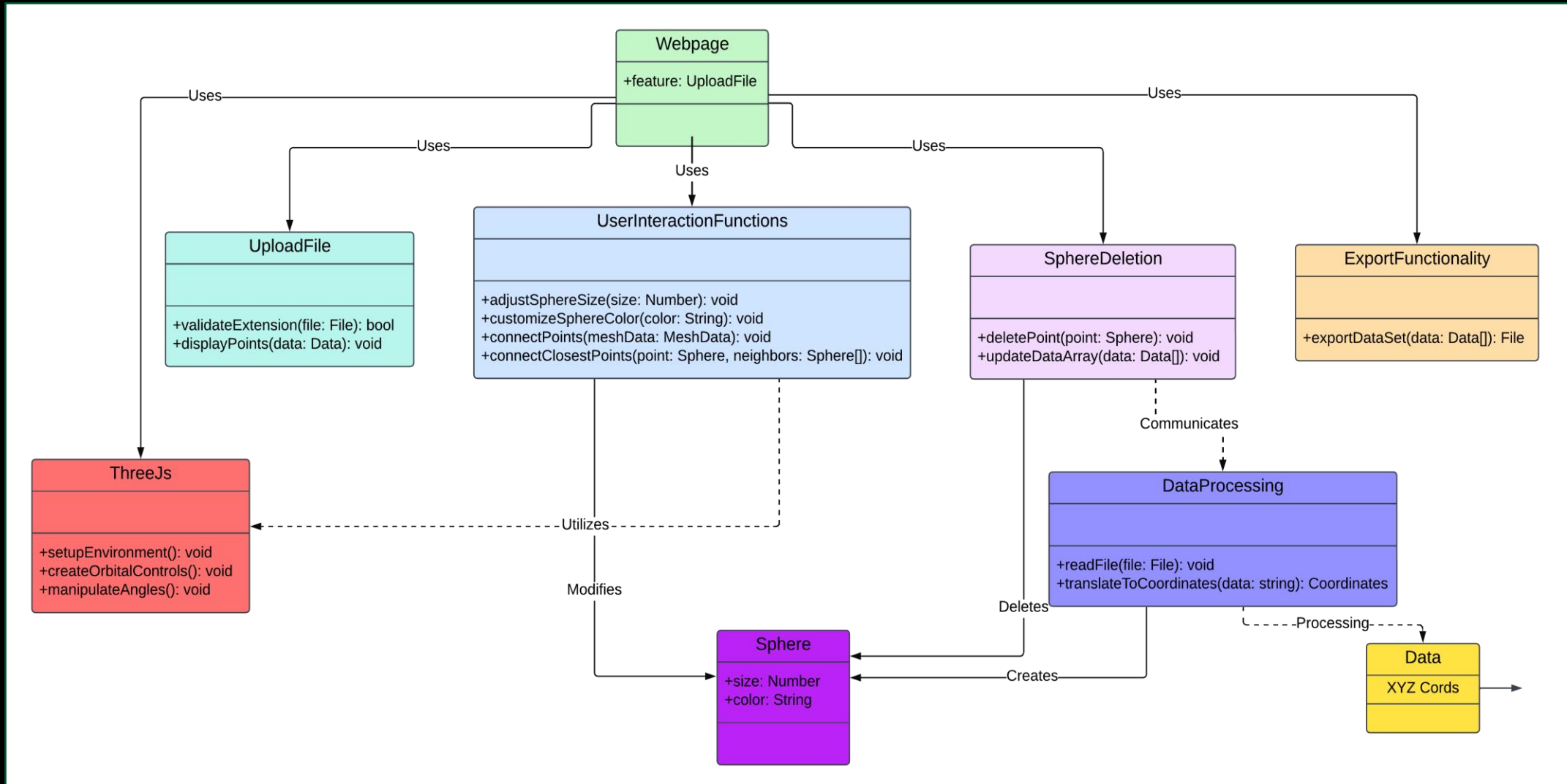
Testing Location



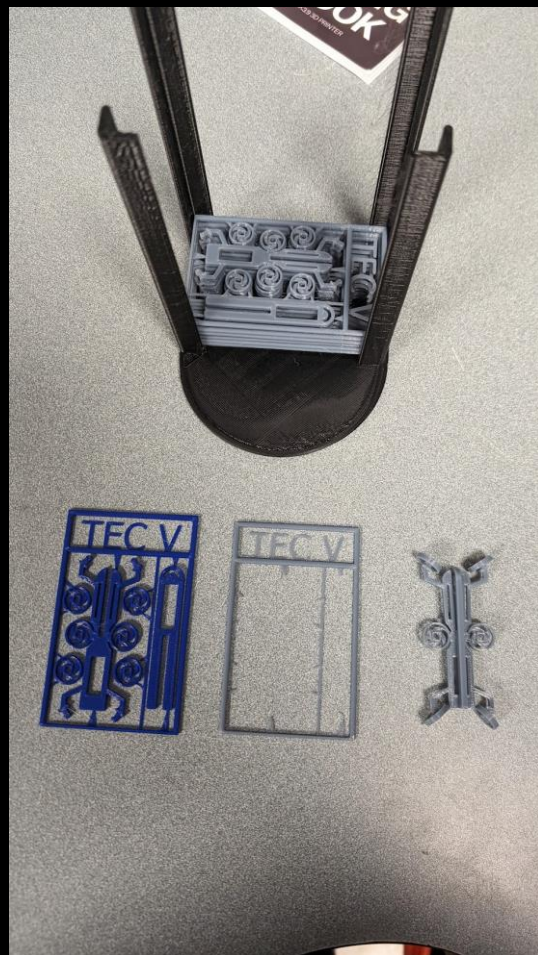
Process Flow




CLASS DIAGRAM: CLOUD PLOT



3D CARDS:





FUTURE

WORK

IMPROVEMENTS

Cloud Plot

- Fix rotation problem with multi-file
- Allow for direct connection of craft.
- Turn the current webpage into an application.

TEC-V

- Implement new sonar
- Process data on board allowing for sensor integration for partial autonomy.

VIDEO DEMO

YouTube:

<https://www.youtube.com/watch?v=uZJNrxZfpB8>

LIVE DEMO

TEC-V- Cloud Plot

https://bluecodehydra.github.io/3DCloudPlot_Webpage/

WEBPAGE LINK

TEC-V

https://bluecodehydra.github.io/FIT_Project-TEC_V/data.html

QUESTIONS?

