# TEC-V MILESTONE 6

By: Michael Dowling & Zealand Brennan

# CLIENT

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  - Program Chair for Ocean Engineering



# MILESTONE 6:

Tashs	Completi on%	Michael	Zealand	To Do
Multi Fild Upload	80%	80%	0%	Testing
Styling	70%	<b>70%</b>	0%	Gain user Feedback
Forward Facing Sonar	30%	30%	0%	Review File Types and API
Autonomy	80%		80%	

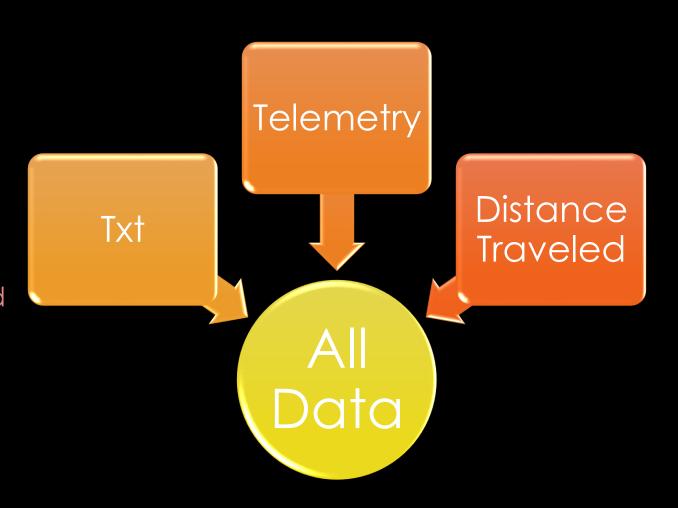
# MILESTONE TASKS

# MULTIFILE UPLOAD

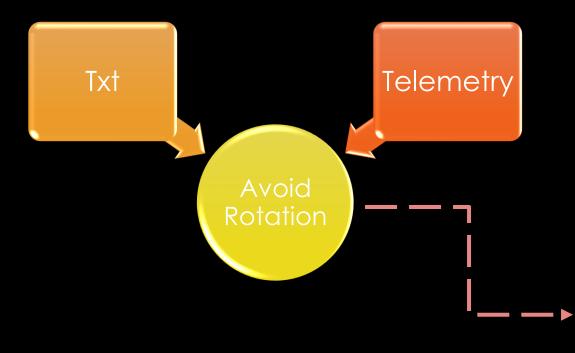
# UPDATED FUNCTIONS

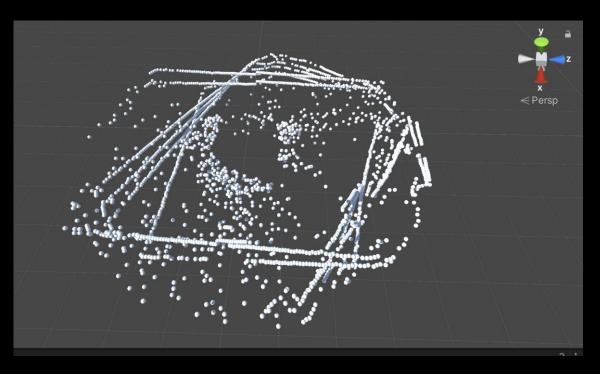
### **Load Coordinates**

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



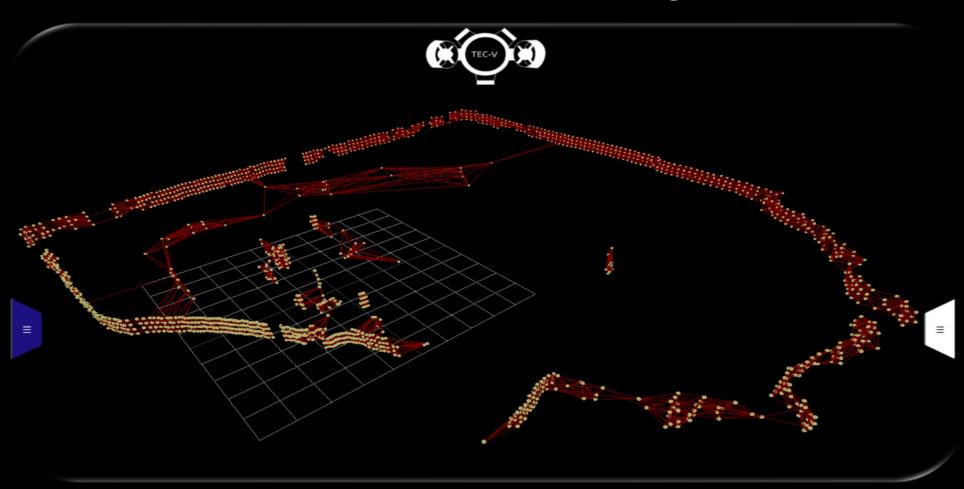
# MAIN ISSUE





# STYLING

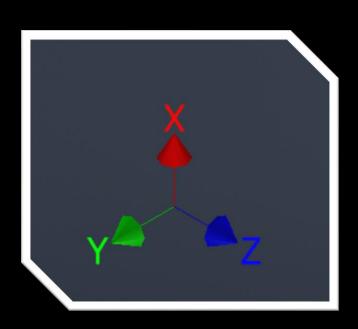
# UPDATED UI



# ATTEMPTED NEW FEATURES

# Coordinate Layout

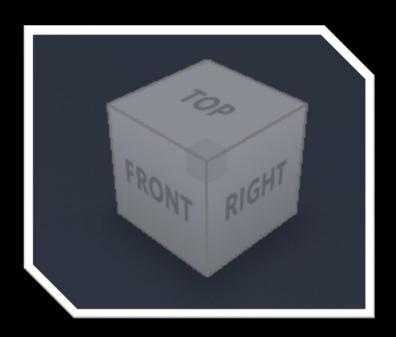
 Allow users to understand orientation of the object



# PLANNED FEATURES

# View Model

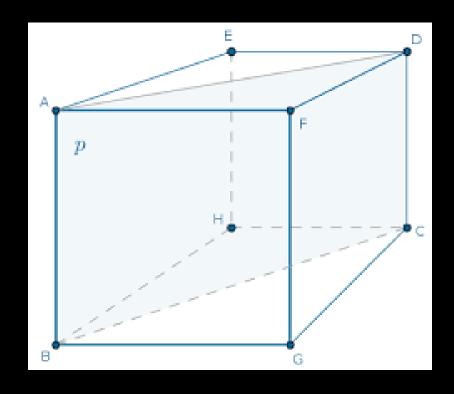
 Allow users to quickly focus on the model and choose a viewing location.



# 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

# Direct SSH

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

# MAIN ISSUES

```
♣ Test.py > 分 send_command
      import socket
      import json
      IP_ADDRESS = '192.168.2.92' # Replace with your sonar's IP address
      PORT = 51200 # Replace with your sonar's port
      def send command(command):
          with socket.socket(socket.AF INET, socket.SOCK STREAM) as sock:
                  sock.connect((IP ADDRESS, PORT))
                  print("Connected to OmniScan 450.")
                  sock.sendall(command.encode('utf-8'))
12
                  print("Command sent.")
              except Exception as e:
                  print(f"An error occurred: {e}")
      if __name__ == "__main__":
          # Example command to set start_mm to 0, adjust pulse_len_percent a
          command = json.dumps({
              "id": 2197,
              "params": {
                  "start mm": 0,
                  "pulse len percent": 10, # Adjust as needed
                  "filter duration percent": 10 # Adjust as needed
```

# 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



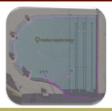
### Introduction

- 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.

### Software Architecture

- Utilized Pvthon for sonar data acquisition, translating raw data into a processableformat.
- ImplementedJavafor3D vi sualization and user interface, enabling interactive data rendering
- Employed Gazebo for virtual testing of AUV autonomy through simulated underwater environments.

### Testing Location

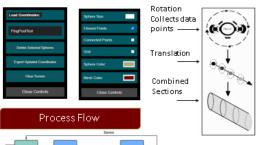


### Cloud Plot: Webpage



### Functions

### Mapping Process



### Mechanical



- Integration of the Omniscan 450 FS sonar, enhanding ROV's scanning precision and depth.
- Custom-designed mechanical components for optimal mounting of sonar equipment and improved hydrodynamics.

### 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 Omniscan 450 FS to refine sonar scanning precision.
- Optimize sonar positioning for comprehensive area coverage.

### Autonomous Navigation:

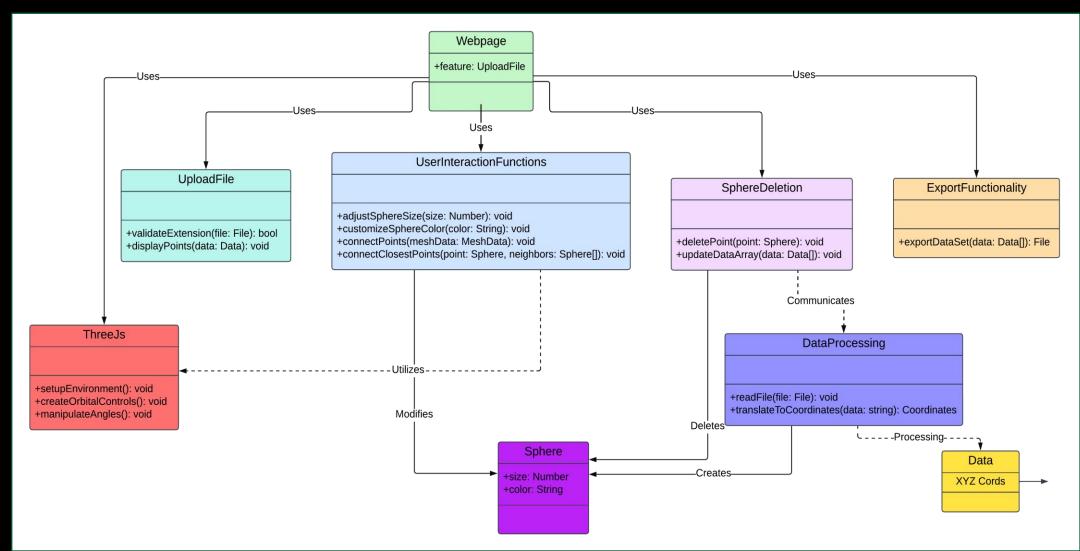
- Improve AUV autonomy using refined sonar data.
- · Enhance the navigational algorithms through simulation testing.







# 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 senor integration for partial autonomy.

## 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?