



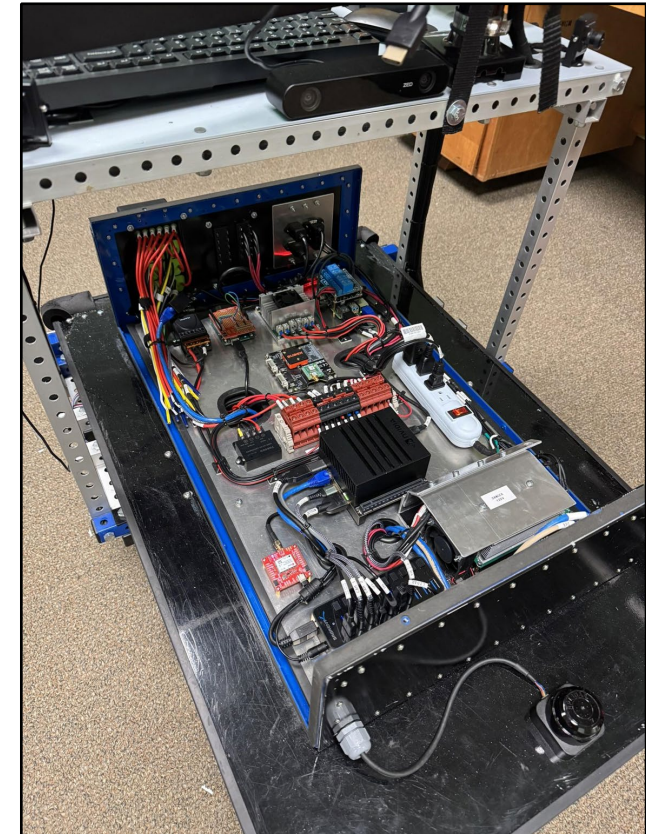
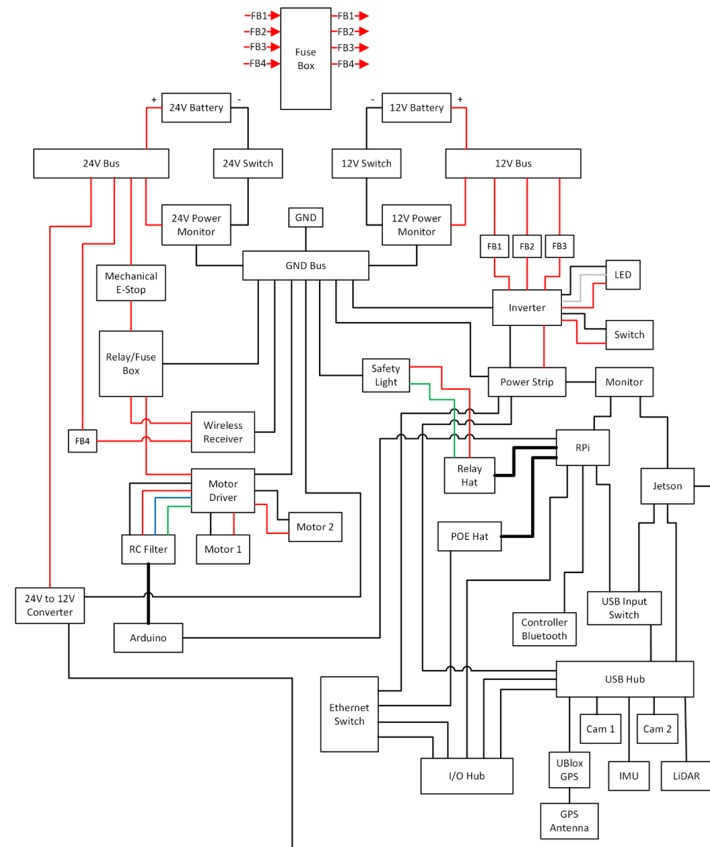
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**Department of Electrical &
Computer Engineering**

ECE 486 SENIOR DESIGN PROJECTS

INNOVATING THE FUTURE IS WHAT WE DO

SPRING 2025



Intelligent Ground Vehicle

Funding Agencies: ACOM, NAMC, NVESD

Team Members: Yasmany Paucar Chambe, Dan Furnary, Zach Gamble, Seth Huthmaker, Thuy Nguyen, Lynnet Rich, Zach Gamble

Advisor: Dr. Lee Belfore

Design Challenge

To meet and exceed every challenge of the 2025 Intelligent Ground Vehicle Competition.

Design Goals

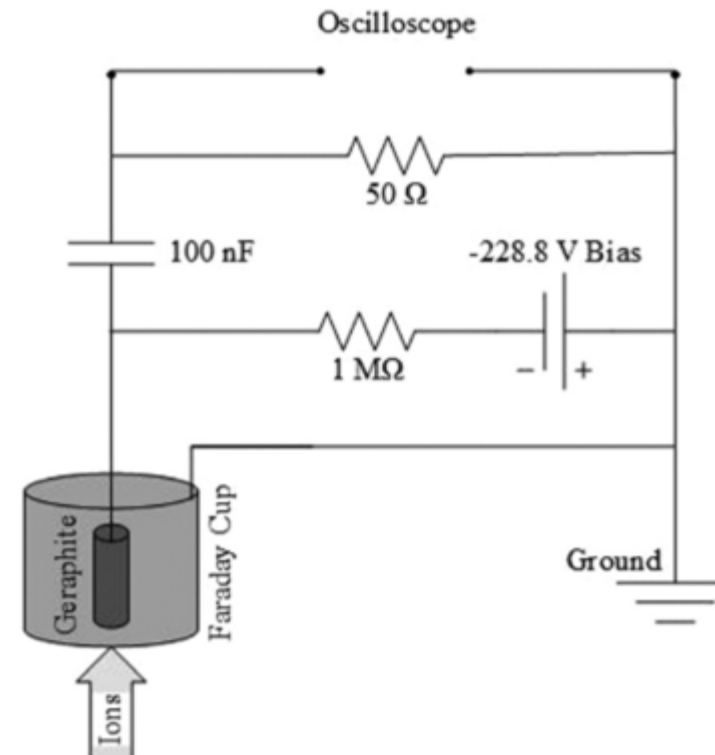
- Isolate the Raspberry Pi from the motor unit for the e-stop function.
- Implement a smoothing control system for the robot controller.
- Obtain more relevant training data from simulating courses similar to the competition.



"Does Little Blue ever pretend to be lost not out of error, but to discover a better path?"
- Yasmany Paucar Chambe



Piece the Faraday Cup will be going on



From Fast Faraday Cup for fast ion beam TOF Measurements in deuterium filled plasma focus device and correlation with Lee model

Design and construction of a fast Faraday cup for ion detection Old Dominion University

This project requires the creation of a fast Faraday cup to detect laser generated ions.

Team Members: Sypress Hill and Ryan VanGuilder

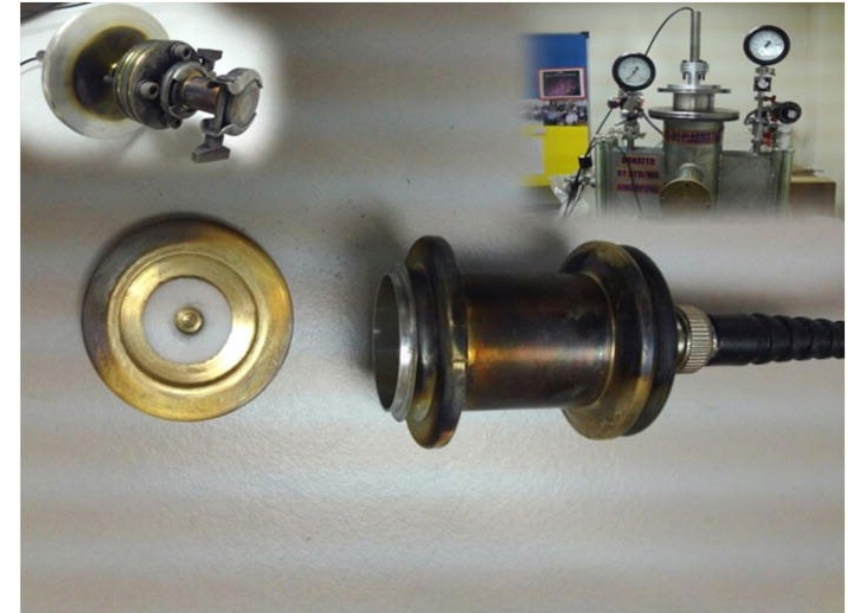
Advisor: Dr. Hani Elsayed-Ali

Design Challenge

Design a mechanical apparatus that connects the Faraday cup to an ion laser source.

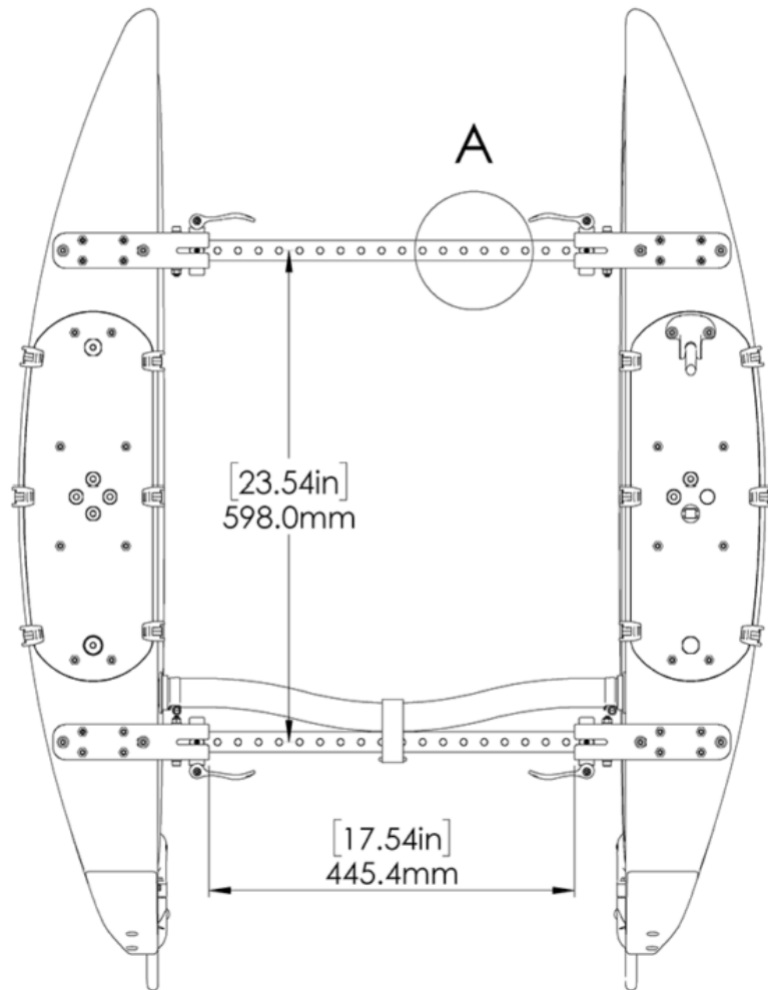
Design Goals

- Design an external circuit and amplifier
- Obtain a resolution of 50 ns and an impedance of 50 Ω .
- Test the Faraday cup with a graduate student.



**When you are up to your neck in
mud, start singing.**





Higher Level Autonomy for BlueBoat

Funding: COET, MAE, VISA

The purpose of this project is to extend the BlueBoat's capabilities to include detect and avoid and return to home functionality. This will be achieved by installing a sensor suite and implementing a controller design via a companion computer.

Team Members: Jack Boutot(ECE), Peter Majewicz(ECE), Nathan Wright(MAE), Michael Gibson(MAE)

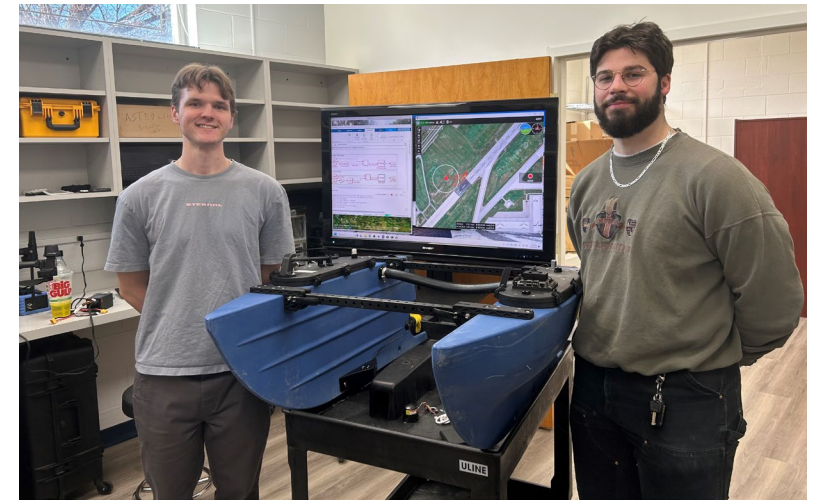
Advisors: Dr. Thomas Alberts, Dr. Oscar Gonzalez

Develop and Design Challenge

Develop and Implement software and hardware modifications to existing BlueBoat to allow detect and avoid functionality in the Chesapeake Bay.

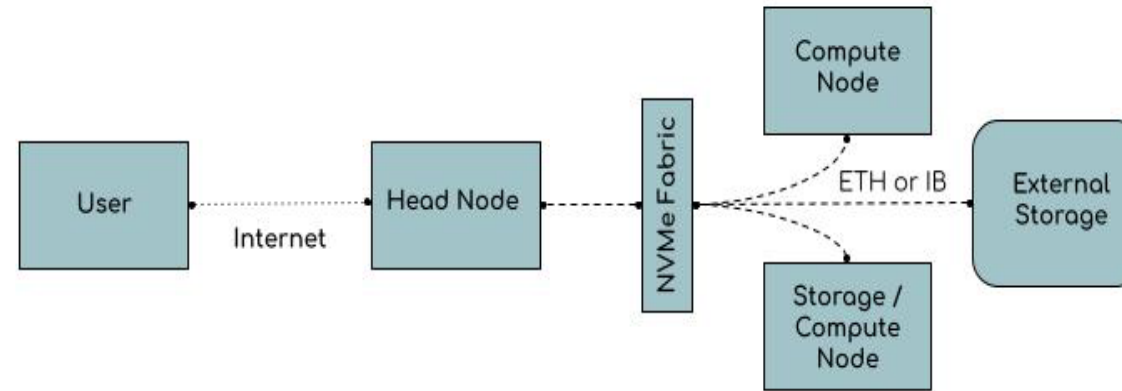
Design Goals

- Create detect and avoid capabilities
- Create plug and play functionality for future BlueBoat use



Jack Boutot and Peter Majewicz

“When you start with nothing, all you can do is build piece by piece until you have something amazing. –Jack Boutot”



Node Manipulation within an HPC Cluster

Funding Agency: Jefferson Lab

Create a dynamic node that can transition back and forth between a compute node and storage node based on direction from the head node.

Team Members: Brinn Ruiz, Jourdan Proffit

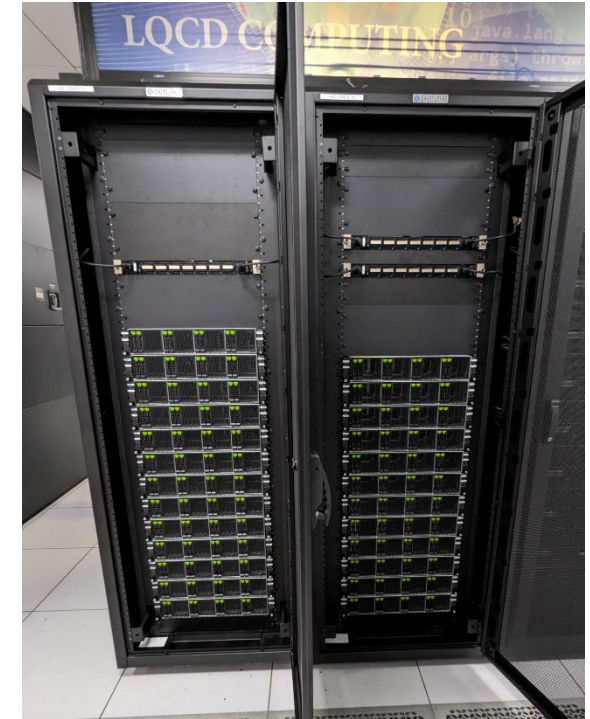
Advisor: Dr. Masha Sosonkina, Singh Amitoj

Design Challenge

Implement Kubernetes and Slurm software together.

Design Goals

- Implement a Kubernetes Cluster to manipulate with Slurm
- Allow node access to an independent storage system
- Develop a process within scheduler software that allows for autonomous node role switching



“This is something we are going to learn together, just keep asking questions.”
-Brinn Ruiz



Real-time HF Propagation Observation System

Funding Agency *TBD*

Design and create a WSPR-based tracking system for monitoring an autonomous boat sailing across the Atlantic.

Team Members: Mingyi Cisar, James Cummins, AJ DiDio, Wesley Wallner

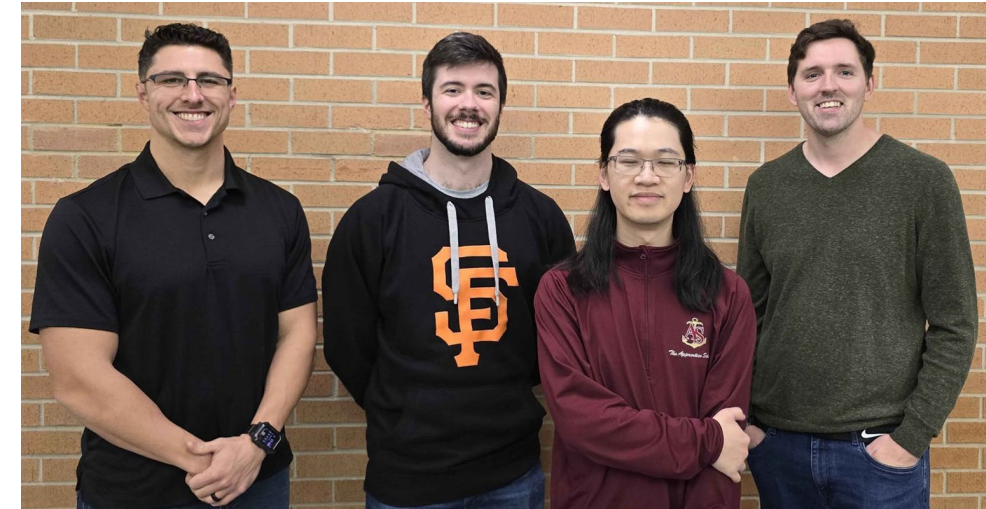
Advisors: Dr. Watson, Dr. Vahala

Design Challenge

Design a HF Propagation system to track an autonomous vessel.

Design Goals

- Program Transmitter to Ideal Signal
- Integrate Transmitter and Antenna with Vessel
- Ensure System is Vibration and Water Resistant
- Maintain Minimal Power Consumption



“I love it when a plan comes together.”
-The A Team
-Wesley Wallner