Team Position	*Electrical System Design Member*
Project Lead	*Jason Lumokso (jason.lumokso@stonybrook.edu)*

Position Summary

The purpose of this team position is to integrate sensors/parts to work under one system. The system should be capable of measuring physical variables such as boat RPM, vehicle speed, motor temperatures, battery voltage, etc. Variables will then be displayed onboard through LCD screens. Ideally, data should be logged from all sensors so that we can study how the variables change over a period of time. This will be critical for benchmarking and continuous improvement purposes. Students interested in test engineering, electrical engineering, and system engineering will benefit from these projects. If you would like to make your own electrical project for the boat (ex: solar charger for Arduino, steering system improvements, etc.), please feel free to let the project lead know.

Duties and responsibilities

- You will need to be comfortable in troubleshooting electrical circuits and creating programs for this project position

Preferred Qualifications

Qualifications include:

- Intermediate to Advanced breadboard and circuit building knowledge
- Must be willing to learn and research on your own time and effort
- Data Acquisition knowledge (MEC 316/317 experience)
- Intermediate to Advanced Arduino or Raspberry Pi knowledge
- Basic CAD Knowledge (Solidworks)
- Basic machining skills (MEC 225 experience)

Available Projects

Establish communication between Arduino and Altrax Motor Controller

- Difficulty: Intermediate to Advanced
- Communication protocol for Arduino: UART (Universal Asynchronous Receiver/Transmitter)
- Communication protocol for Motor Controller: RS-232
- Please contact project lead for more details

Electronic Device Power System

- Difficulty: Intermediate
- Most of the devices work on different voltage levels. Design a system that distributes the proper amount of power to each device.
- Power Source for electronics: 12V Lead Acid Battery
- Power Source for onboard motor: 3 x 12V Lead Acid Batteries in parallel
- Necessary voltage for Arduino: 9V
- Necessary voltage for Speedometer: 12V
- Necessary voltage for Bilge Pump: 12V
- Please contact project lead for more details

Dashboard Design and Fabrication

- Difficulty: Basic to Intermediate
- Design dashboard to mount toggle switches, screens, etc. by using Solidworks.
- Dashboard must be in ideal position and must take into account driver comfort.
- Material of the dash will be 0.25" thick ABS Plastic.

Data Logger
- Difficulty: Intermediate to Advance
- Program Arduino SD card shield to log sensor data

OR

- Establish communication between Raspberry Pi and Arduino.
- Send data wirelessly from Raspberry Pi to a computer.

Electronic Device Enclosure
- Difficulty: Basic
- Design the enclosure for microcontrollers and electronics. This involves finding the optimal layout for electronics, finding the best place to mount the controllers, and ensuring that overheating will not occur.
- This enclosure should be designed in Solidworks.
- Basic machining skills are required.

Projects Already Assigned

The following projects have already been taken. If you would like to take part in any projects listed below, please contact the project lead.

- Motor temperature sensors
- Vehicle speedometer
- Program LCD for real time data display
- Battery voltage indicator
- Throttle controller
- Toggle switches for onboard devices.
- Shaft RPM sensor
- Sensor mounts

Pictures