



Project Albatross

*Subsurface Data Acquisition using
Semi-Autonomous Aquatic Robotics*

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The Team

Connal West



Steven Seeberger



Dave Evans



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Approximately 40% of the lakes in America are too polluted for fishing, aquatic life, or swimming

Problem Formulation



- Monitoring water quality is becoming increasingly important with rise of...
 - Water pollutants (plastics, chemicals, etc.)
 - Climate change (causing ocean acidification)
 - Extreme weather patterns
- Marine biologists mainly rely on manual data capturing
 - Data sparsity
 - Aliasing issues
 - Mostly vertical profiles
 - Time/Cost of Measurements

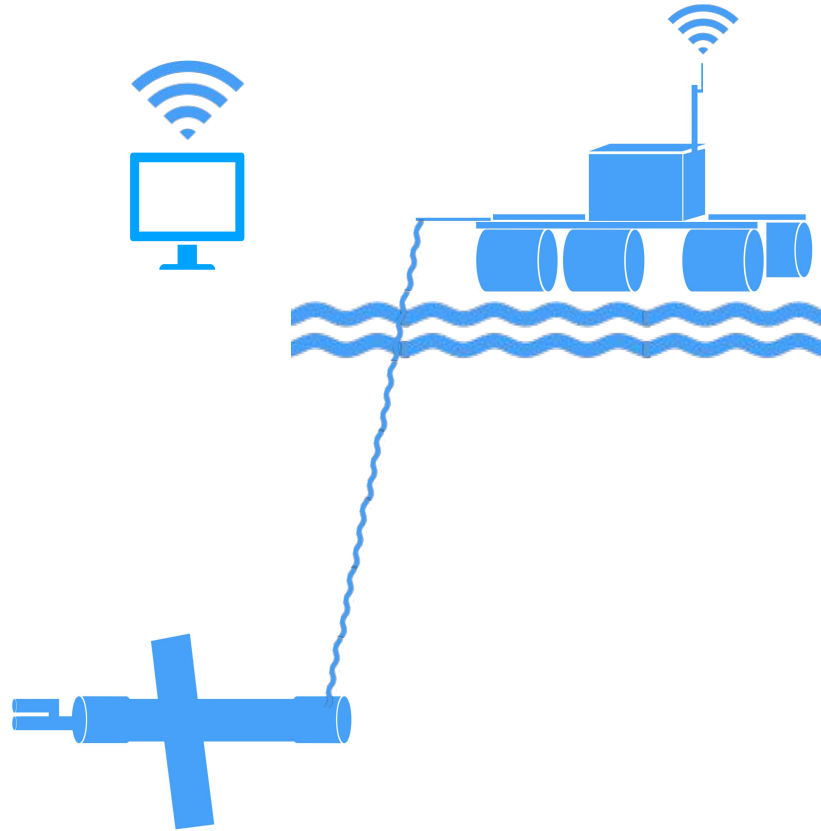


Project Albatross

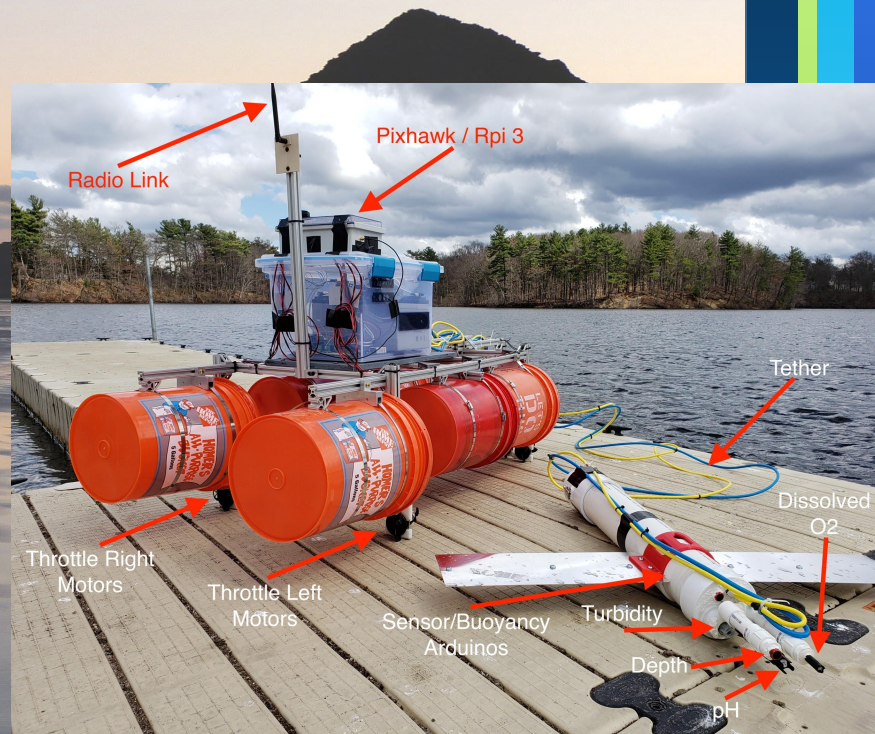
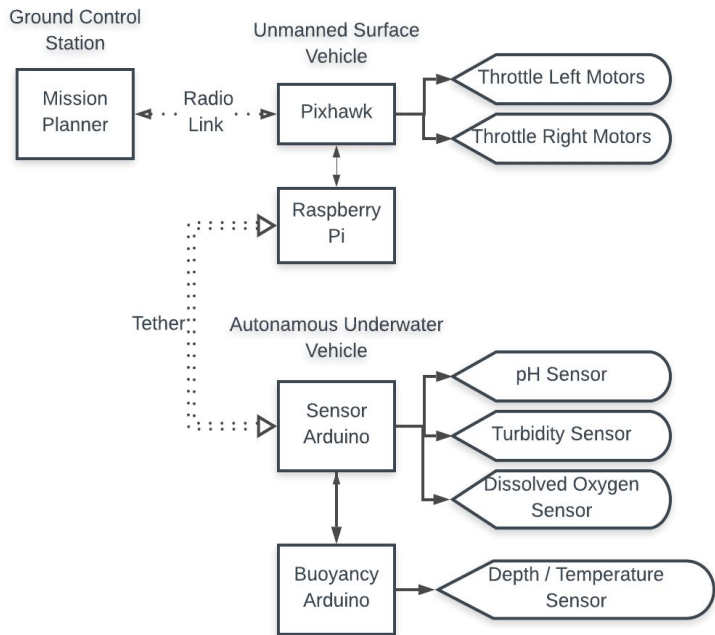


Design Solution

- Create an autonomous watercraft
- Obtain underwater measurements at various depths
- Able to relay data/route updates to user mid-mission
- Process and present data in a digestible manner



System Architecture



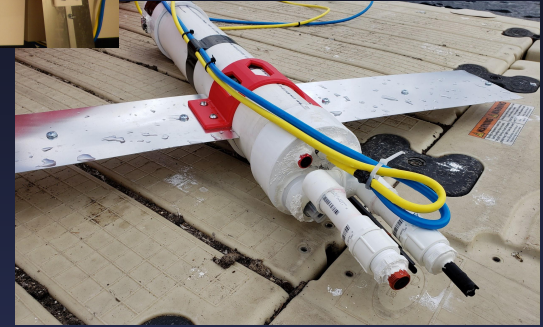
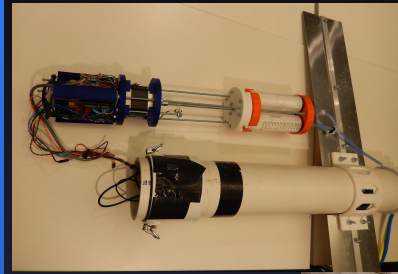
Unmanned Surface Vehicle (USV)

- Custom aluminum frame, custom pontoons, sealed electric housings
- 6 modified bilge pumps powered by two 12V SLA batteries
- Pixhawk flight controller
- RaspberryPi



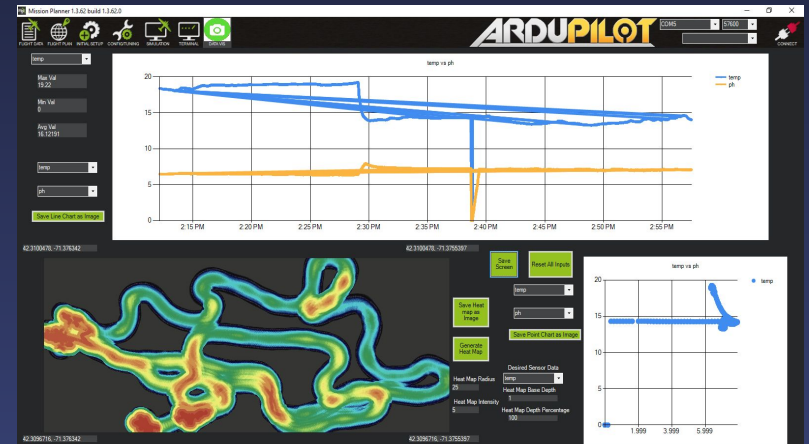
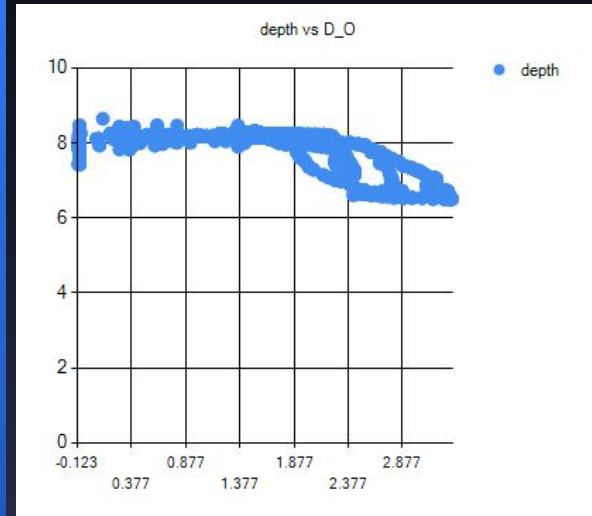
Autonomous Underwater Vehicle (AUV)

- Sensors: pH, turbidity, dissolved oxygen, temperature, and depth
- Stepper motor/ syringes adjust buoyancy
- 2 integrated Arduinos for:
 - Sensor Data
 - Buoyancy Control



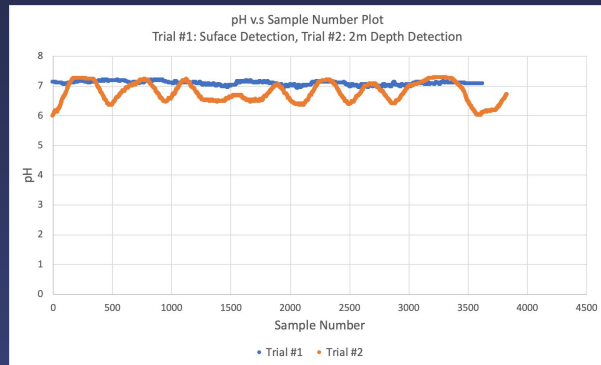
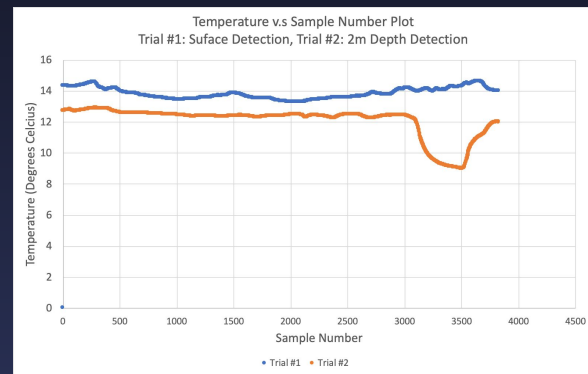
Data Processing

- Processes sensor data in real time
- Visual sensor data using:
 - Line Charts
 - Point Charts
 - Heat Maps
- Provides holistic view of mission data



Overall Results

- 2 missions: surface and 2 meter depth
- Able to perform variety of mission paths and return to “home” location successfully
- Transfer data and commands from shore to sub with various sub depths
- Data viewed/processed in real-time in Mission Planner and exported to CSV





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Questions?

Thanks!

