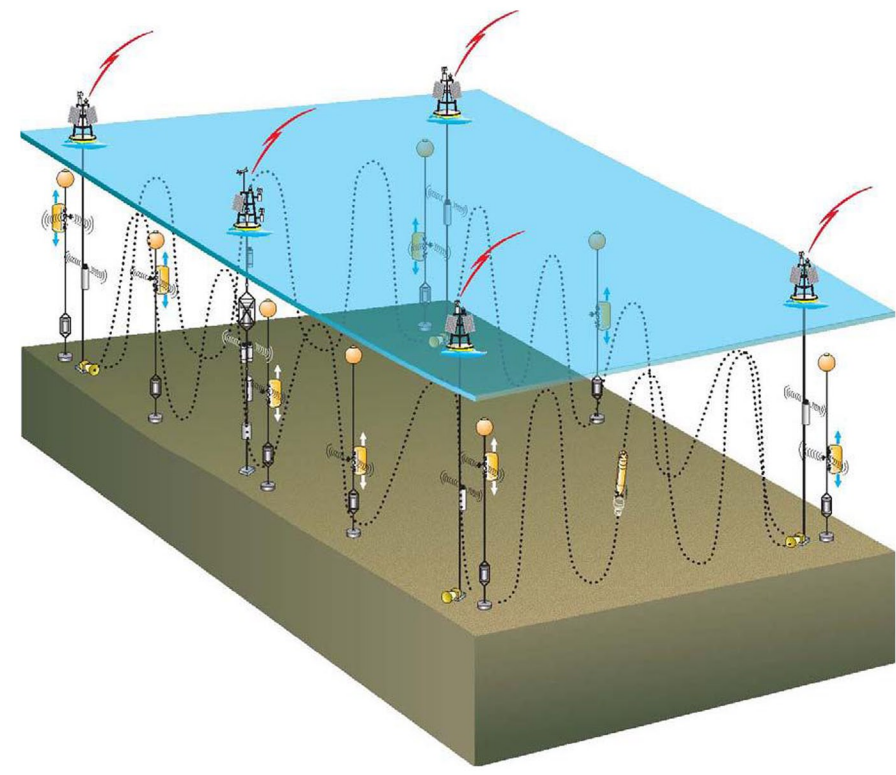
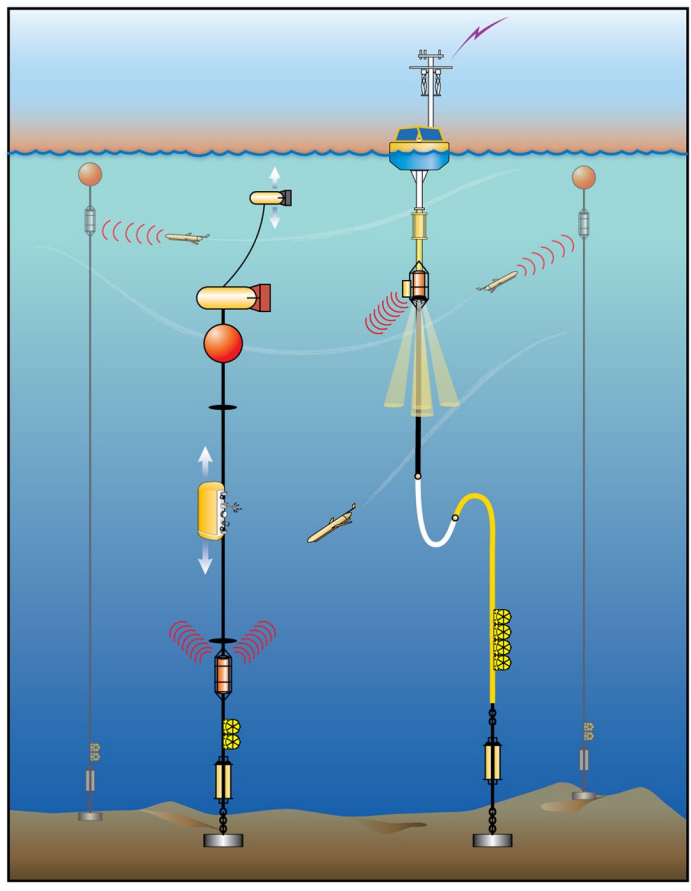


WHOI Buoy Power Simulator

Background



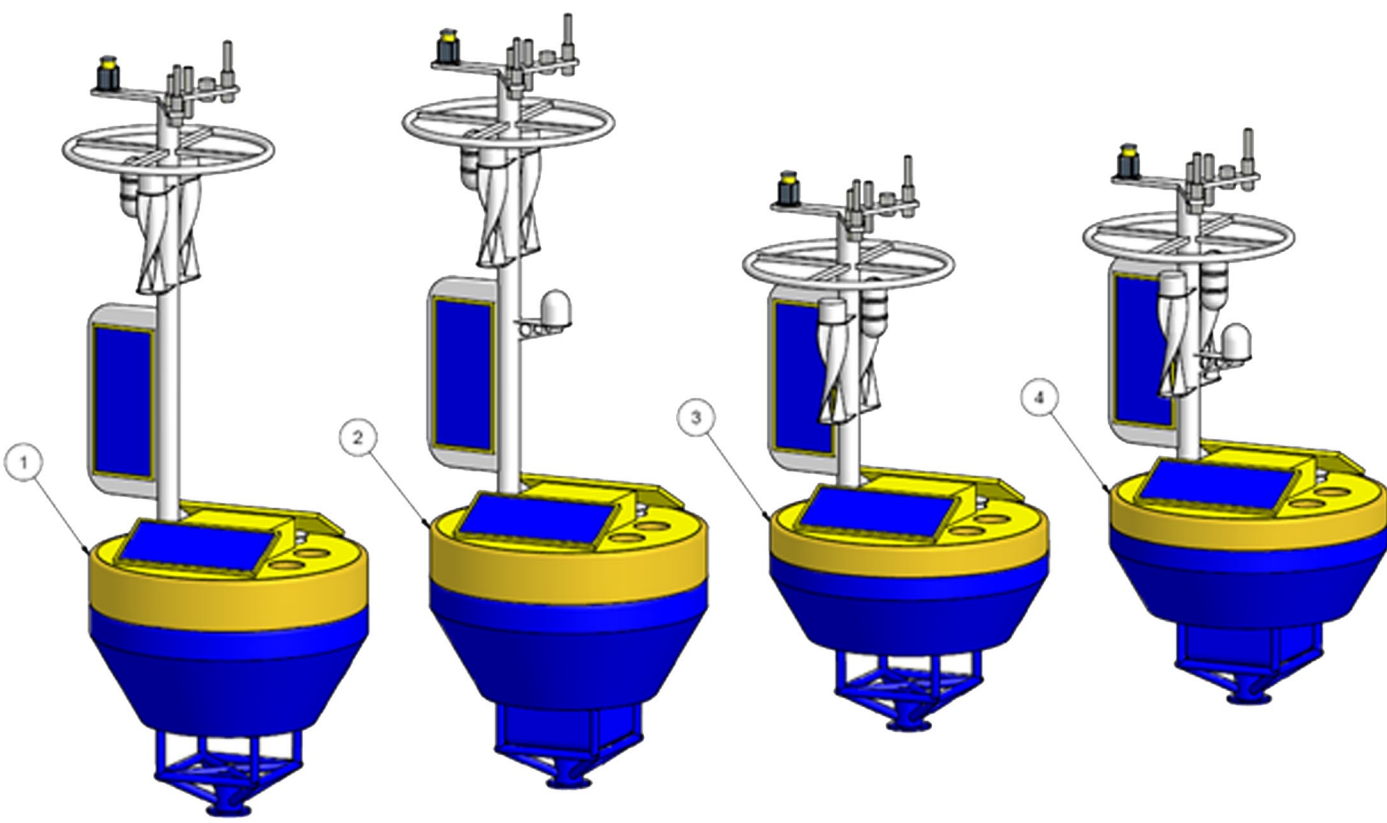
Ocean Observatories Initiative (OOI)

Network of buoys for monitoring physical, chemical, geological, and biological variables in the ocean and on the sea floor.

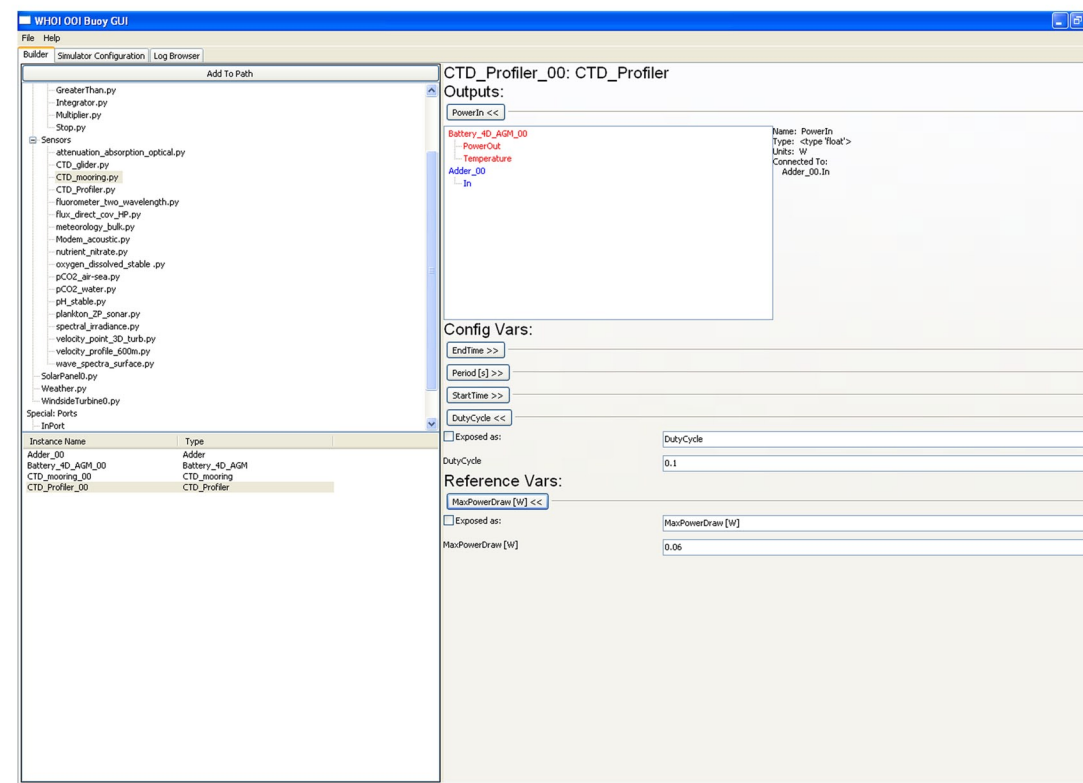
Expected to operate for 25 years with annual maintenance.

Powered by a combination of solar and wind power generation and an on board fuel cell.

The Olin Raytheon/WHOI SCOPE team is assisting WHOI in the design effort by writing software tools for managing the energy budget of a deployed buoy.



GUI Design



Simulation Setup

Start Date

Date and time for simulation start

End Date

Date and time for simulation end

Timestep

Resolution of simulation in seconds

Logged Variables

Variables to be logged for plotting

Buoy Layout

Module Selection

Add batteries, sensors, and power modules.

Input / Output Connections

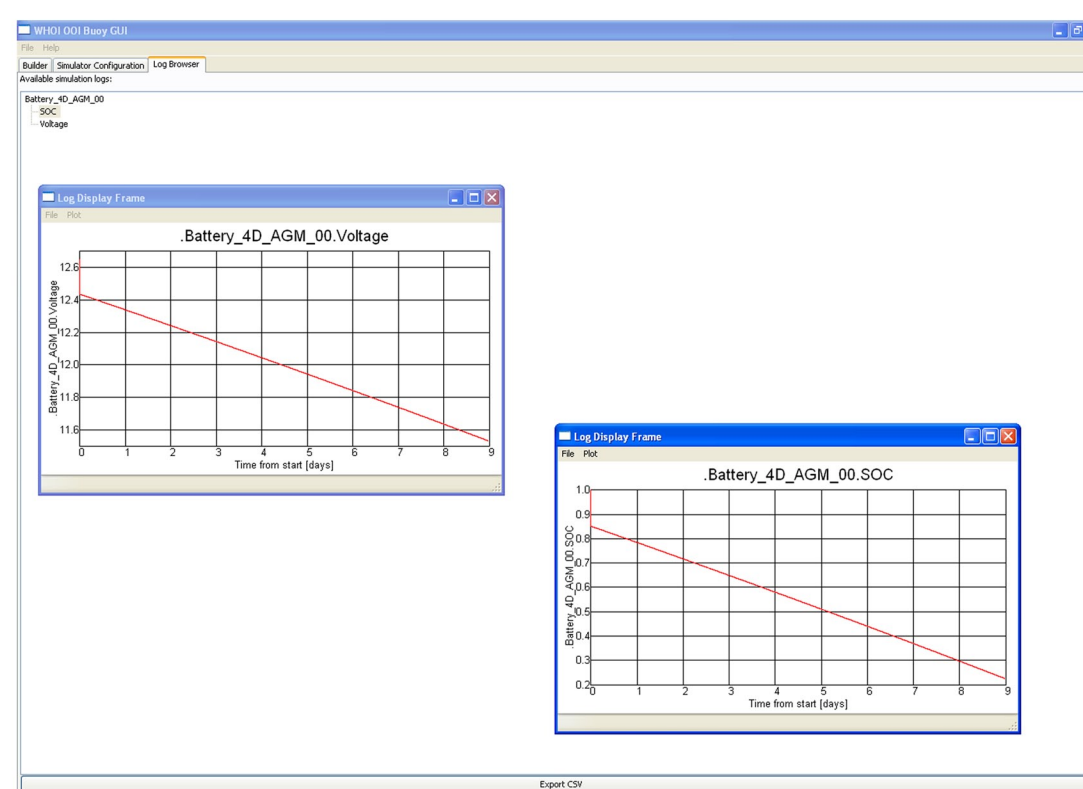
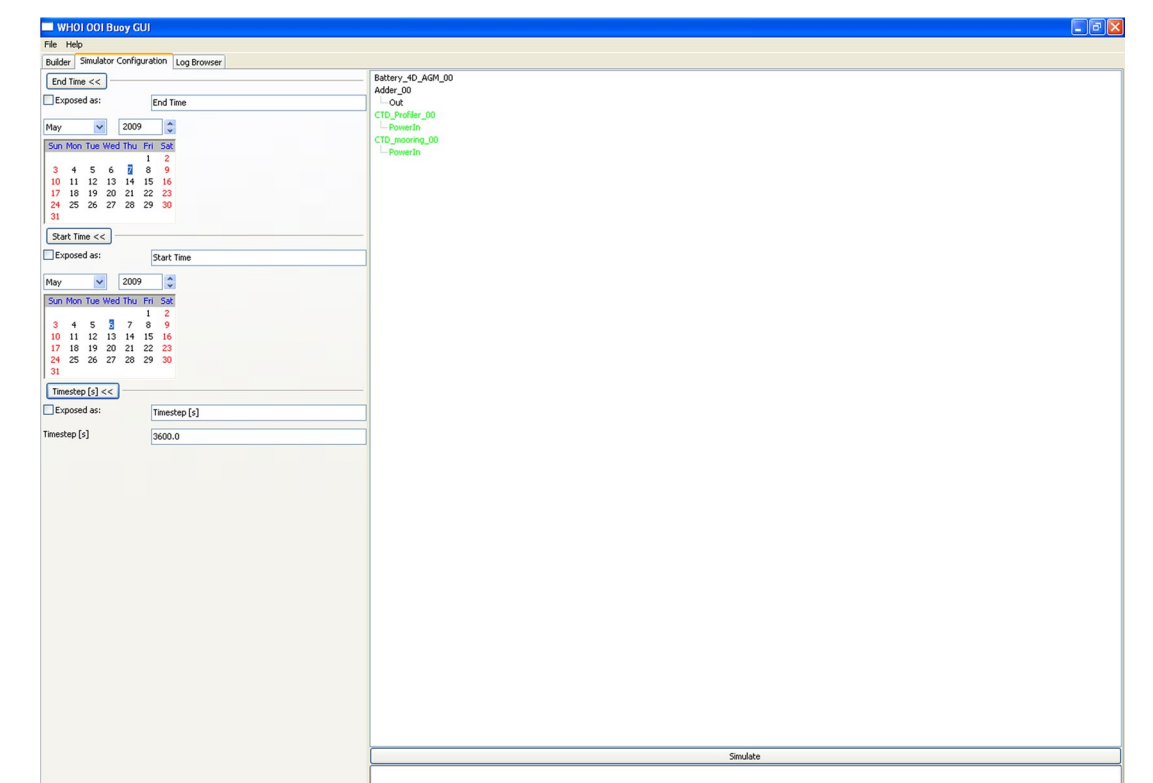
Determine how the system is interconnected.

Parameter Configuration

Set up modules for a specified behavior.

Subsystem Assembly

Generate subsystems from other modules to be instantiated as a single module



Output Viewer

View Logged Variables

Plot data from logged variables

Export Data

Data can be exported to be used in another plotting environment.

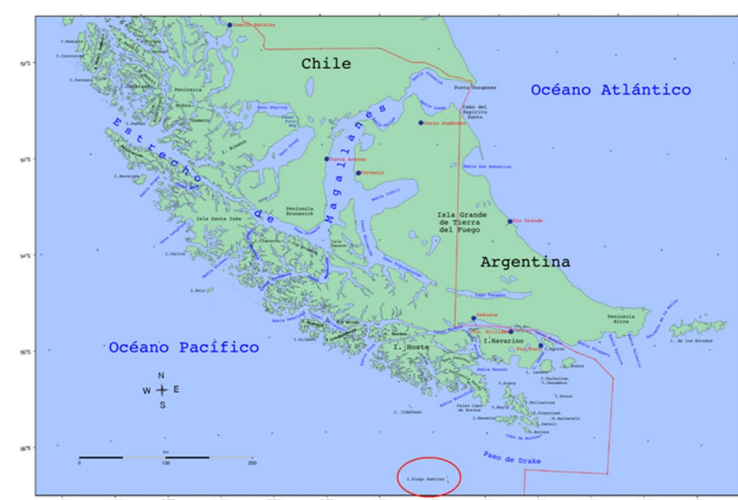
Simulation Models



+



+



Energy Harvesting Models -

Based on average weather data and probability distributions.

Sensor Models -

As a static power draw controlled by period and duty cycle.

Battery Models (Lead Acid) -

Simplified version based on state of charge and temperature.



SCOPE

Senior Consulting Program for Engineering

Raytheon

Raytheon - Woods Hole Team
 Faculty Advisor: Chris Lee
 Project Manager: Jobim Santos
 James Whong
 Roberto Santana
 Joan Liu
 Chris Nissman

