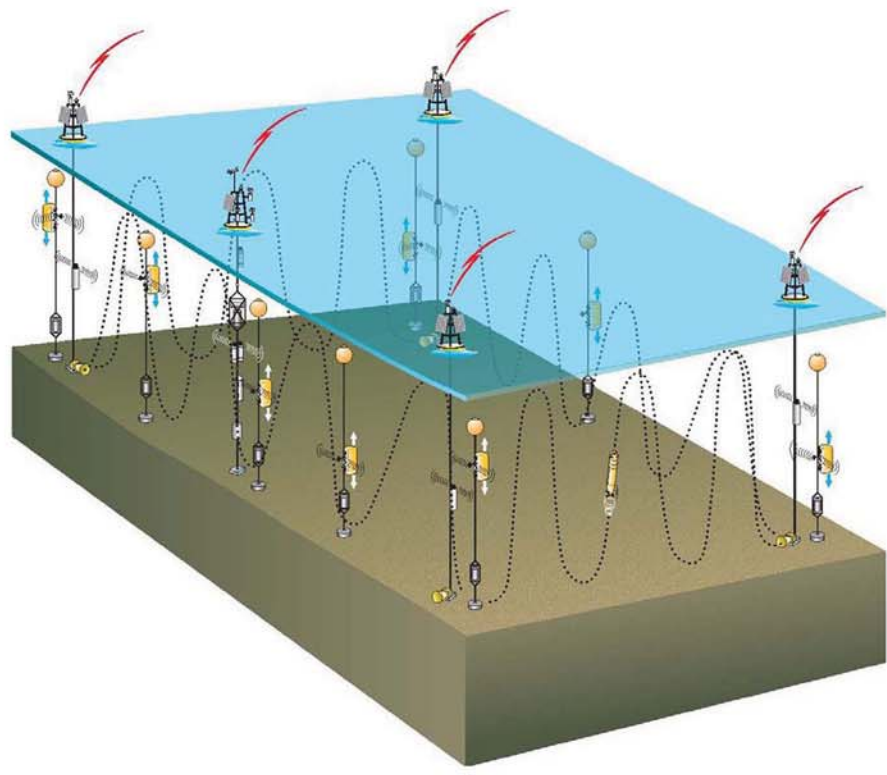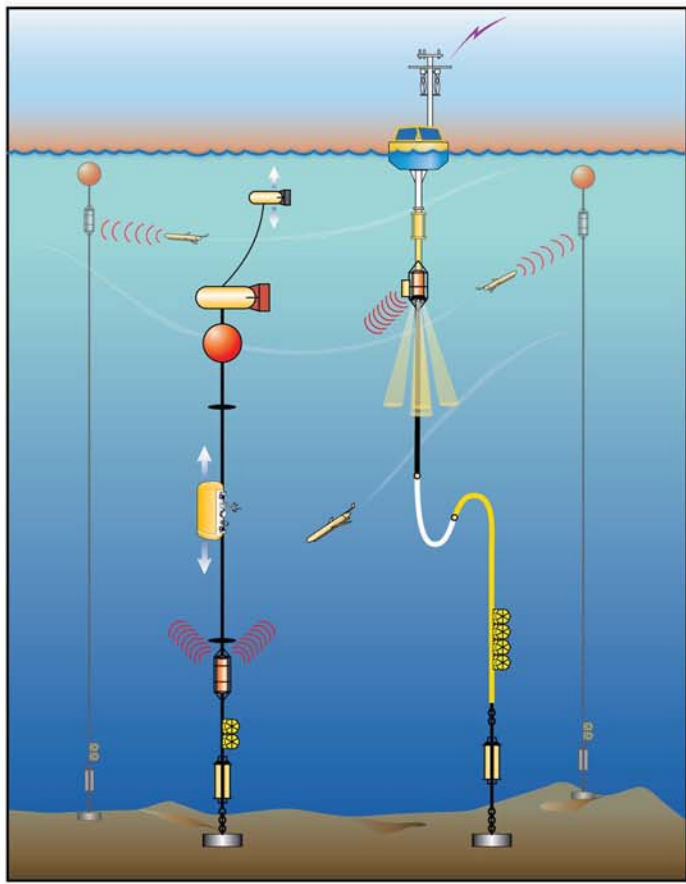# WHOI Buoy Power Simulator

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.
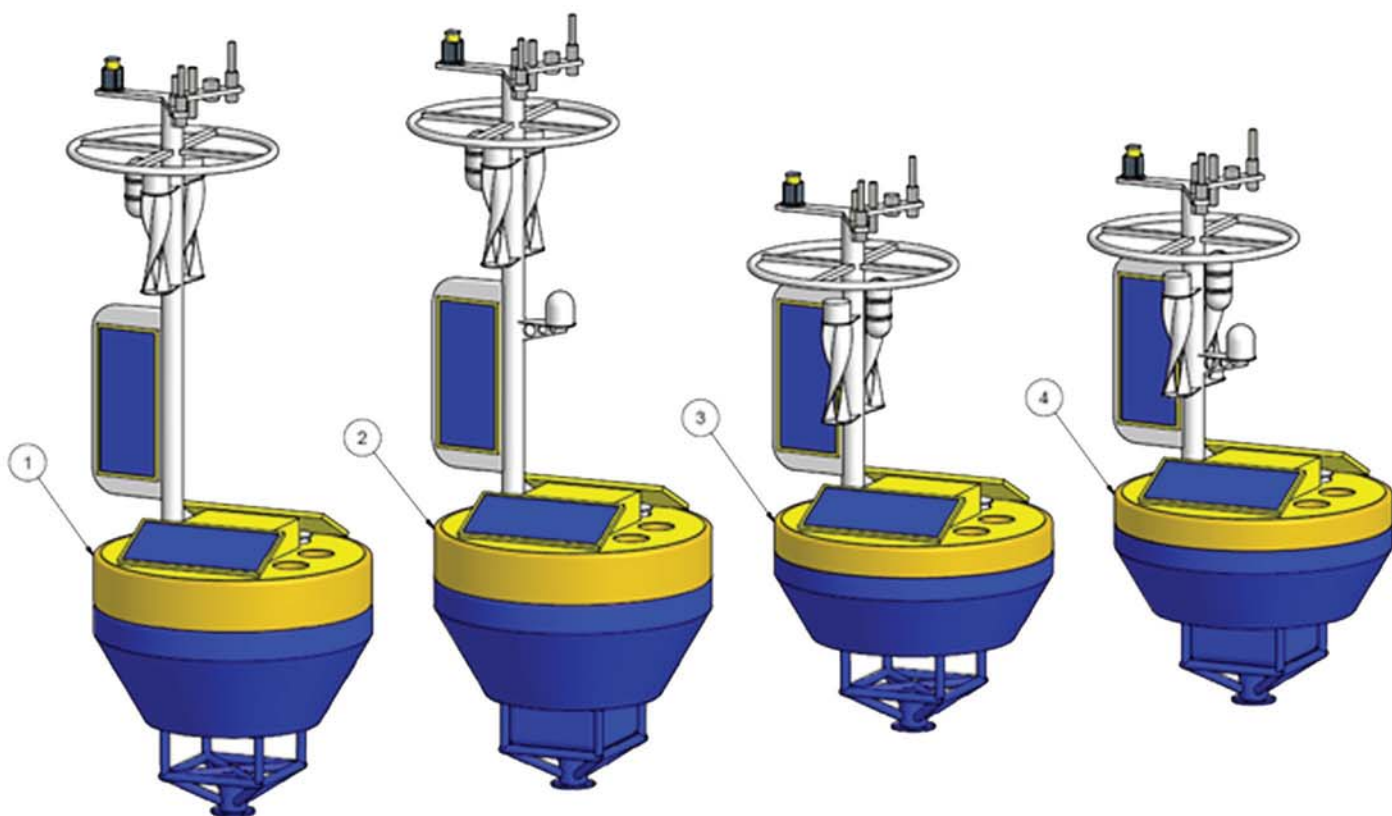

GUI Design
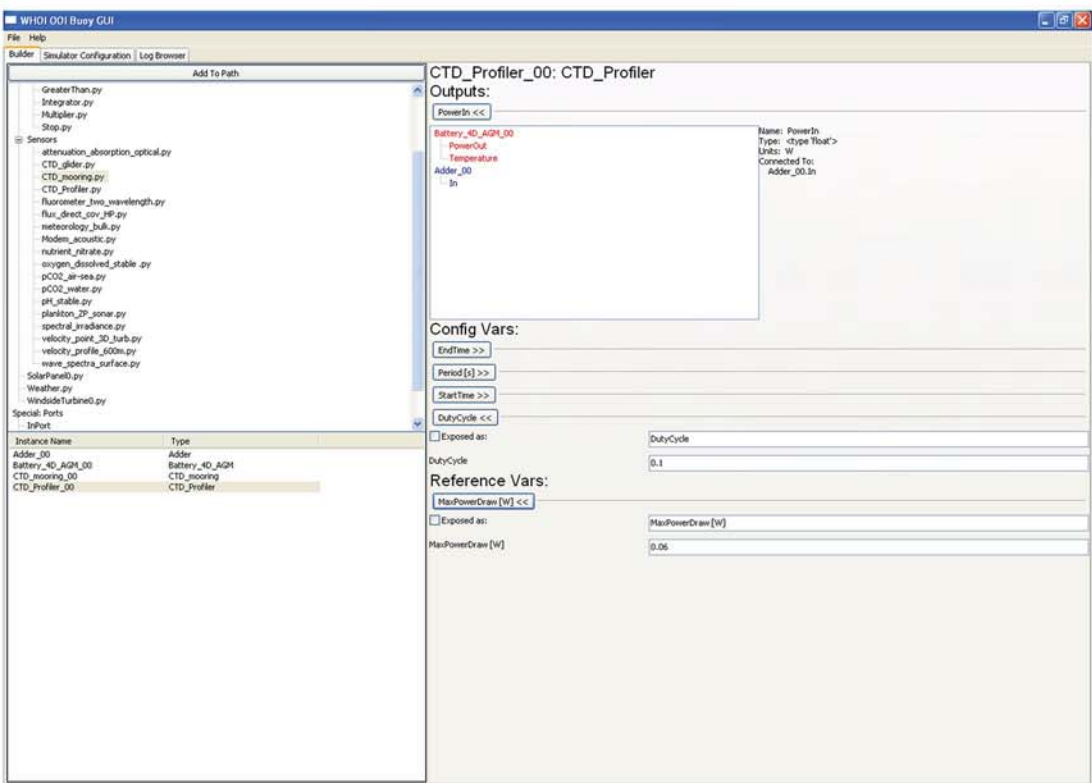
Simulation Setup

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
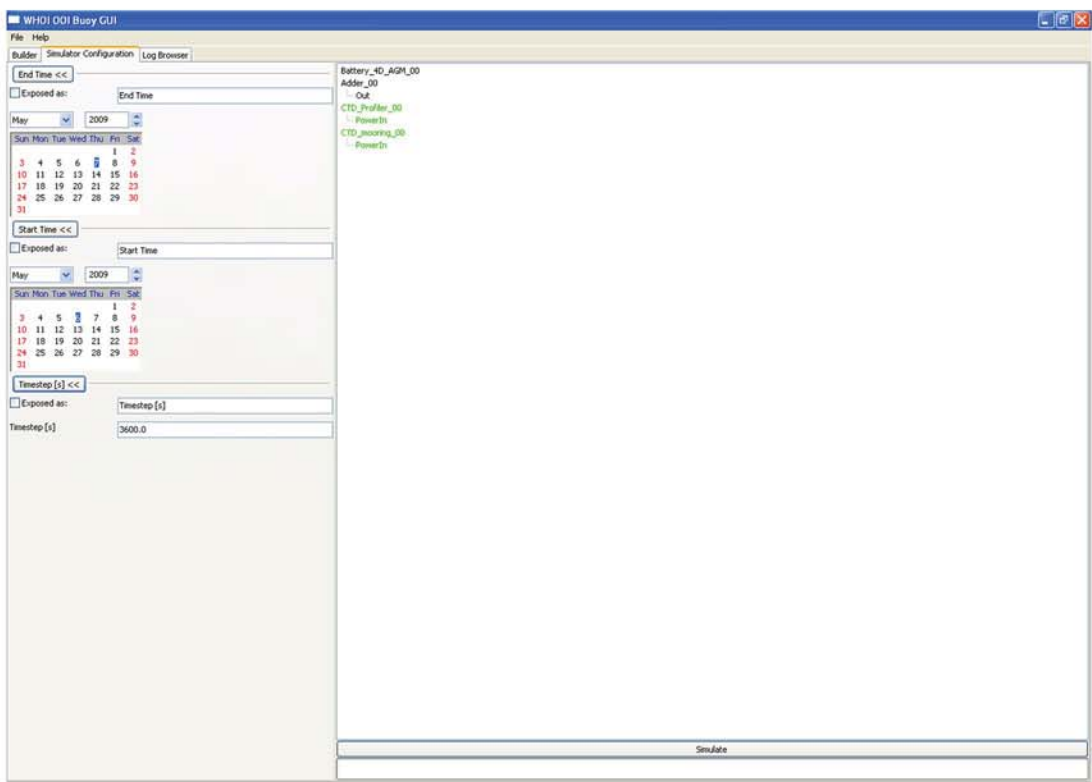
Output Viewer

View Logged Variables
    Plot data from logged variables
Export Data
    Data can be exported to be used in another plotting environment.
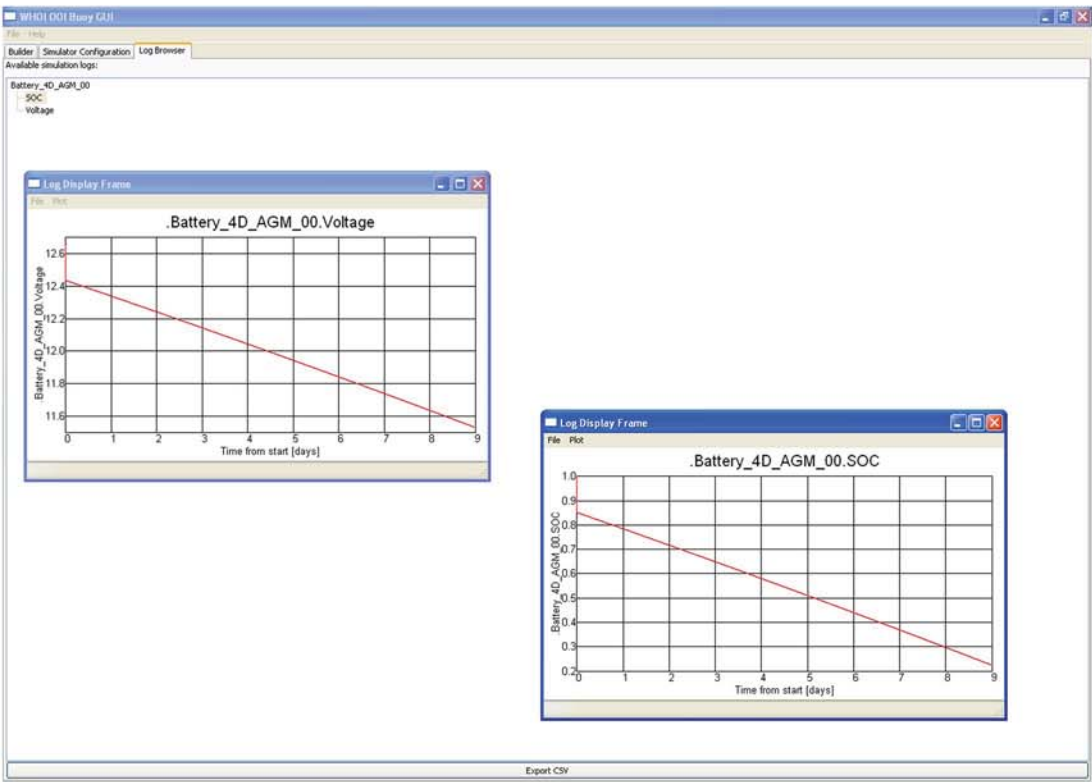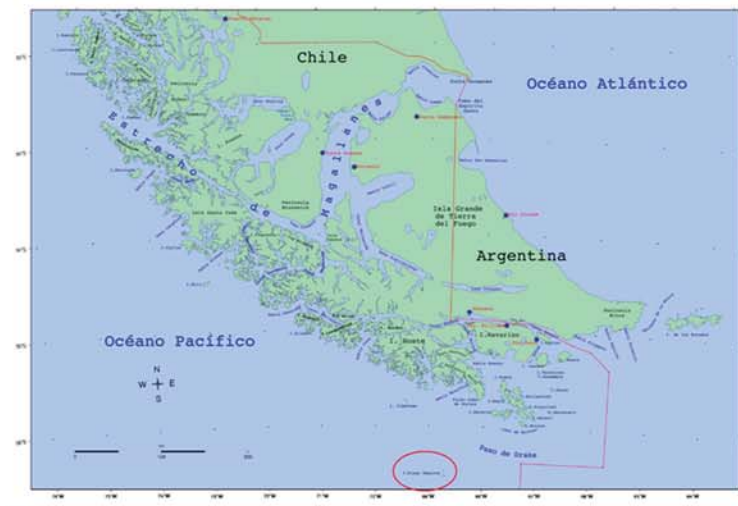
Simulation Models

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.

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