# Continuous Water Quality Monitoring Platform for Grand Lake St. Marys

## Abstract

For the past decade, Grand Lake St. Mary's (GLSM) has struggled to provide a stable and clean water source for the community affecting people and businesses alike. A safe level of microcystin – a toxin in the harmful algal blooms– is 20 ppb in recreational water, and GLSM has seen an excess of 82 ppb. As of now, there is no solution to continuously monitor the water quality; therefore, corrective actions are only based off intermittent samples taken by hand. A solution to this issue would be a water quality platform (WQP) that monitors parameters such as water and air temperature, conductivity, pH, rainfall, and wind speed along with water depth in fifteen-minute intervals. To monitor the required parameters: 1) a remote WQP will be constructed, 2) the sensors on this platform will relay data wirelessly to a data logging computer, and 3) a database will be updated with the latest condition of the lake. The WQP will provide researchers means to learn in real time what contributes to the water quality, while community members are provided with the ability to monitor the conditions, safety, and usability of the water. Scientific evidence on the quality of the water allows sound decisions to be made regarding the management of the lake through determining the cruxes leading to the poor water quality.
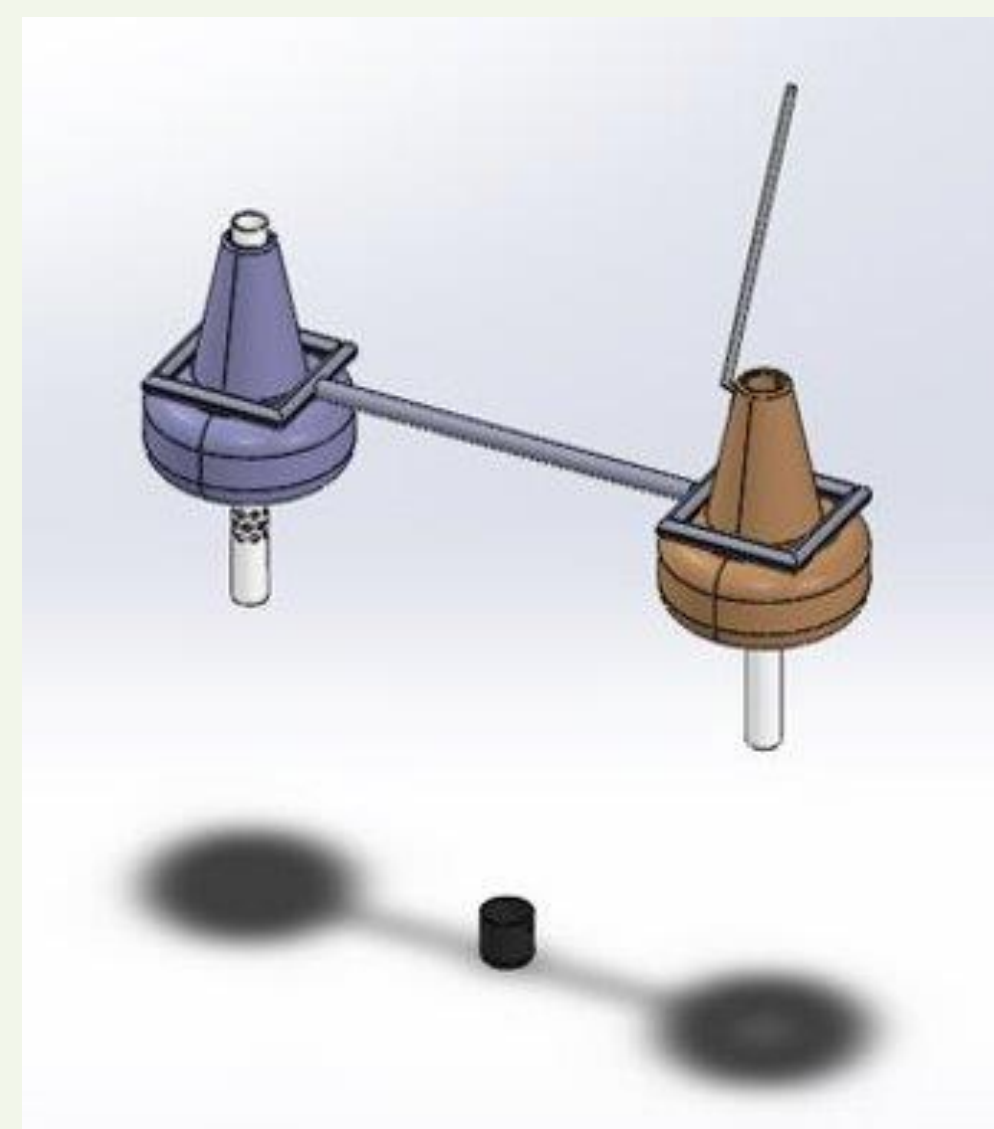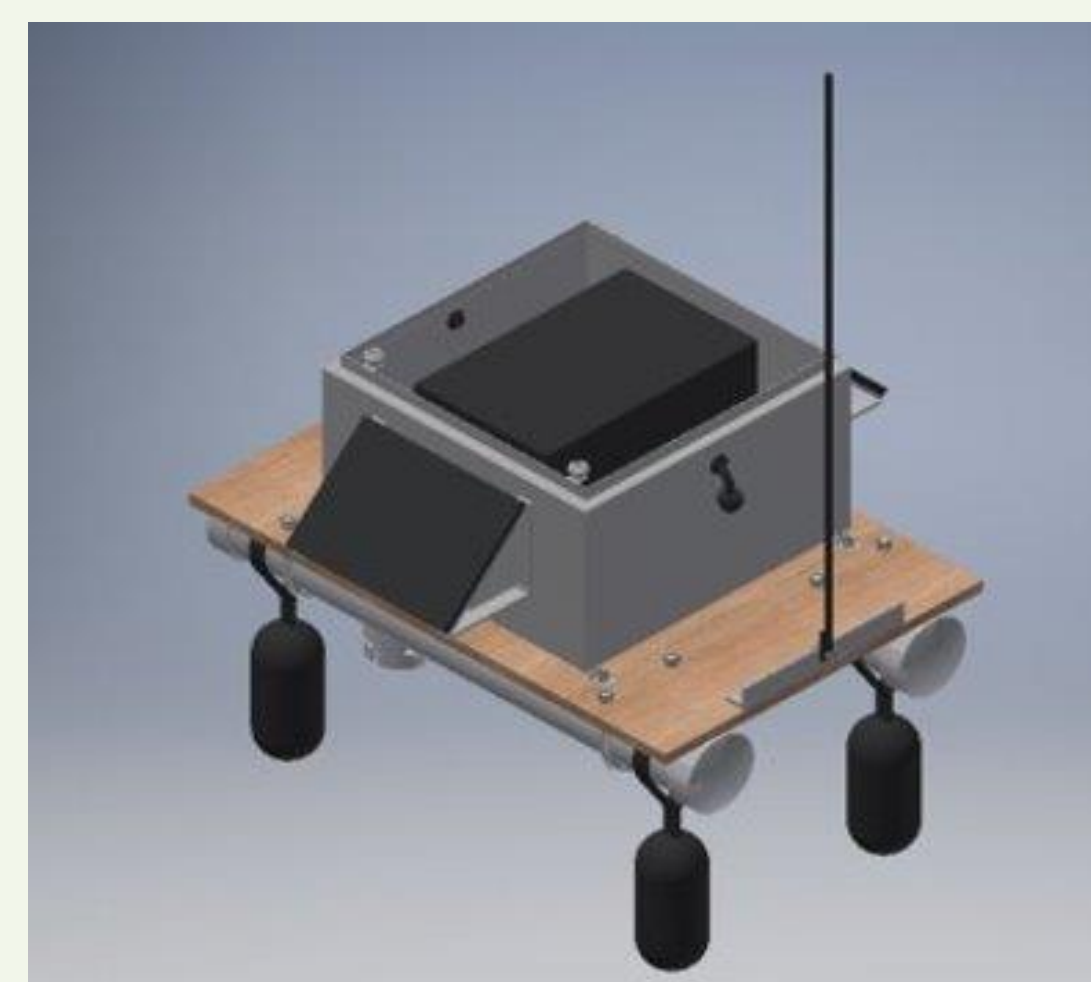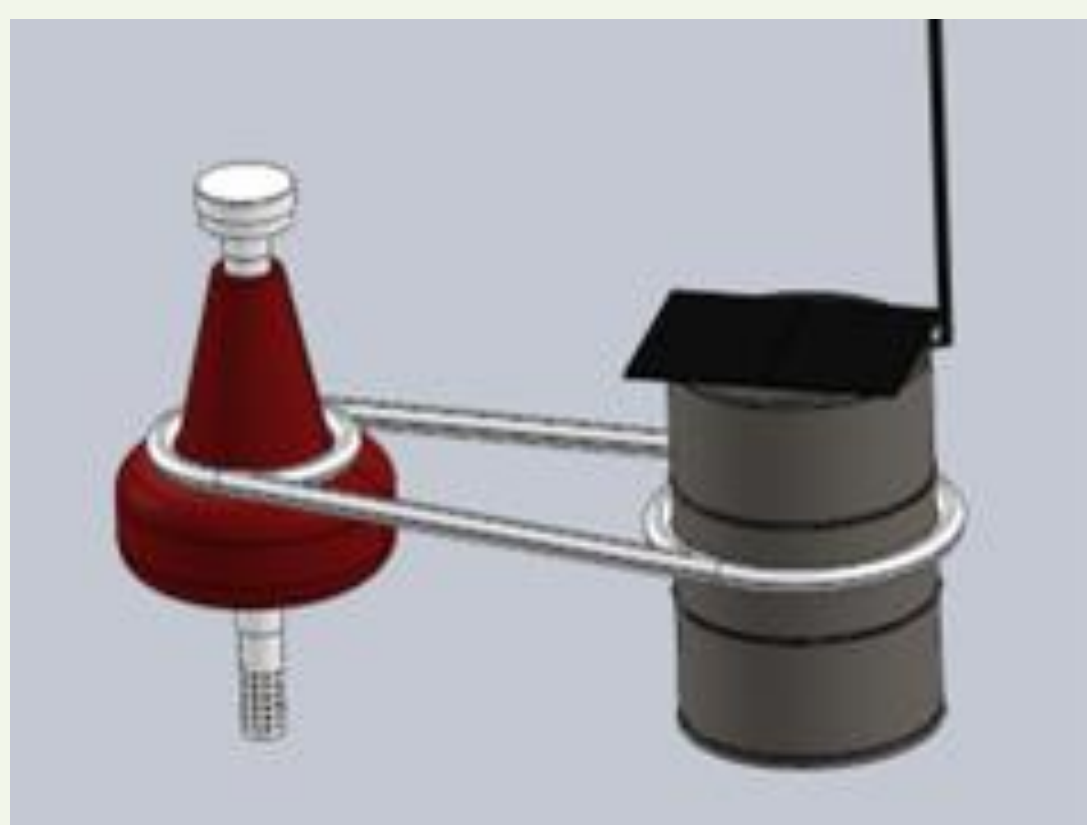
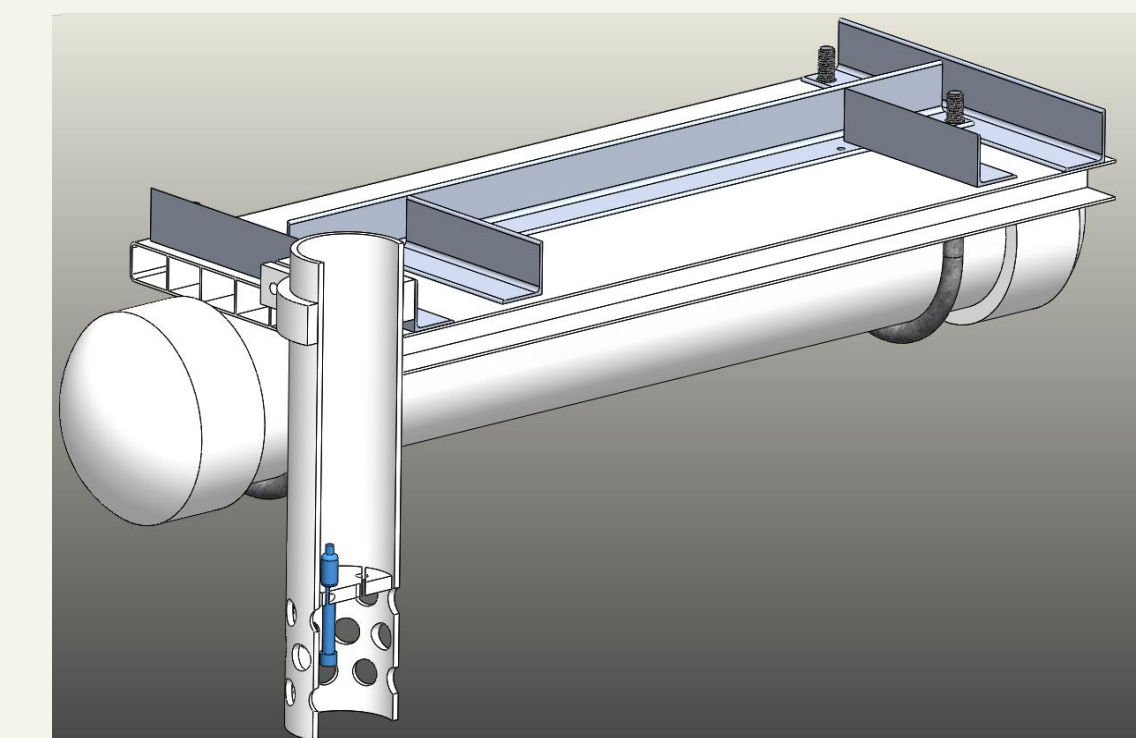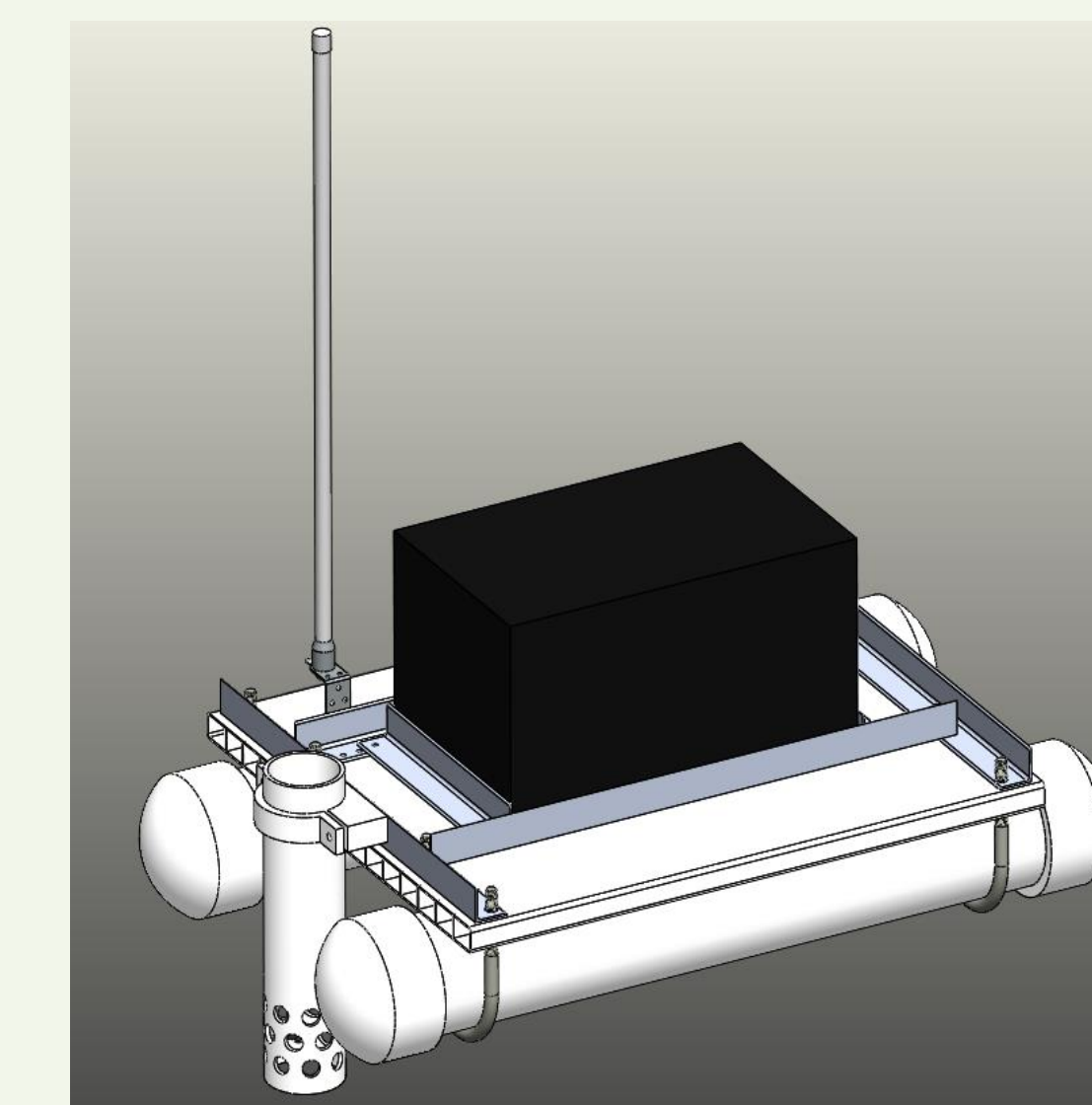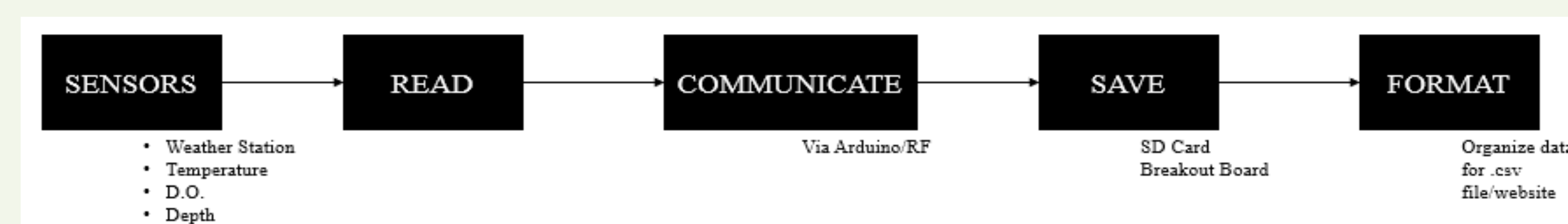## Mechanical Design



Design 1



Design 2



Design 3

| Design Matrix | | | |
|---|---|---|---|
| | Design 1 | Design 2 | Design 3 |
| Manufacturing | 3 | 2 | 1 |
| Maintenance | 3 | 2 | 1 |
| Longevity | 1 | 3 | 2 |
| Price | 1 | 2 | 3 |
| Portability | 2 | 3 | 1 |
| Weight | 2 | 3 | 1 |
| Size | 2 | 3 | 1 |
| Total | 14 | 18 | 10 |



**Final Design**

## Programming Design



**Initial Layout**
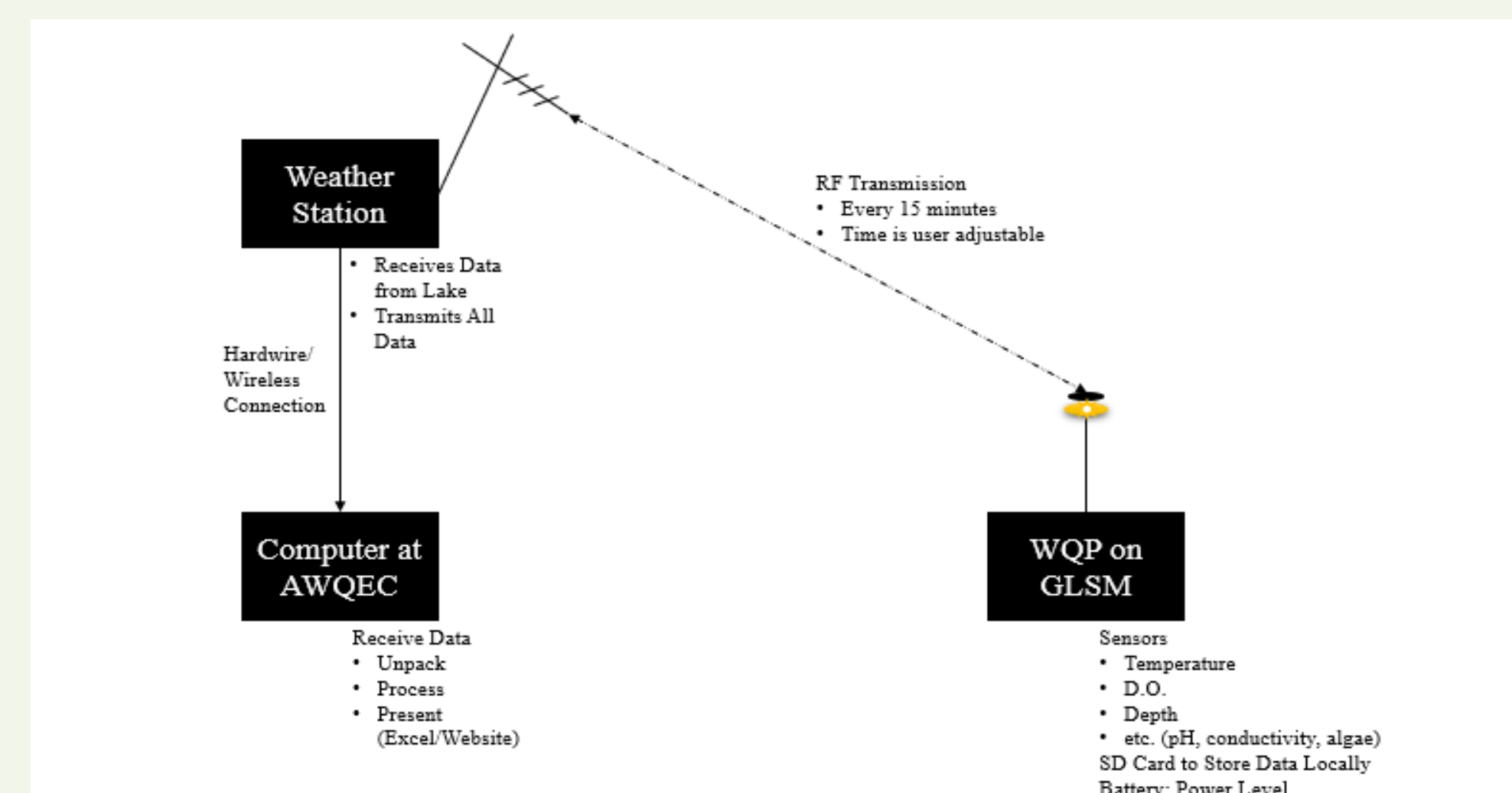


**Expanded Layout**



**Final Layout**

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