Intelligent Water Project:

Remote Sensing of Pump Health for Promotion of Clean Water Access In Developing Countries

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Department of Engineering
the Collaboratory for strategic partnerships and applied research
Messiah College
World Vision

Walking For Water

Unclean Water Sources

Improved Water Sources

Walking Farther For Water

More People Walking

Our Solution

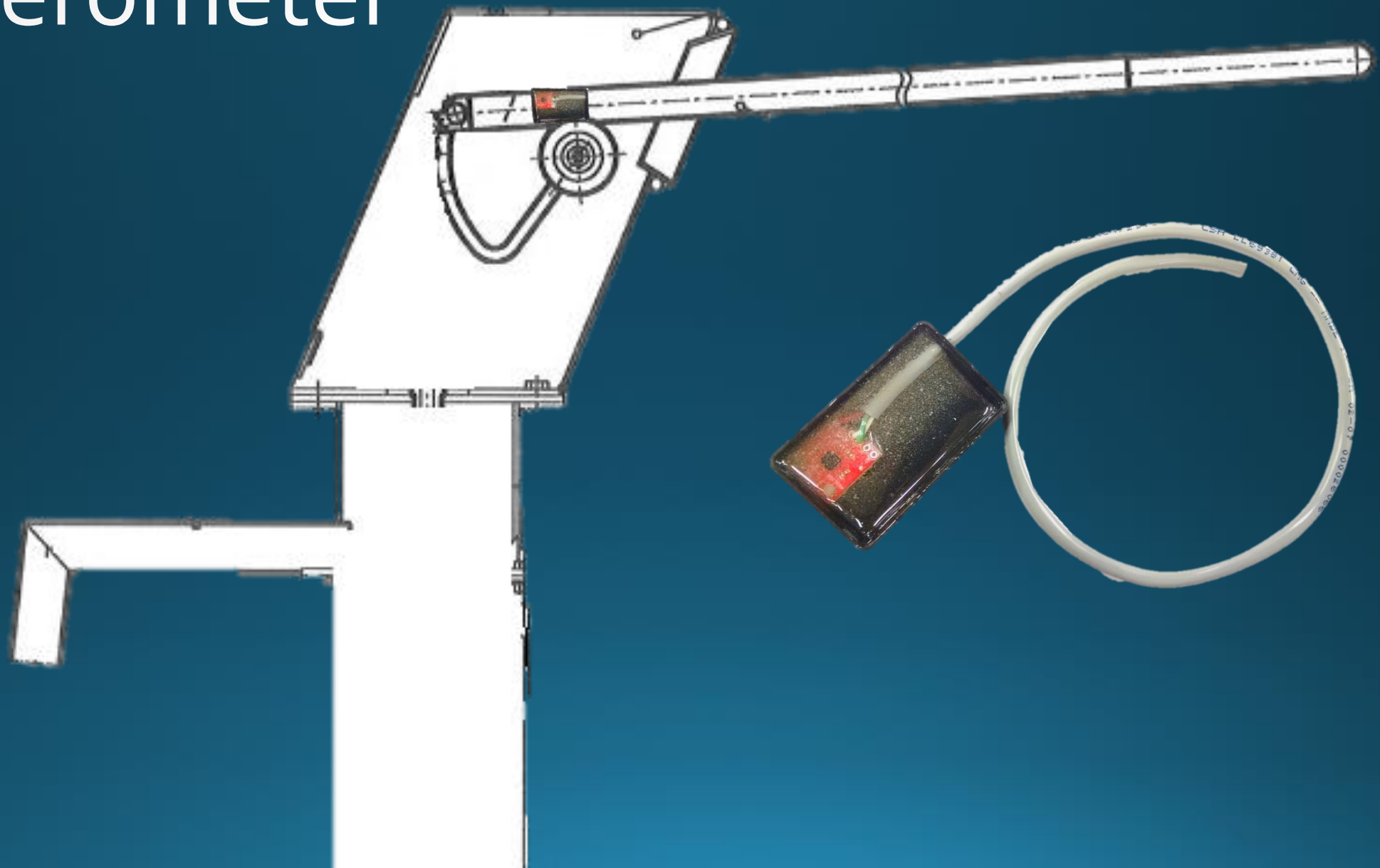
What We Measure:

- Volume Pumped
- Priming Time
- Leak Rate

How We Measure:

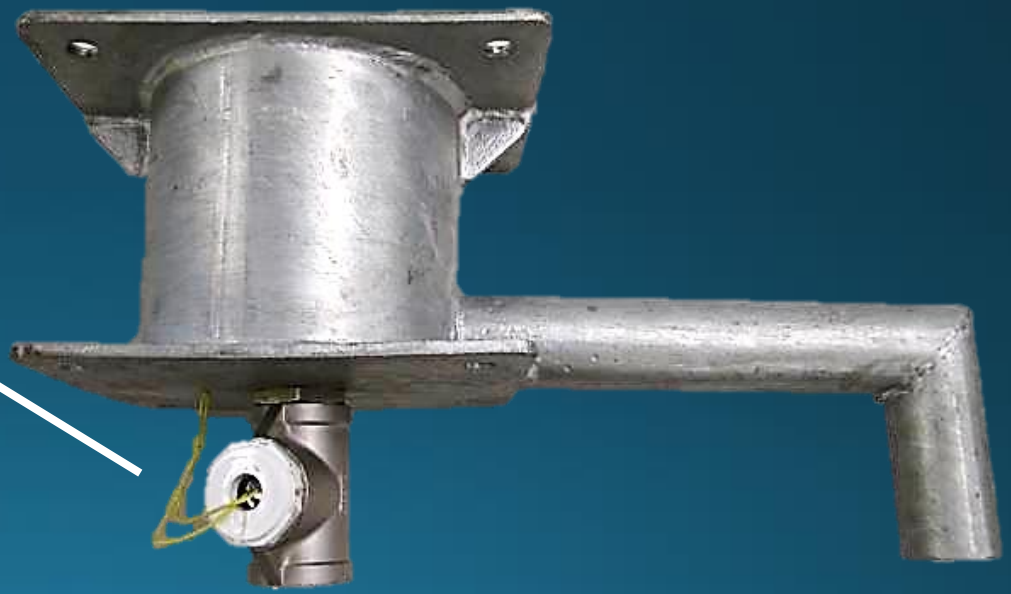
- Accelerometer
- Water Presence Sensor

Accelerometer



Water Presence Sensor

Water Presence Sensor



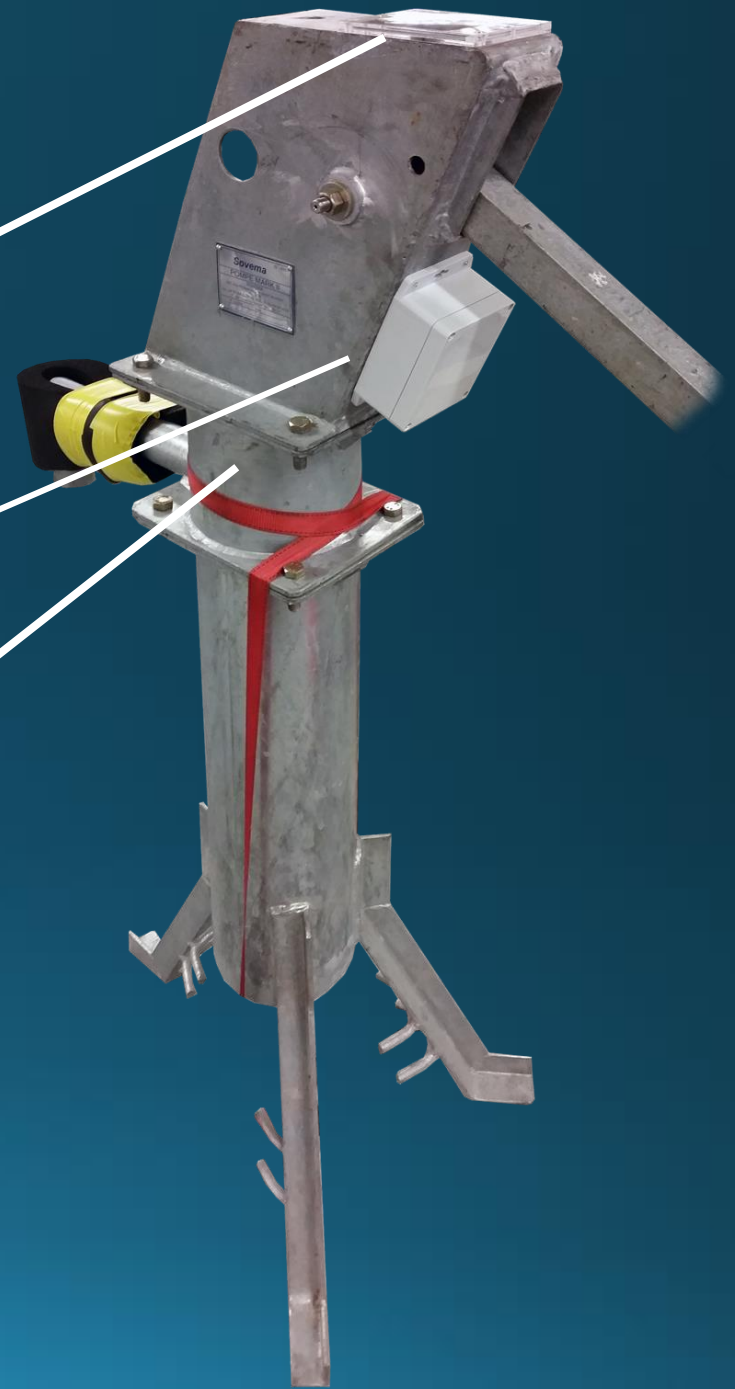
Our System

Accelerometer

Solar Panel
(Battery)

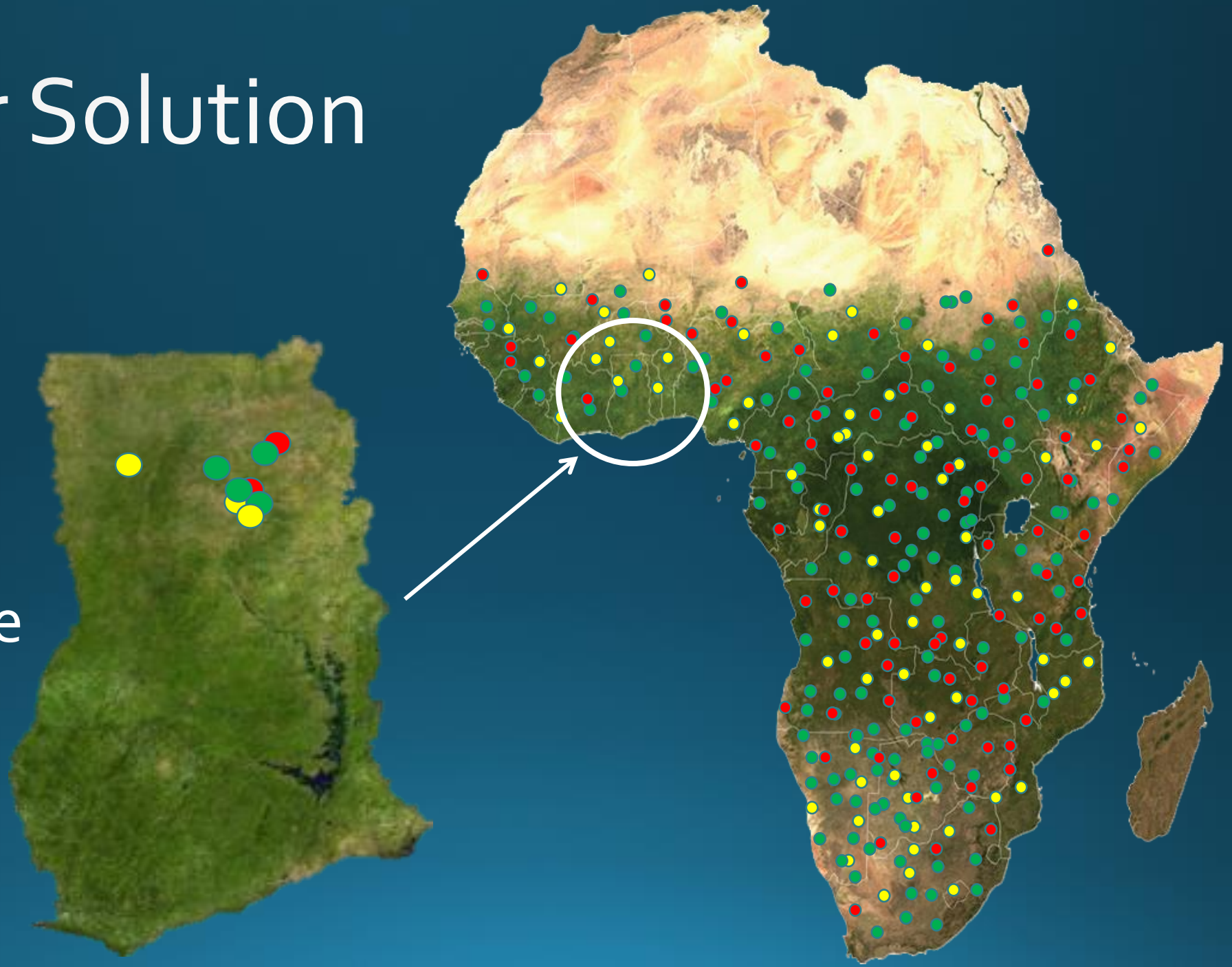
Electronics Box

Water Presence
Sensor



Sharing Our Solution

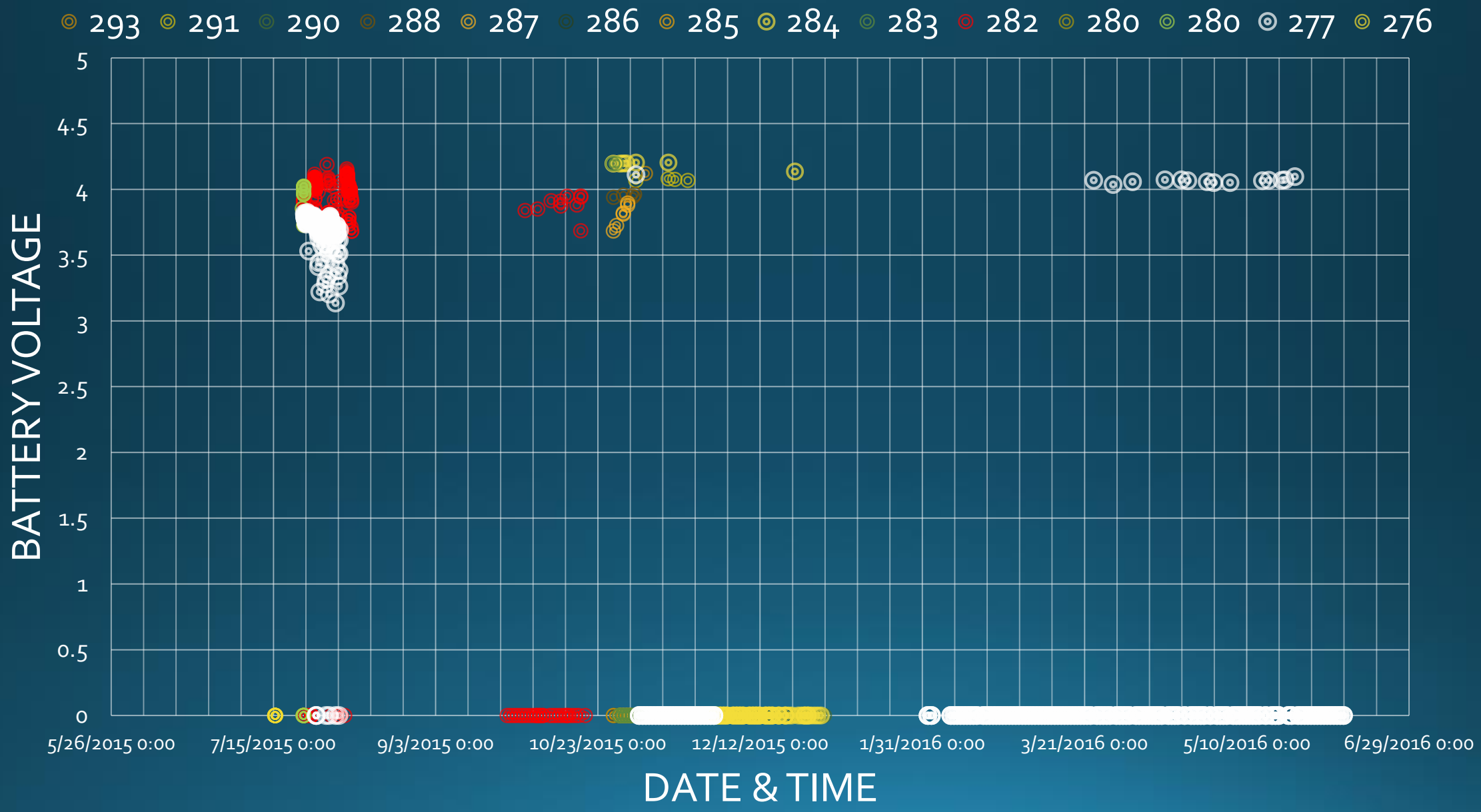
- Functional
- Requires Maintenance
- Critical Failure



2016-2017 Focus

- Functionality
- Serviceability
- Manufacturability

Battery Level for All Pumps

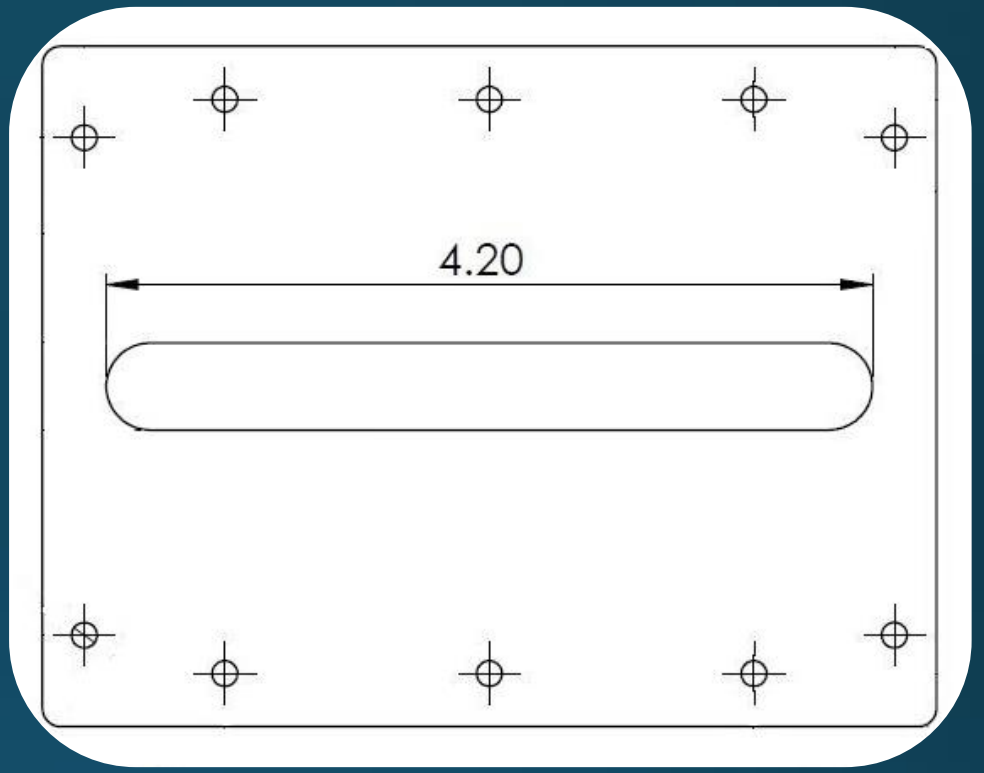


To Ghana

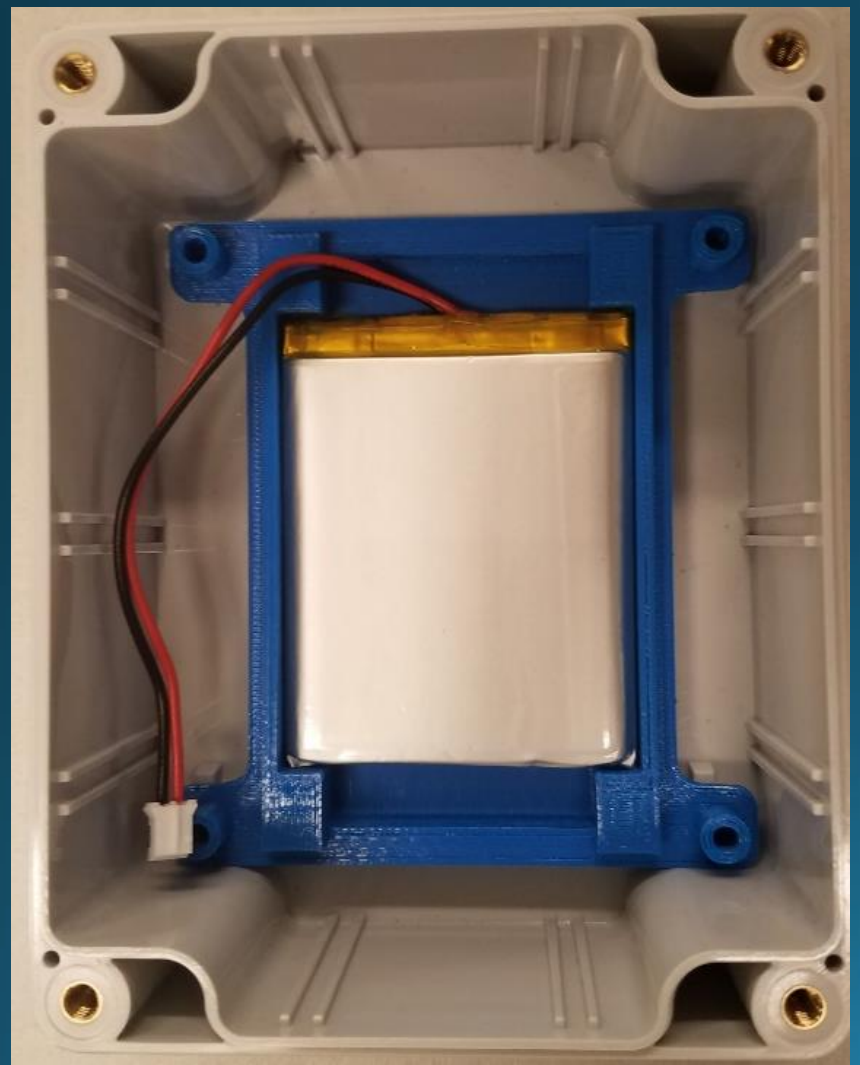
Solar Panels

Solar Panels

Solar Panels



Main Electronics Issues



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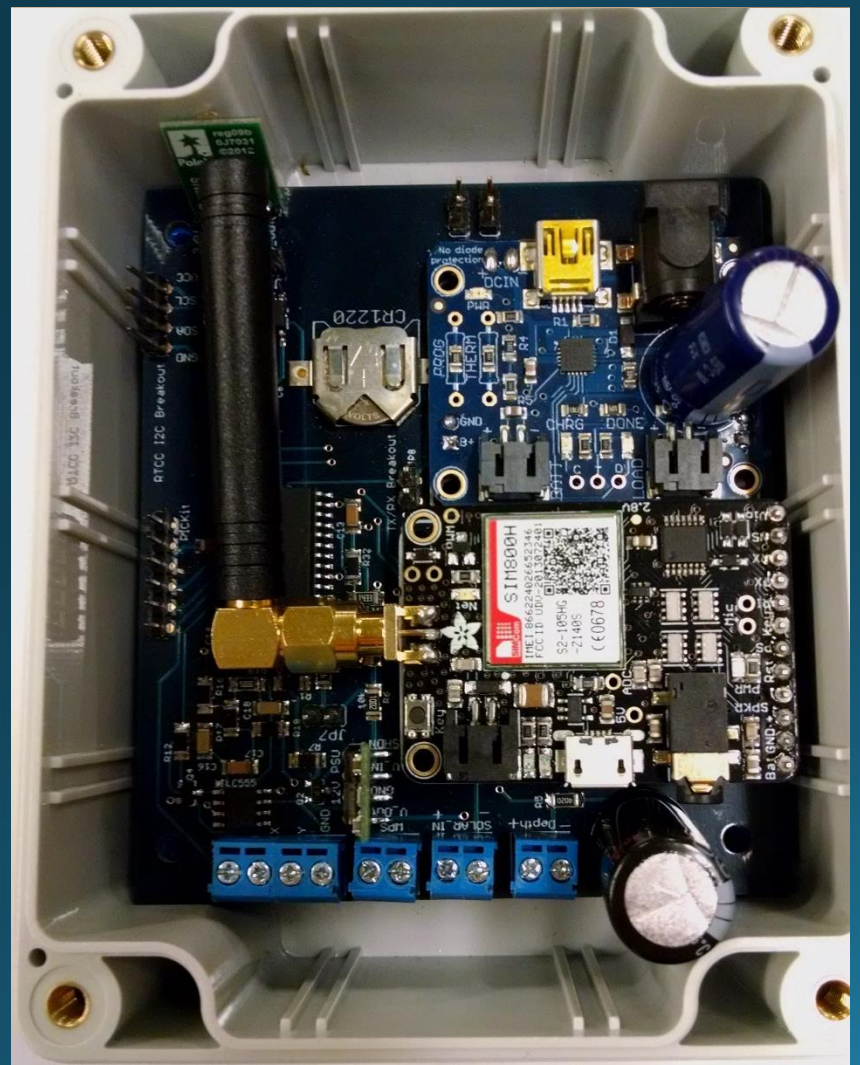

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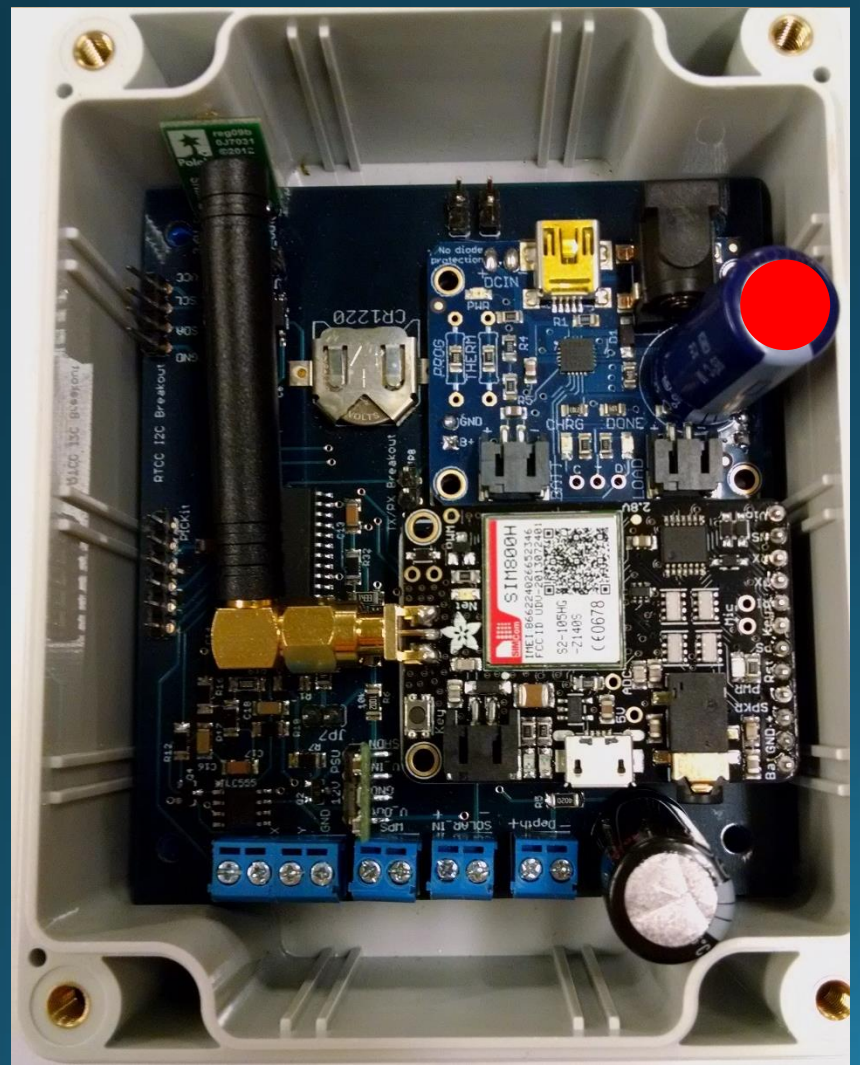

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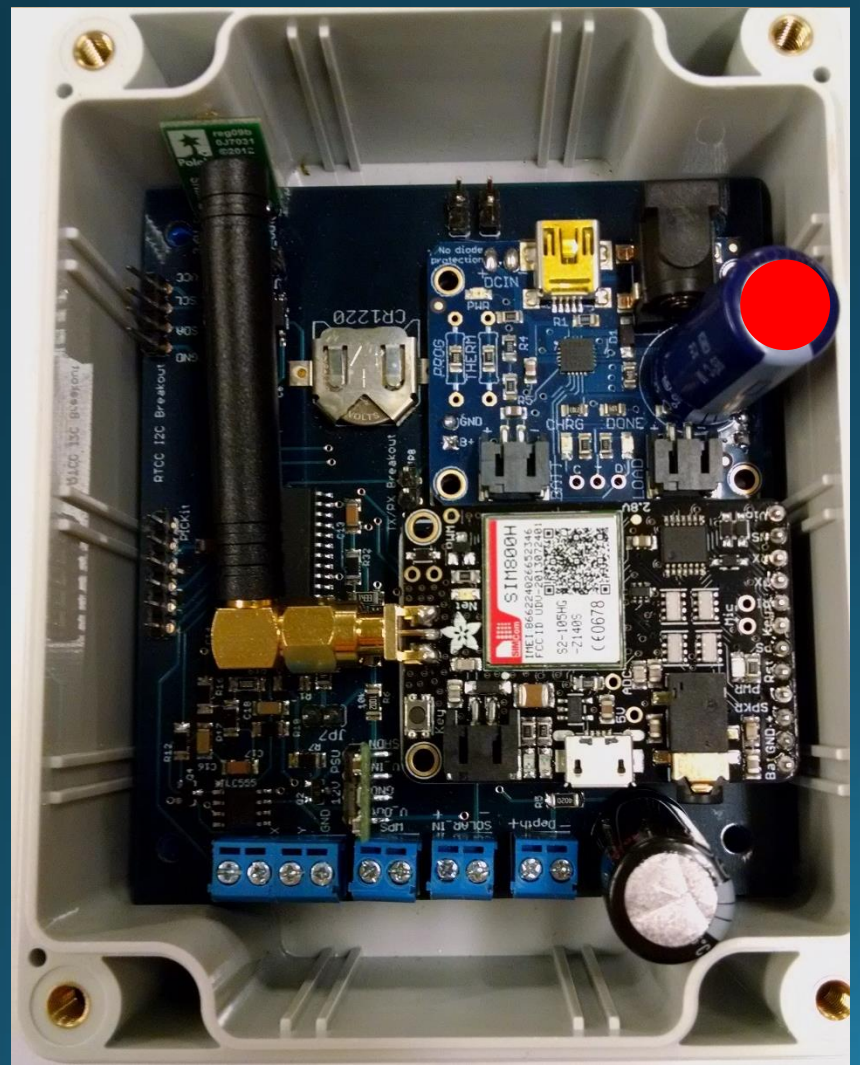

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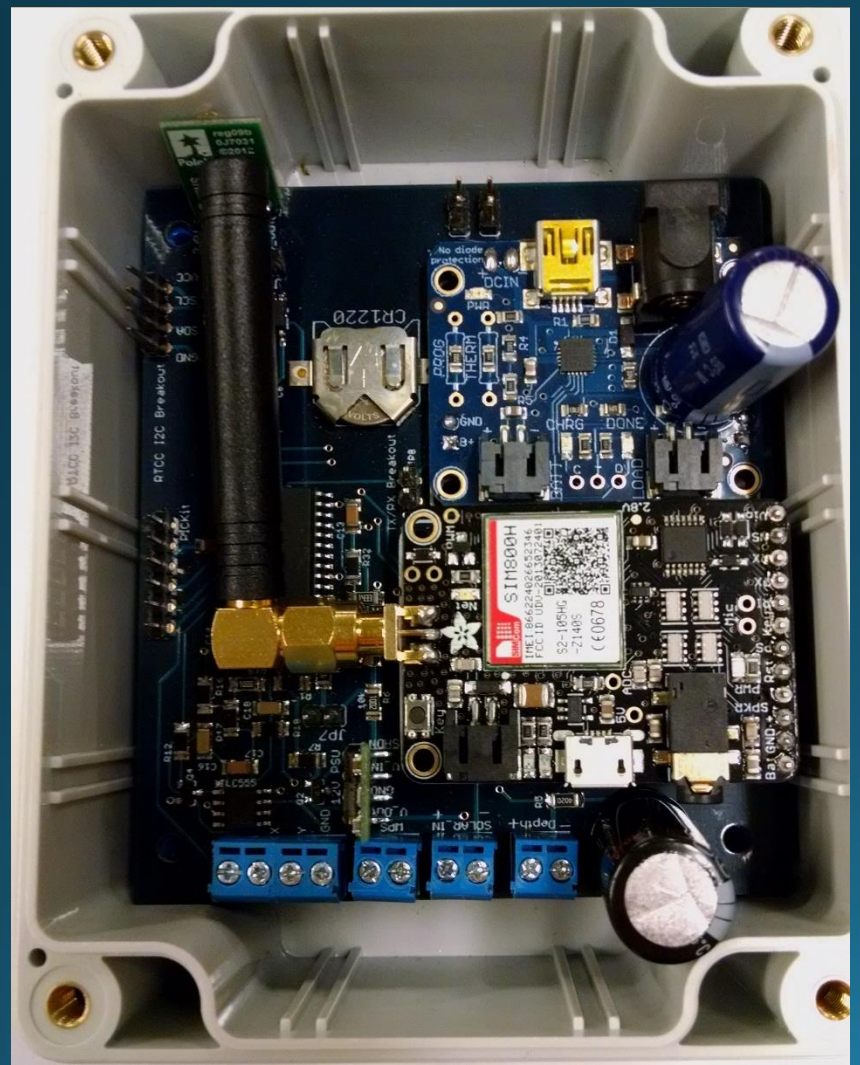
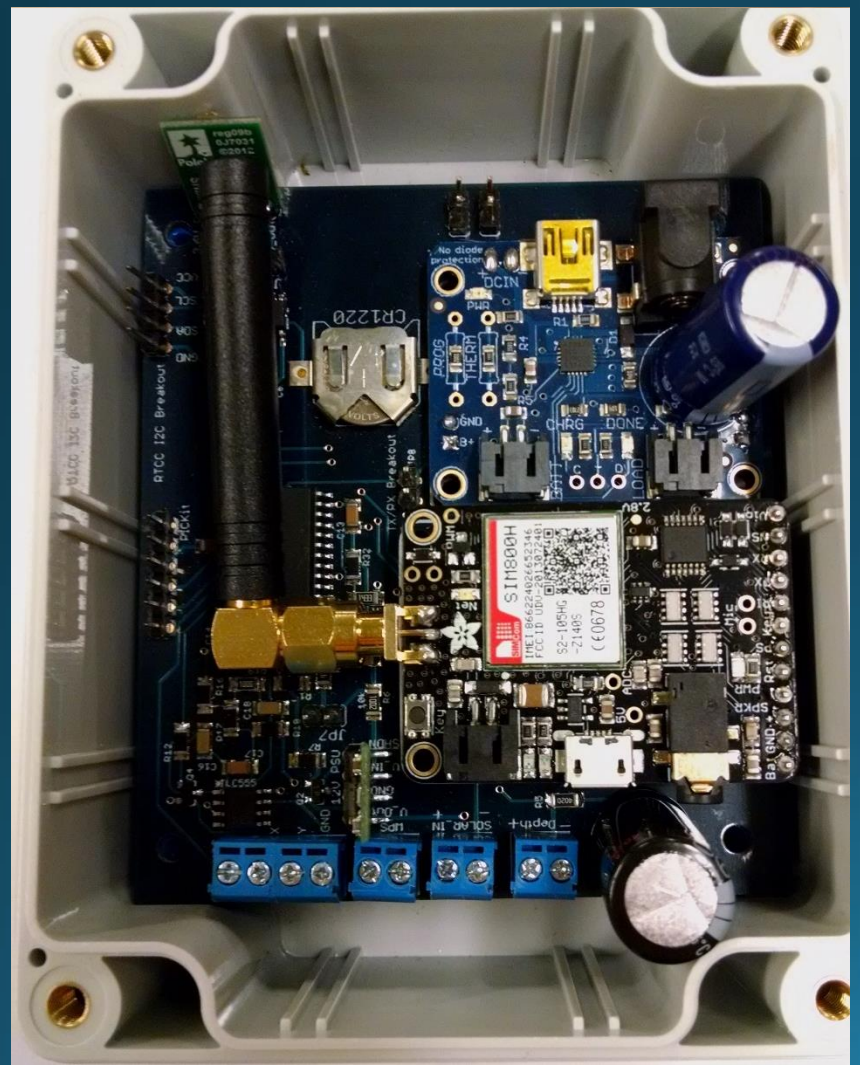


Solutions

- Mount Battery above Electronics
- Added power saving measures to the firmware

Main Electronics Issues



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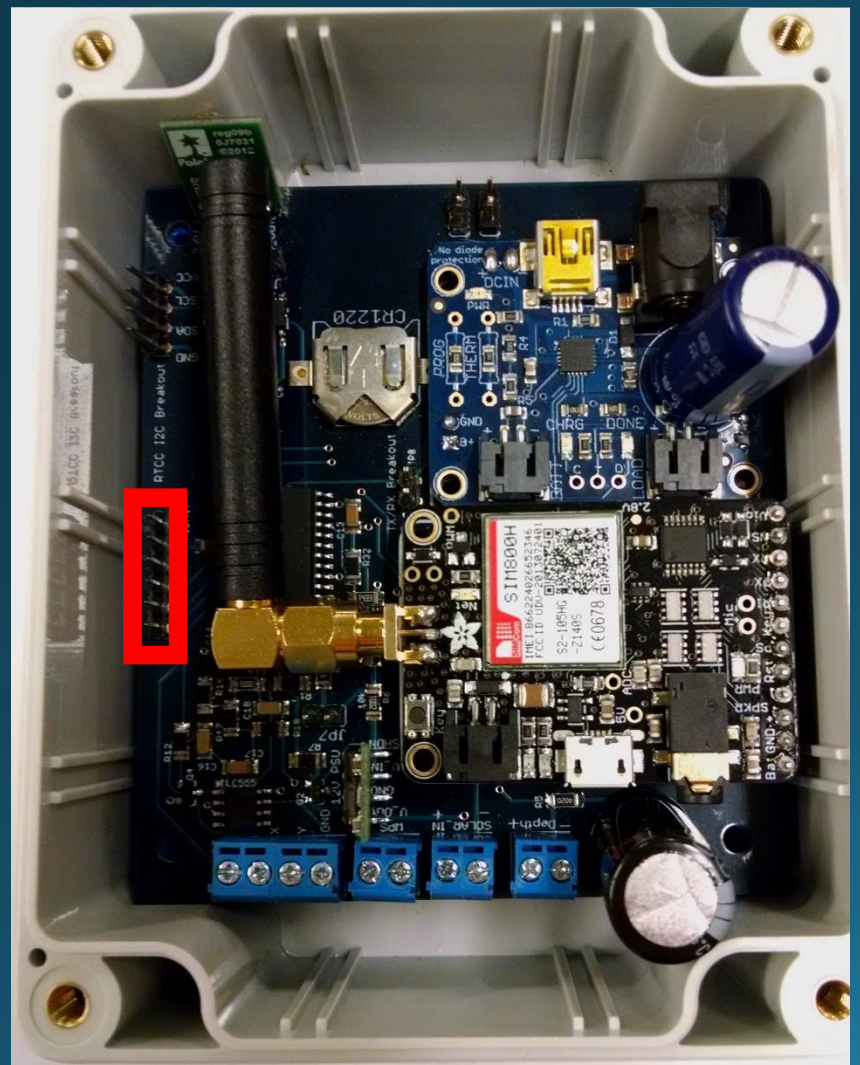
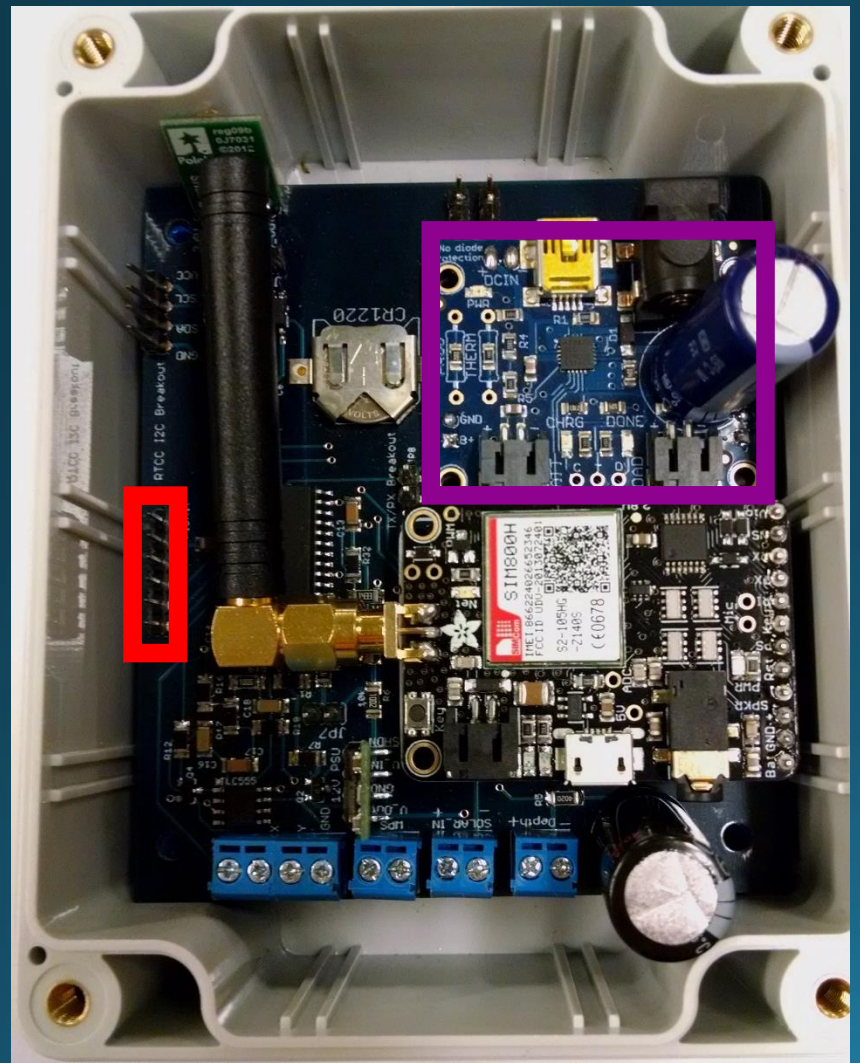


Main Electronics Redesign



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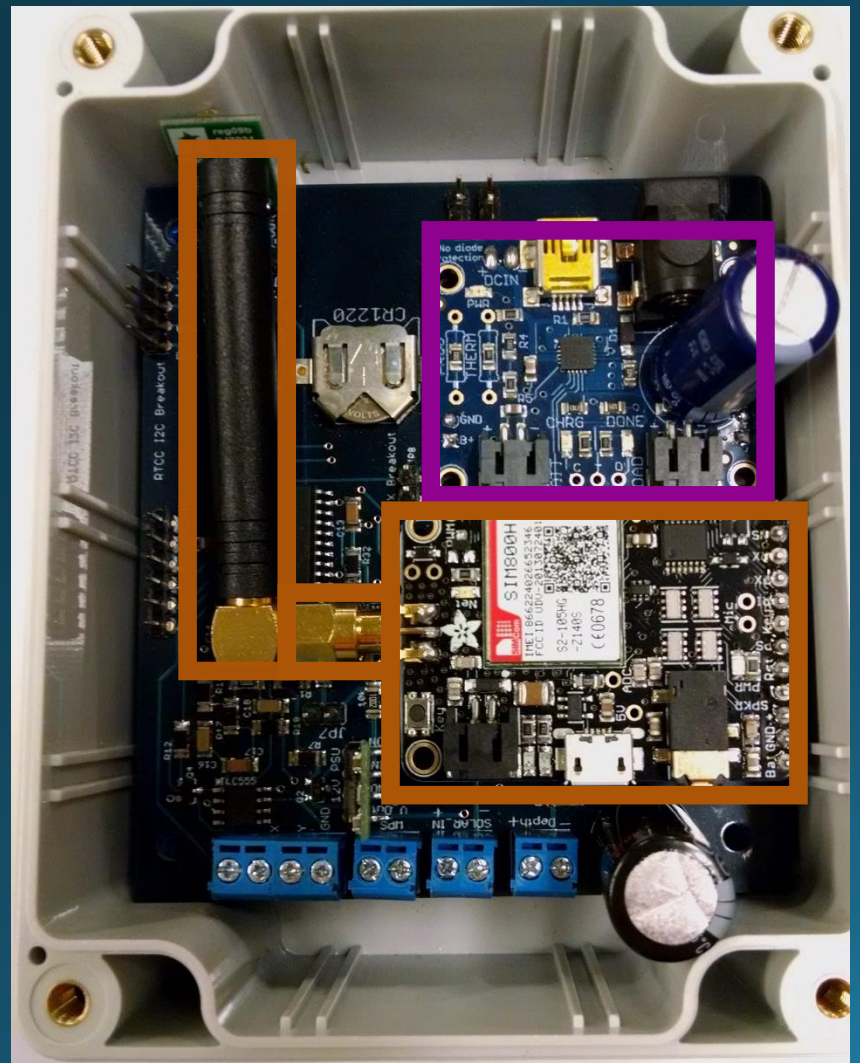

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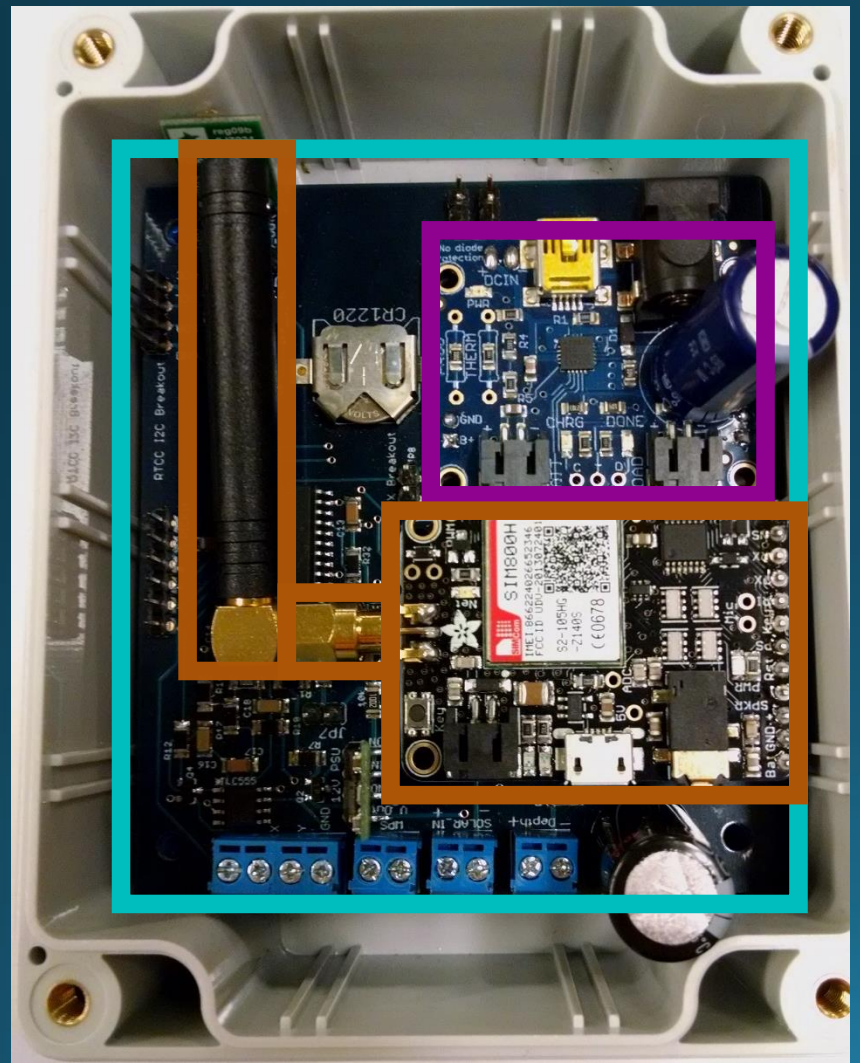

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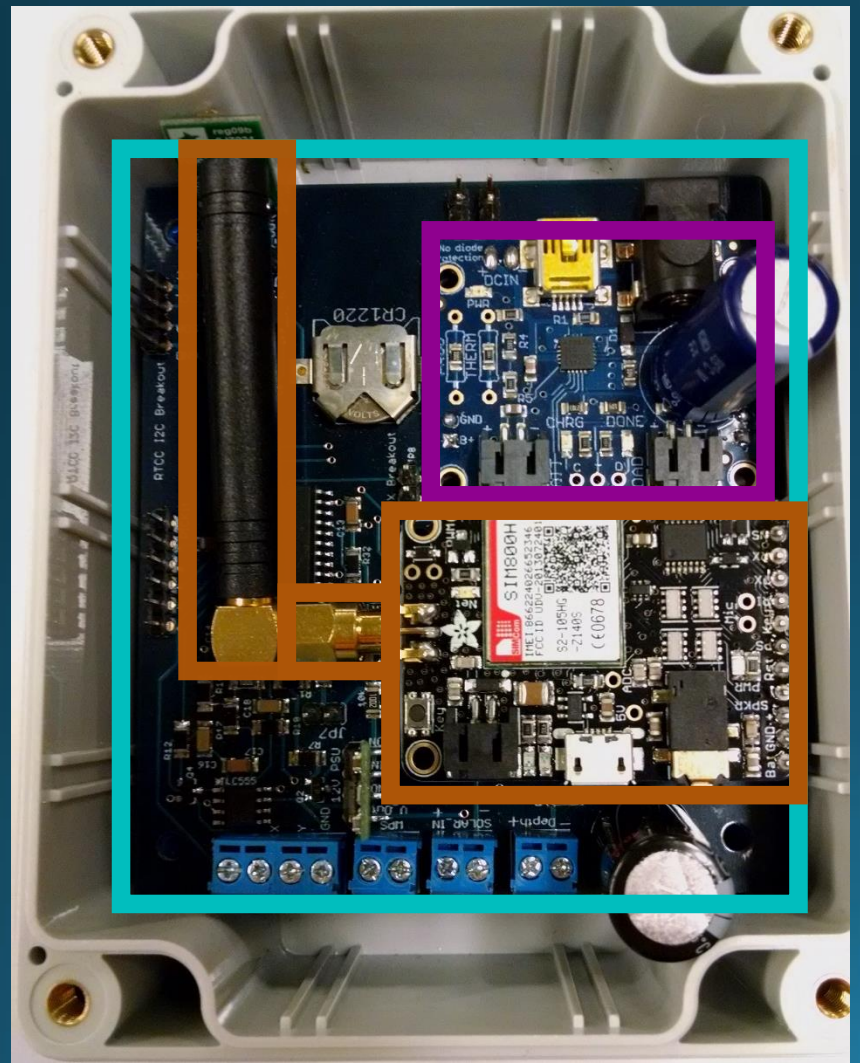
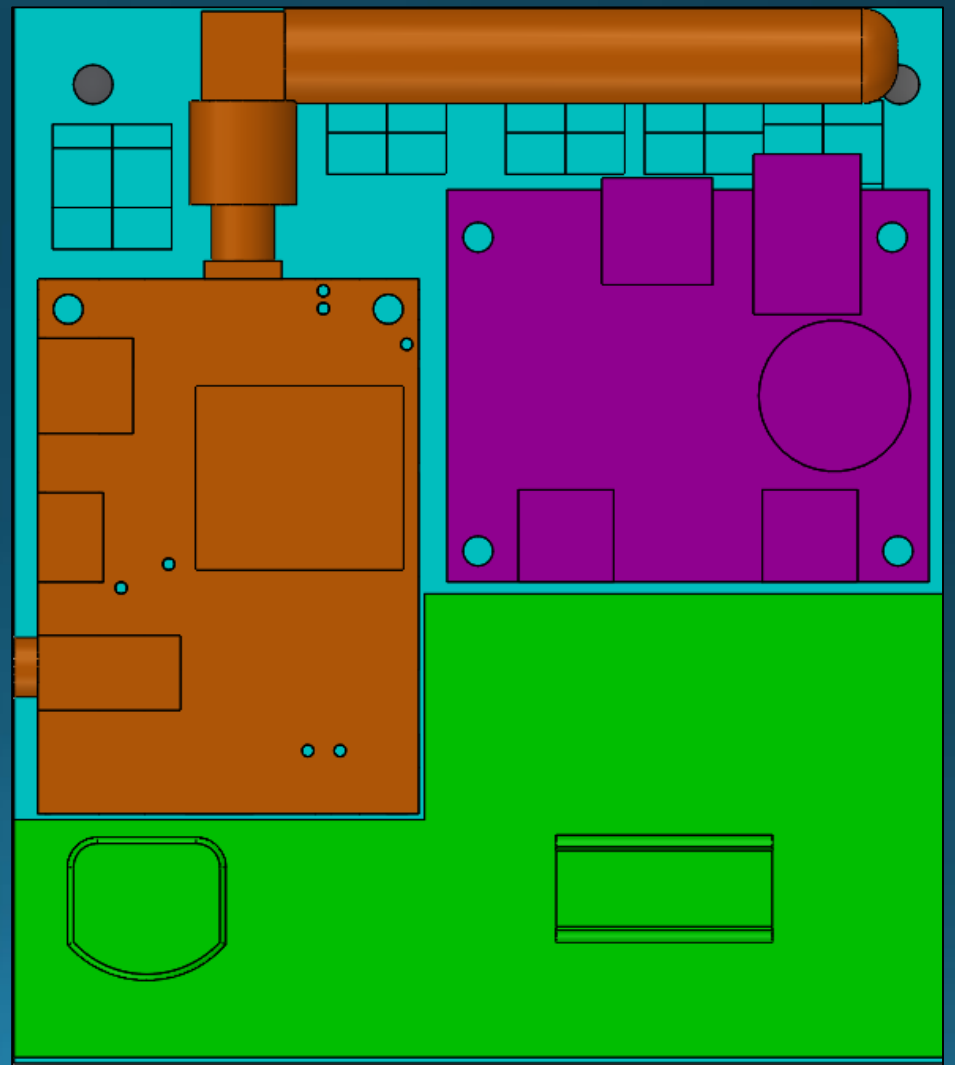
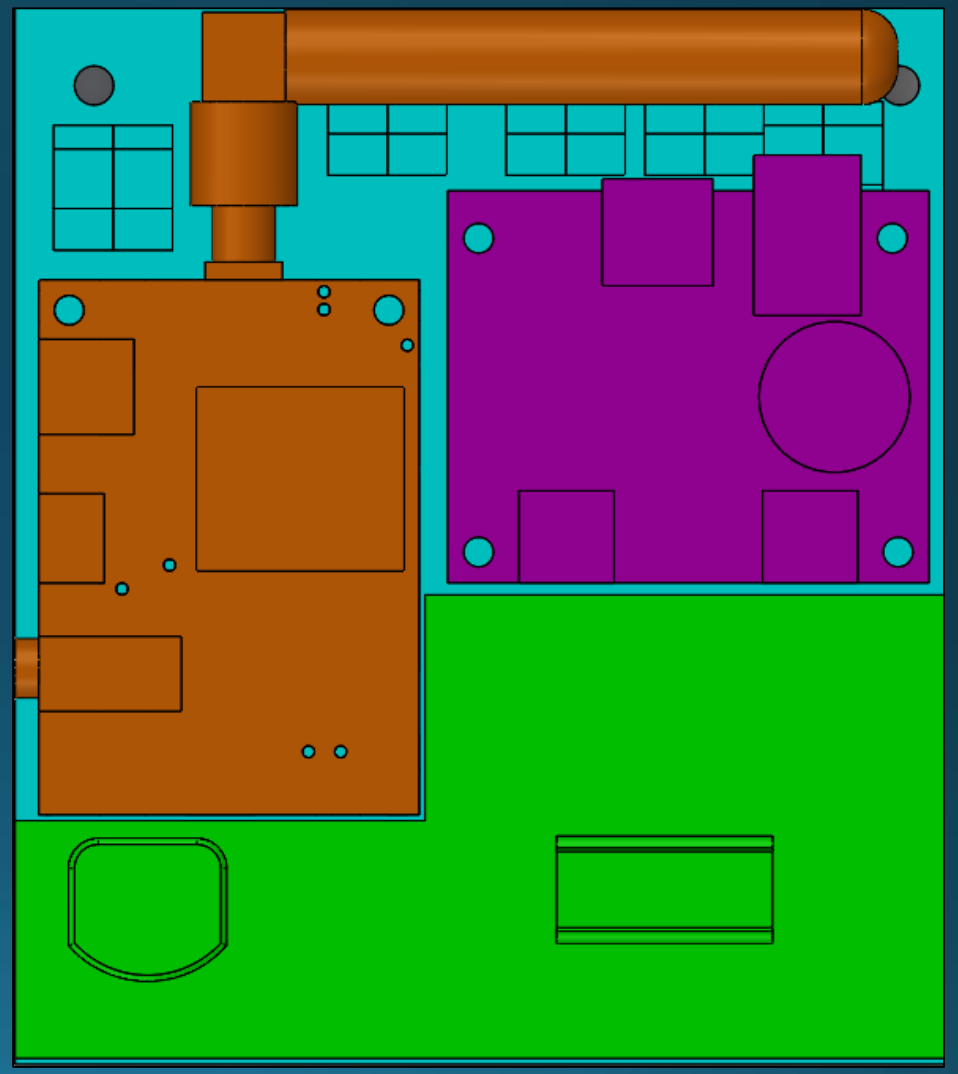




System Redesign

- Serviceability
  - Modular Design
- Functionality
  - Hardware & Software Redesign
- Manufacturability
  - Changes made in consultation with Optima Tech (contract manufacturing)



Water On Campus

Water On Campus

Water On Campus

Future Goals

- Redesigned System
  - Complete Assembly
  - Test Locally
  - Test in Ghana
- Retrofit previously installed systems
- Collect data

Thanks to:

Advisors
- Dr. Randy Fish
- Tony Beers
- Jacqui Young
- Ken Kok
- Adam Chilcote

Project Manager
- Sandy Snozzi

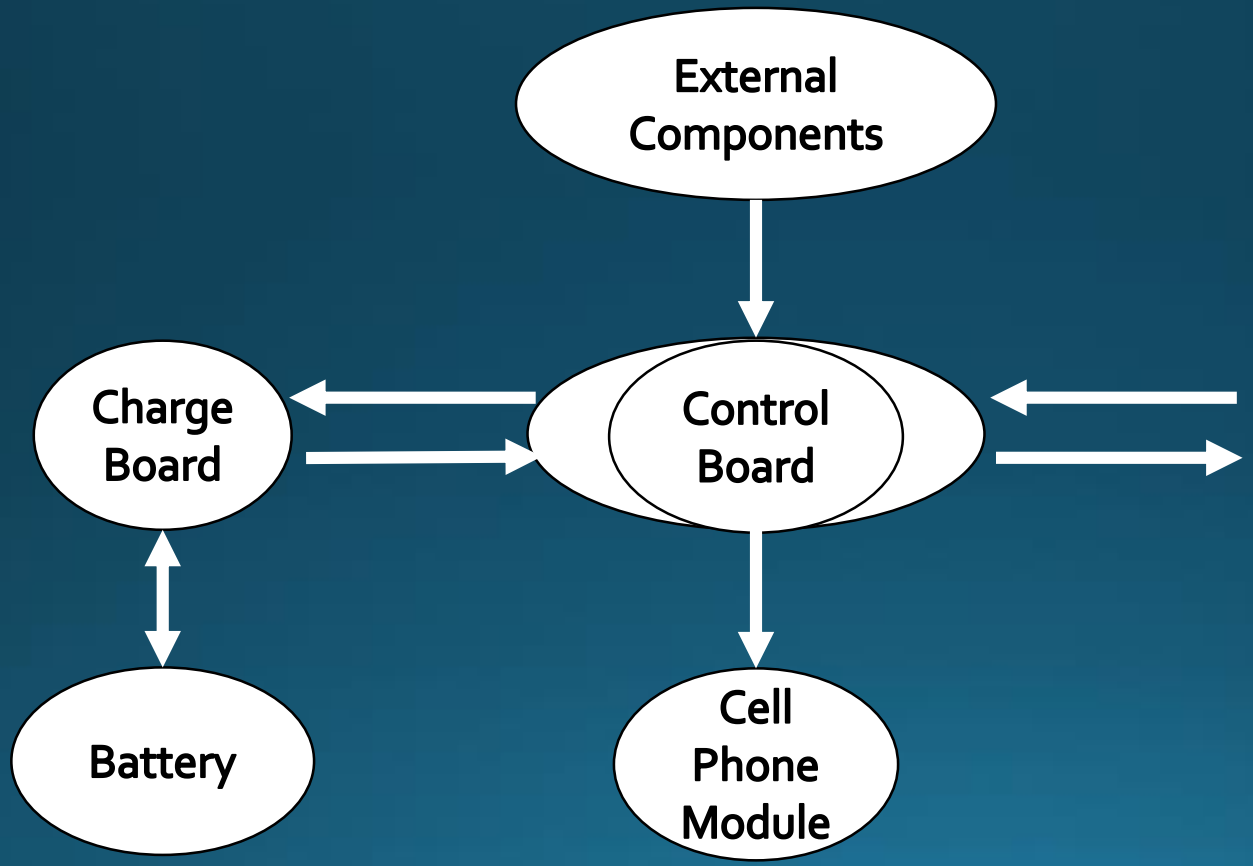
Project Members
- Owen McCullum
- Kelsey Nichols
- Roque Dietrich

Project Members
- Matt Eshleman
- Nicholas Sum

Other:
- PumpMinder

Questions?

Main Electronics



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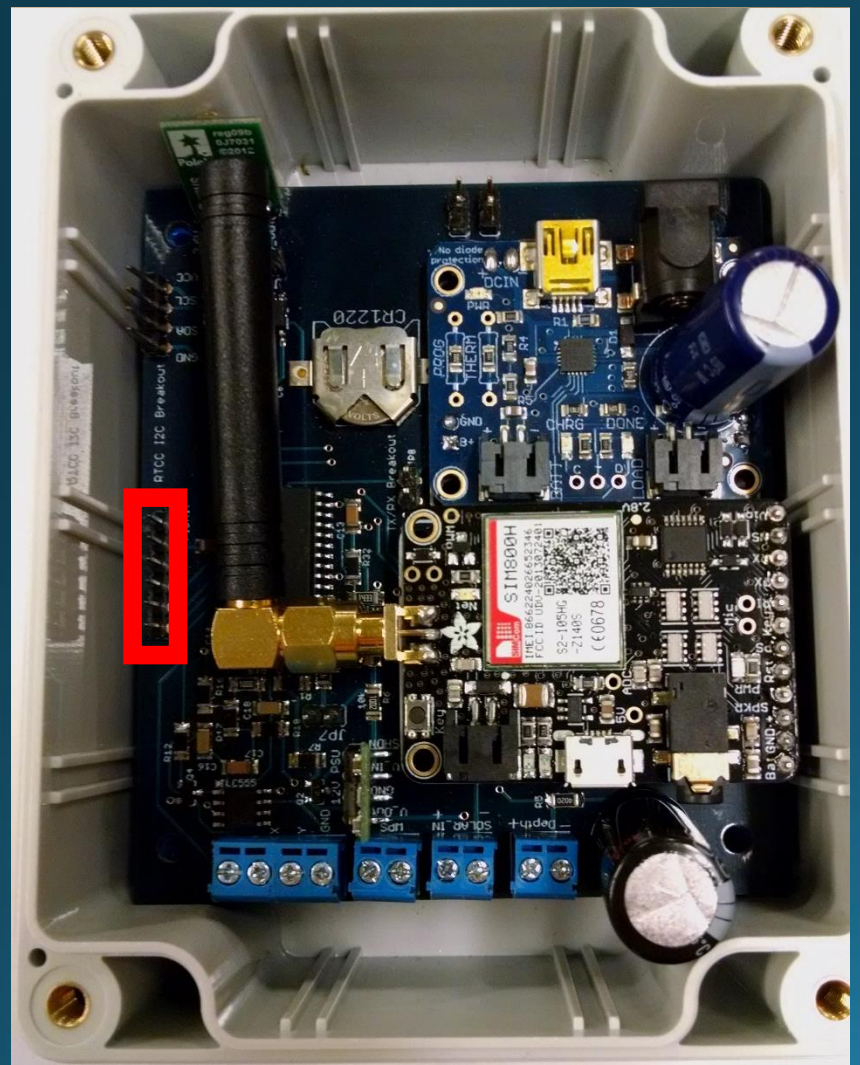

Main Electronics Redesign