

Team sddec20-06
EE 491
1 March 2020
Batteryless, Encapsulated Hydrometer

Bi-weekly Status Report #4 [B4]

Individual Contributions:

Name	Contributions to the team	Hours Worked for the Week	Total Cumulative Hours
Tilden Chen	Mechanical Design Research	6	24
Josh Hall	Microcontroller/Embedded Research	6	24
Jensen Mayes	Mechanical Design Planning	6	25
Chris McGrory	Mechanical design application	7	26
Griffin Orr	Antenna/Hardware Research	10	29
Chris Pedersen	Sensor Selection	6	25

Summary:

In the past two weeks of development, we expanded upon our plan for the project. We wrote and submitted our first version of the design document and have started splitting off tasks into sub-teams of group members to focus on them. We have a breakout board nearly finalized that will allow us to test our chip layout and program on our selected MCU and we have begun writing test code to run on the development board. We have also discussed the basic look of our module and have been investing time into researching specific components for the board. Additionally, we have made progress in the area of mechanical design with a plan for testing the tilt mechanism partially created.

Individual Contributions

- Griffin Orr
 - In the past two weeks I redesigned a breakout PCB that will allow for prototyping with the EFR32BG13 microcontroller we have selected for this project. In this redesign, I added power regulation circuitry and a programming port. Additionally, I continued the design work on the impedance matching network for the RF circuitry. I also worked in the lab with Chris McGrory to begin testing the characteristics of the energy harvesting network.
- Chris McGrory

- In the past two weeks, I have developed been developing various encapsulation prototypes. I have spent my time becoming more familiar with CAD tools such as Solidworks to implement these designs. I have also done some other research regarding waterproofing and the inertness of our design.
- Josh Hall
 - In the past two weeks, I been working on coding the base station (a raspberry pi) to receive a beacon burst from the micro controller. I do not have the micro controller doing this yet so to test the base station, I am using a beacon creator app on my phone.
- Christopher Pedersen
 - Hello, my name is Christopher Pedersen and I spent the last two weeks looking into the microcontroller pin-out. I have also been researching libraries for the sensors.
- Jensen Mayes
 - I have been working through the math to calculate exactly how our system's tilt will react in a container of fluid. I have been spending a significant amount of time reading up on buoyancy calculations and using force diagrams to determine how much tilt we can expect to see in fluids of different specific gravities.
- Tilden Chen
 - I have continued learning about the mechanical aspects of how the tilt aspect of the hydrometer should work and additionally have been considering various shapes. I have also been looking through sensor and controller datasheets.

Pending Issues:

- No major pending issues.

Future Plans:

- Design impedance matching circuit for the antenna and test the power and range of the antenna.
- Order and assemble the microcontroller expansion PCB.
- Determine a functional mechanical layout of the hydrometer.
- Determine a prototype design for testing the tilt ability of the system.