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

Bi-weekly Status Report #2 [B2]

Individual Contributions:

Name	Contributions to the team	Hours Worked for the Week	Total Cumulative Hours
Tilden Chen	Mechanical Design Research	6	18
Josh Hall	Microcontroller/Embedded Research	6	12
Jensen Mayes	Mechanical Design Research	7	19
Chris McGrory	Test power limitations of energy harvester and begin prototyping with communications software	6	12
Griffin Orr	Antenna/Hardware Research	7	19
Chris Pedersen	Sensor Selection	6	19

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 designed a breakout PCB that will allow for prototyping with the EFR32BG13 microcontroller we have selected for this project. Additionally, I have begun the design work on the impedance matching network for the RF circuitry. Hardware will be ordered within the next week and testing will begin when the hardware arrives.
- Chris McGrory

    - In the past two weeks, I have developed test cases for the energy harvester and RF transmitter. We will begin testing sometime in the next week. Still working on getting lab access to graduate laboratory. Also, began prototyping with communications software but we are still getting acclimated to the program environment.
- Josh Hall
    - In the past 2 weeks, I have downloaded the SDK and started trying to figure out the given skeleton code for setting up Bluetooth 5.0 communication for the microcontroller we are wanting to use.
- Christopher Pedersen
    - Hello, my name is Christopher Pedersen and I spent the last two weeks looking into the different options we have in terms of sensors. We will need a temperature sensor and an accelerometer to determine the specific gravity of the liquid and unfortunately none of the IMU's available have leads that would allow us to solder them onto the PCB. This means we will need to use separate sensors on the board. Additionally, this will allow us to get rid of the gyroscope which is unnecessary for our measurements.
- Jensen Mayes
    - I have been working on some different modeling software options for designing our system. I've decided upon using FreeCAD because it is open source software which has good support for python integrations which will be useful after I graduate for modeling in the future. I have also been developing a method to test out the workings of the hydrometer to make a simplified test unit for determining if our tilting system will work as expected.
- 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'm also looking into different accelerometer and gyroscope sensors with Chris Pedersen.

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.
- Finalize testing plans for the tilt system.

- Use tutorials to learn modeling software.