Team sddec20-06
EE 491
12 April 2020
Batteryless, Encapsulated Hydrometer

Bi-weekly Status Report #5 [B5]

Individual Contributions:

Name	Contributions to the team	Hours Worked for the Week	Total Cumulative Hours
Tilden Chen	Microcontroller Sensors Research	6	30
Josh Hall	Microcontroller/Embedded Research	4	30
Jensen Mayes	Mechanical Design Work	6	31
Chris McGrory	Mechanical design application	6	32
Griffin Orr	Antenna/Hardware Research	5	34
Chris Pedersen	Microcontroller Research	6	31

Summary:

In the past two weeks of development, we have made some significant progress on our project. In the area of mechanical design, we have come up with an affordable prototype option and have been designing a more aesthetic final version. Additionally, we have made progress on programming the board and have been able to place an order for prototype components as well as a test board to practice reflowing of the main MCU.

Individual Contributions

- Griffin Orr
  - In the past two weeks, I have ordered the prototyping board along with some components and the hardware necessary to program the microcontroller. I also ordered the energy harvesting module for use in the development phase of the project. Additionally, I began work on the RF impedance matching circuit in the past few days.
- Chris McGrory
  - In the past two weeks, I have developed a prototype testing design for our mechanical encapsulation. This design will provide us with an accurate testing platform for the mechanics of our accelerometer and hydrometer. The prototype should only cost us around $20 from a local hardware store. I need to validate this design with my peers and then review the order via the ETG.

- Josh Hall
  - In the past two weeks, I still been working on coding the base station 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. I am running into issues with mapping the Bluetooth libraries I need to use because I am not very familiar with linux.
- 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. In addition I ordered the Thunderboard Sense 2 board and will be working with the sensors to work on writing the code with Tilden.
- Jensen Mayes
  - I have finalized the mathematical model for how our system should behave and have begun modeling it in CAD. I have spent a significant amount of time watching CAD tutorials for help in designing it.
- Tilden Chen
  - In the past two weeks, I encountered a lot of issues. Originally, we thought there was an IMU sensor on the BRD4104A board we had on hand. There isn't, so I ordered a Sense 2 board that should be coming in this week. I was going to write a program for reading from the IMU sensor and then converting that 3-axis output into a specific gravity measurement that could be quickly calibrated once we determined the enclosure. I decided to shift gears and work on the Bluetooth output side of the project but was unable to transmit beacons from the board. None of the demos from Silicon Labs worked.

Pending Issues:

- No major pending issues.

Future Plans:

- Design impedance matching circuit for the antenna and test the power and range of the antenna.
- Assemble the microcontroller expansion PCB.
- Order and assemble the testing platform. (04/12/2020) - McGrory
- Determine a prototype design for testing the tilt ability of the system.
- Write pseudocode for converting the 3-axis output to specific gravity.