

EE 492 Progress Report MAY15-23 Period 2 (2/2/15-2/15/15)

Advisors: Daji Qiao

Client: Halil Ceylan

Members (roles): Brandon Wachtel, Tyler Fish (Team Communicators)

Mitch Balke (Team Leader)

Brandon Maier, Johnnie Weaver (Web Masters)

Trieu Nguyen, Christofer Sheafe (Key Concept Holders)

Project Title: Wireless Embedded Roadway Health Monitoring

Period Summary

This period consisted of work on the PCB and enclosure designs, beginning work on Raspberry Pi base station, as well as some more testing of the charging circuitry and charging coils/antennas. PCB design has almost been finalized and is waiting on the inductive coil circuit to be completed in order to have an initial prototype be sent off for fabrication.

2/2 Group Meeting with Advisors

Duration: 1 Hour

Members Present: All

Purpose and Goals:

The purpose of this meeting was to discuss the inductive coils and how they have not performing as indicated in the research papers we have read. We also talked about beginning the PCB design and creating the routing network for it. Finally, we discussed the computer model and design of the enclosure and how we were exposing the sensor to the concrete as well as the mounting procedure for connecting the PCB to the enclosure.

Meeting Notes:

Adding a microcontroller with more memory

Look into ordering a 2Mbit external flash chip

Communications is back up and working again

Currently just transmitting raw data

Use hot air and talk to Lee, ask for suggestions on how to fix the board

Creating final footprint for communications and data for PCB

Hopefully placing the order for the PCB early next week

Starting work on the routing procedure

Began work on the Raspberry Pi base station code

Re-solder and begin tests on charging chip

Going to need voltage multipliers and a voltage regulator for the receiver

Testing transmitter and receiver coils

Talk to Lee about 3-D printer for enclosure

Talk to design college about a 3-D printer

Cut the gap in the walls of the enclosure by half

Talk to the civil group again

Impedance matching testing for coils circuit

Test RF antennas with the Powercast kit some more

ICs can be shut down when not being used

2/9 Group Meeting with Advisors

Duration: 1 Hour

Members Present: All

Purpose and Goals:

Talked about our continued testing and research with the inductive coils and how it compares to the testing that we have started working on with the RF antennas from the Powercast kit. Enclosure design will be finalized and sent for cost approximation once coil/RF and PCB design and dimensions are completed. We will continue working on the inductive coil charging for the system.

Meeting Notes:

Discussed inconsistencies with charging circuit
Try getting rid of the Rin or make it as low as possible for charging
Set current limit to a few hundred mA
Finishing PCB design
Getting final sizes for enclosure design
Complete enclosure design soon
Work on efficiency testing of coils
Continue communications coding and testing
Ask if 3-D printer makes stuff that is water-tight
Make sure to have more on the inductive coils and testing for next meeting

Pending issues

Charging circuit consumes too much current during standby mode
Inductive coils are not efficient enough
PCB design is waiting on the inductive circuit and finalized charging circuit
Enclosure design is waiting on PCB and inductive coil design
Nodal communication cannot be tested until we have fabricated PCBs

Plans for Third Period

Contact LTC to resolve issues with the charging circuit and finalize charging circuit design
Finalize the inductive charging circuit with assistance from Professor Song
Finalize PCB and enclosure designs

Individual Contributions (This Period)

Johnnie Weaver: Attended advisor meetings (2hr), attended group meeting (1.5hr), worked on inductive coils and circuit (4.5hr), testing of charging circuitry (2hr)
Brandon Wachtel: Attended advisor meetings (2hr), attended group meeting (1hr), reconstructed and tested charging circuit (5hr), writing progress report (1hr)
Tyler Fish: Attended advisor meetings (2hr), attended group meeting (1.5hr), worked on microcontroller with Mitch (0.5hr), dealt with 3-D printing (1hr), looked at PCB design with Mitch and Brandon Maier (0.25hr), enclosure design (0.5hr), writing progress report (1hr)
Mitch Balke: Attended advisor meetings (2hr), attended group meeting (1.5hr)
Brandon Maier: Attended advisor meetings (2hr), attended group meeting (1.5hr)
Trieu Nguyen: Attended advisor meetings (2hr), attended group meeting (1.5hr), worked on power amplifier circuit (2hr), created new coils for testing (2hr), RF testing with Johnnie (1hr)
Christofer Sheafe: Attended advisor meetings (2hr), talked to people about 3-D printing (1hr)

Total Contributions this Period

Johnnie Weaver: 10 Hours
Brandon Wachtel: 9 Hours
Tyler Fish: 6.75 Hours
Mitch Balke: 3.5 Hours
Brandon Maier: 3.5 Hours
Trieu Nguyen: 8.5 Hours
Christofer Sheafe: 3 Hours

Total Contributions to project

Johnnie Weaver: 77.25 Hours
Brandon Wachtel: 78.5 Hours
Tyler Fish: 81.25 Hours
Mitch Balke: 76.25 Hours
Brandon Maier: 72.75 Hours
Trieu Nguyen: 70 Hours
Christofer Sheafe: 55.5 Hours