

EE 491 Weekly Report **MAY15-23** Week 12/13 (11/17/14-11/30/14)

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

Weekly Summary

We started constructing our prototype. The transmitter ran into a few problems with our printed circuit board having incorrect connections. First attempt at the charging circuit did not succeed and we are in the process of reconstructing it. Regardless of the final charging method, we need to do wireless charging as a requirement for the project. Met with Civil Engineering group and they informed us of Department of Transportation procedures, the process of constructing a road, the hazards of road construction that concern our design, and a demonstration of concrete mixing and setting.

Meeting notes:

Rebar is 5 ½ inches above the dirt, midway in the road

1 ½ inch deep cut in the road every 20 feet on interstates

Need to find a way to fasten the product to the ground

Survivability of the system during paving

Dowel bars are 1 ½ inch in diameter at meetings between concrete slabs, mid depth of the concrete

High strength plastic or wood anchors

Drive anchors into the ground using a sledgehammer

Possibility of putting multiple nodes on an anchor

Ideally, we should have a 5 year lifespan

Blocking roads is not allowed for charging of the circuitry

Vibration harvesting is a possible charging method

Thermal electrics for power harvesting

Interface for changing time period between sensor readings

Look into research for power harvesting techniques

Having changing data transmission over the road life

- Every day for first month, then 1 time a week after that etc.

- Programmable

We can come and make concrete for testing our nodes

10/24/14 Group Meeting with Advisers

Duration: 1.5 hours **Members Present:** All

Purpose and Goals:

To receive more information about road conditions during and after the curing process and common practices of the Department of Transportation. During the meeting, we were informed that wireless charging would not be possible with due to the Department of Transportation's restrictions on road closures. We will continue to design the system using wireless charging and, if time permitting, we will design a thermal plan as well.

Pending issues

Redesign of the transmitter (if current prototype does not work)

Reconstruction and testing of the charging circuit

Designing of semester presentation

Plans for next week

Mitch: Finish construction of transmitting circuit

Brandon M: Finish construction of transmitting circuit

Brandon W: Reconstruct charging circuit

Trieu: Design final version of transmitting/receiving coils

Johnnie: Reconstructing charging circuit, design final version of transmitting/receiving coils

Tyler: Design final version of patch antennas

Chris: Design final version of patch antennas

We will all work on creating our presentation PowerPoint for presentations the following week

Individual Contributions (this week)

Johnnie Weaver: Attended group meeting (0.75hr), attended adviser meeting (1.5hr), updated website and revised description and slideshow to member page (1.25hr)

Brandon Wachtel: Attended group meeting (0.75hr), attended adviser meeting (1.5hr), reconstruction of charging circuit (1hr), writing weekly report (0.5hr)

Tyler Fish: Attended group meeting (0.75hr), attended adviser meeting (1.5hr), RF transmitter research (1.5hr), researched thermoelectric generators (1hr), writing weekly report (0.5hr)

Mitch Balke: Attended group meeting (0.75hr), attended adviser meeting (1.5hr)

Brandon Maier: Attended group meeting (0.75hr), attended adviser meeting (1.5hr), started CC1101 compilation (2hr)

Trieu Nguyen: Attended group meeting (0.75hr), attended adviser meeting (1.5hr)

Christofer Sheafe: Attended group meeting (0.75hr), attended adviser meeting (1.5hr)

Total weekly contributions (this week) for the project

Johnnie Weaver: 3.5 Hours

Brandon Wachtel: 3.75 Hours

Tyler Fish: 5.25 Hours

Mitch Balke: 2.25 Hours

Brandon Maier: 4.25 Hours

Trieu Nguyen: 2.25 Hours

Christofer Sheafe: 2.25 Hours

Total contributions for the project

Johnnie Weaver: 47.5 Hours

Brandon Wachtel: 56 Hours

Tyler Fish: 51 Hours

Mitch Balke: 47.5 Hours

Brandon Maier: 45.25 Hours

Trieu Nguyen: 42 Hours

Christofer Sheafe: 44 Hours