

SENIOR DESIGN WEEKLY STATUS REPORT

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INTRODUCTION

SDS19-21- Battery-less IoT Devices

Week 1 Report

January 21- February 08

Advisor: Dr. Henry Duwe

TEAM MEMBERS

Derek Nash – *Meeting Scribe, Power Systems Engineer, Test Engineer*

Matt Goetzman – *Power Systems Engineer, Test Engineer*

Mohamed Gesalla - *Power Systems Engineer, Test Engineer*

Adithya Basnayake – *Report Manager, Power Systems Engineer, Test Engineer*

Mohammed-Al-Mukhaini – *Meeting Facilitator, Power Systems Engineer, Test Engineer*

Bradley Rhein – *Power Systems Engineer, Test Engineer*

SUMMARY OF PROGRESS

JAN 21 – JAN 25

Met together as a group to introduce one another and define team roles. Planned a time schedule to meet as a group every week and meet with the advisor.

JAN 28- FEB 01

Met with the advisor to introduce ourselves and to get a detailed explanation about the overall idea of battery-less IoT devices. From our discussion with the advisor, we got an in depth understanding about the designs aspects, the practical usage and benefits of this IoT device. As a starting point, our advisor recommended to look into designs of previously developed battery-less IoT devices to get a broader insight and research the feasibility of harvesting energy through Wi-Fi to power the IoT device.

FEB 03- FEB 08

Each member did individual research on previous designs of battery-less IoT devices and came up with design ideas for a prototype to test the feasibility of using Wi-Fi as the power source. Met together as a group and discussed about the test prototype designs and parts needed to build the prototypes. For an extra source of support on designing these test prototypes, we met with Dr. Jiming Song who is currently teaching the Electromagnetic Radiation, Antennas and Propagation course. From this meeting we gathered useful insight to come up with two designs to test the feasibility of using Wi-Fi as a power source. End of

the week we met with our advisor to discuss and get his point of view on the test designs. During this meeting he suggested to test the Wi-Fi signal strength in Durham and develop a Matlab script to calculate the power outcome for the Wi-Fi signal available.

PENDING ISSUES

We were planning to meet our clients Dr. Nathan Neihart and Dr. Daji Qiao to introduce ourselves and discuss about their expectations for this project. Unfortunately, we ran into a complication in finding a time that would work for all 7-8 people. We will resolve this soon.

UPCOMING PLANS

In the next two weeks, it is planned to acquire a device to measure Wi-Fi signal strength and conduct a test run to measure the Wi-Fi strength in Durham and use Matlab to calculate the power outcome. With the results from this test, we are planning to meet with our advisor to discuss if we can move forward with building a device to harvest energy through Wi-Fi. It is also planned to meet Dr. Nathan Neihart, who is one of our clients, beginning of next week.

TEAM MEMBER CONTRIBUTIONS

Team Member	Contribution	Weekly Hours	Total Hours
Derek Nash	Researched similar batteryless energy harvesting projects. Searched online for antennas and diodes. Found similar commercial products for cost comparison.	4	10
Matt Goetzman	Basic research into current batteryless IoT methods. Met with Dr. Song and looked at antenna lecture notes to find a specific antenna configuration for our project.	5	10

Mohamed Gesalla	<p>Read articles on similar IOT devices</p> <p>Searched articles and data on feasibility of Wi-Fi energy harvesting</p> <p>Understood the different design blocks of the IOT device</p> <p>Developed a test method for testing feasibility of Wi-Fi harvesting</p>	5	10
Adithya Basnayake	<p>Read articles on previously developed battery-less IoT devices and came up with a design idea to harvest energy via Wi-Fi. Wrote weekly report.</p>	6	14
Mohammed-AI-Mukhaini	<p>Researched more different ways we can employ our knowledge and gear it towards how we can find ways to harvest energy that would be used for the MSP430.</p>	4	10
Bradley Rhein	<p>Researched types of MSP430 MCUs, notably their power & voltage requirements, current draws, and flash memory sizes.</p> <p>Familiarized myself with the concept of wireless energy harvesting; collaborated with team on the high level design of the board.</p>	4	10