EE 491 WEEKLY REPORT 3 *Date: 9/20/16-9/26/16*

Group number: 18

Project title: Radio Frequency Readout Device (RFRD)

Client &/Advisor: Dr. Qiao

Team Members/Role: Brandon Baxter/Team Leader, Vaughn Dorsey/Team Webmaster, Luke Myers/Team Communication Leader, Kurt Turner/Team Key Concept Holder, Aaron Haywood, Robert Buckley, Mehdy Faik, Kellen Yoder, Michael Miller

- **Weekly Summary**

This week our team conducted further research on differing aspects of our project (as described in the weekly accomplishment section). The reader group has starting looking into technology and pricing for different RF radio options. The antenna group has looked into options for dipole antennas. The IC group looked further into circuit development for power generation at the receiving end on the RF tag.

- **Past week accomplishments**
  - Brandon Baxter:Continued research on the capacitor sensor
  - Vaughn Dorsey: Continued work on preparing a programming environment for future development. Also assisted in doing research on possible RF radios that can be used.
  - Luke Myers: Conducted some initial research on RFID tag ICs. Also did research on material thickness measurements with capacitive sensors.
  - Kurt Turner: Met with IC team to discuss details of the capacitive sensor, and formulated a plan for designing the RFRD sensor device. Conducted some research on how RFID tags are constructed.
  - Aaron Haywood: Continued research on antenna design considerations
  - Robert Buckley: Looking over options for reader, we have found many options that seem to be workable at under $100. Hopefully, anyway. We have started building a slideshow to present options next week.

- Mehdy Faik: Calculated a function for acceptable half-power bandwidth of the receiving antenna based on distance from reader to sensor and angle of elevation of reader wrt tag; looked into options for dipole antennas.
- Kellen Yoder: Continued research on what we will be using for creating the module portion of the project.
- Michael Miller: Met with IC group and conducted research on the RFID power harvesting circuitry.

o Pending issues

- Brandon Baxter: N/A
- Vaughn Dorsey: None
- Luke Myers: N/A
- Kurt Turner: None to report at this time.
- Aaron Haywood:
- Robert Buckley:
- Mehdy Faik: Looks straightforward for now.
- Kellen Yoder: None
- Michael Miller:

o Individual contributions

NAME	Individual Contributions	Hours this week	HOURS cumulative
Brandon Baxter	Research on Capacitive sensor	1	3
Vaughn Dorsey	Development Environment Setup LoRa Radio Research Meetings with Reader Team and professor	3.5	6
Luke Myers	Research on tag integrated circuits and capacitive sensor thickness measurements. Met with advisor. Met with the IC group.	4	8
Kurt Turner	Research on RF device construction.	0.5	1.5
Aaron Haywood	Continued research on antenna design considerations	1 hr	3 hrs
Robert Buckley	Looked into cheaper options for reader. Reviewed suggestions from Vaughn.	4	8

Mehdy Faik	Antenna design	3	6
Kellen Yoder	Module research continued	1	3
Michael Miller	Conducted virtual trials of power circuitry for the RF Tag	5 hr	7 hr

- **Comments and extended discussion**

- **Plan for coming week**
  - Brandon Baxter:Meet with the rest of the team to determine how to design the IC with constraints consisting of size of antennae, etc.
  - Vaughn Dorsey: Determine software functional requirements for both reader and mobile application. Additionally, work on further Android development practice.
  - Luke Myers: Work with circuitry group to develop and test the power harvesting circuit
  - Kurt Turner: Continue to research RF tag device construction.
  - Aaron Haywood: Meet with Dr. Qiao
  - Robert Buckley:
  - Mehdy Faik: Look for higher gain antennas, keeping in mind the half power bandwidth requirement I found this week. Simulate some top candidates.
  - Kellen Yoder: Work with Robert and Vaughn. Continue research.
  - Michael Miller: Continue to work on IC design, research RFID IC design

- **Summary of weekly advisor meeting**

On Monday, September 26, six of of our team members met with Dr. Qiao and Dr. Song. We discussed the current state of our project and what we want to have accomplished by next week. We also clarified some application aspects of our project including details concerning the capacitor sensor, the IC circuit, and reader options. Now we will need to conduct research on the RFID digital packet format for sending the capacitance data from the RF tag to the RF reader.