

sdmay18-38: Smart Wireless Ag Sensors for Measurement of Soil Water Contents

Week 8 Report

November 12 - November 18

Team Members

Colin Cox — *App/Software*

Wage Miller — *Control Box*

Jarrold Droll — *Sensors*

Rachel Hoke — *Sensors*

Scott Rowekamp — *App/Software*

Tyler Thumma — *Control Box*

Summary of Progress this Report

Sensors:

For the sensors we went back to the lab with the knowledge of how the chemical reaction should look after the FeCl_3 is applied to the electrodes. We were able to successfully apply the chemicals we were able to see the correct color change due to the chemical reaction. While testing the sensor we found a visible cut halfway down the electrode that disconnected the conductivity between the copper pads and the bottom of the electrodes.

Control Box:

For this reporting period we began to look at new possibilities for batteries that can be implemented in our circuit. As it stands, the battery is the largest component of the control box, so it is important to reduce this in order to achieve the overall desired control box size. In the current design a 3.7 V lithium ion commercial battery is being used, so we want to find a similar battery that is reduced in size. This should be the last component that needs to be reduced in order to reduce our overall control box size.

App:

During the reporting period Colin and Scott met with the graduate TA to finally get the requirements for the app and other software needed for this project. We are going to move away from using a mesh network and instead use low energy Bluetooth to transfer data. The data will be transferred to a phone to view the data and upload it to a server for storage and data analytics.

Pending Issues

Sensor Box:

We are still facing issues during the Ag to AgCl step within the fabrication process only this time we were successful in applying the chemicals but had problems with the tool used to help separate the top and bottom of the electrodes. When using a slide to block the chemicals from running to the top of the electrodes there was too much pressure applied and this resulted in a cut on the electrodes causing the conductivity to fail.

Control Box:

There are not any pending issues, we just need to find a suitable battery that will sufficiently power our circuit.

App:

None

Plans for Upcoming Reporting Period

Sensor Box:

The next steps that we plan to take during the future reporting period is to design multiple sensor designs researching different concepts and ideas. We will also consider our past attempts at fabricating the sensors in order to improve the process and final product.

Control Box:

For the upcoming reporting period we plan on looking at costs associated with purchasing our components and getting the circuit potentially outsourced.

App:

During the next reporting period we will be working on implementing a web to save the data on a server and view it.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Colin Cox	Worked on getting application requirements and started developing the new app.	3.5	29.5
Wage Miller	Researched potential battery alternatives for the circuit. Simulated circuit with different corresponding voltage levels.	2.5	29
Jarrold Droll	Worked on sensor fabrication within the lab, met with PhD student and Dr. Dong to go over future sensor plans/development	1.5	27.5
Rachel Hoke	Worked on sensor fabrication within the lab, met with PhD student and Dr. Dong to go over future sensor plans/development	1.5	28
Scott Rowekamp	Worked on getting application requirements and started developing the new app.	3.5	28
Tyler Thumma	Researched potential battery alternatives for the circuit. Simulated circuit with different corresponding voltage levels.	2.5	25.5