

Team 29: Automated Greenhouse Bi-Weekly Update 5

Chandler Kramer, Samuel Erickson, Mengtian Ke

**Sponsor: Kevin Nowka** 

**TA: Skyelar Head** 



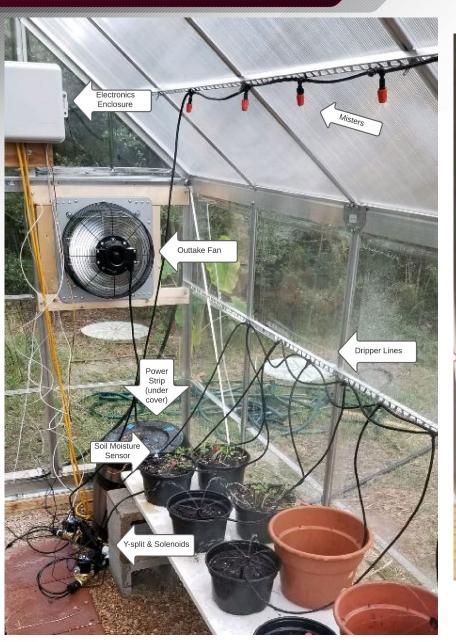
#### **Project Summary**

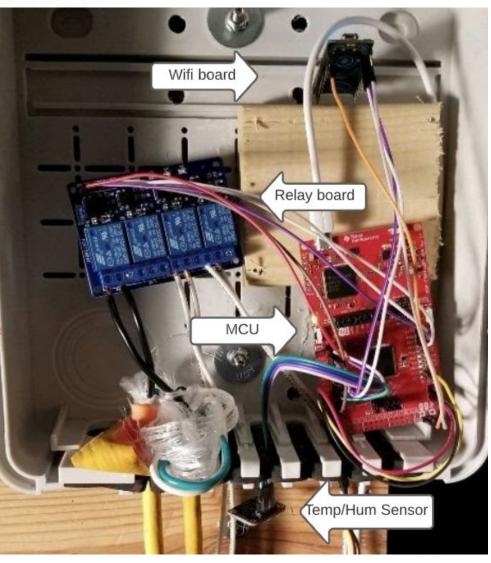
- Traditional gardening, even with a greenhouse, is a very manual process that can be very time consuming and plants are still vulnerable to the elements.
- The automatic greenhouse attempts to alleviate this problem by automating water delivery, temperature regulation, and airflow according to remotely set values by the user.





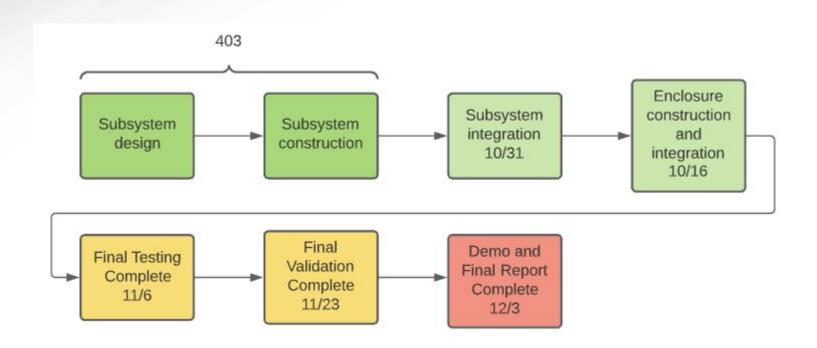
## **Integrated System Diagram**







#### **Project Timeline**





# **Power Subsystem**

**Owner: Chandler Kramer** 

Accomplishments since last update 18 hrs of effort	Ongoing progress/problems and plans until the next presentation						
<ul> <li>New BC</li> <li>Ordered PCB Components</li> <li>Began PCB Design</li> <li>Perf Board</li> <li>Perf Board Components</li> </ul>	<ul> <li>Finalize PCB Design and have it sent out</li> <li>Construct Prototype on Perf Board</li> <li>Test Bench Prototype</li> </ul>						



## **MCU** and Sensor Subsystems

**Owner: Samuel Erickson** 

Accomplishments since last update 9 hrs of effort	Ongoing progress/problems and plans until the next presentation						
<ul> <li>Tested humidity and soil moisture control algorithm, collected data on current performance</li> <li>Validated wifi connectivity and data collection in live environment</li> </ul>	<ul> <li>Add improvements to algorithm based on test data</li> <li>Test updated algorithm and validate in live environment</li> </ul>						



#### **Client Interface Subsystem**

**Owner: Mengtian Ke** 

Accomplishments since last update 10 hrs of effort	Ongoing progress/problems and plans until the next presentation
<ul> <li>Client Interface sends out data to temperature, humidity and soil moisture sensor and receive current data every two seconds.</li> <li>Implemented features in the Client Interface</li> </ul>	<ul> <li>Display data trading over time</li> <li>Summarize data over a period of time</li> </ul>

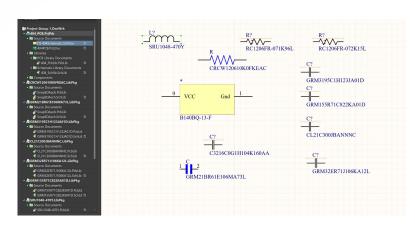


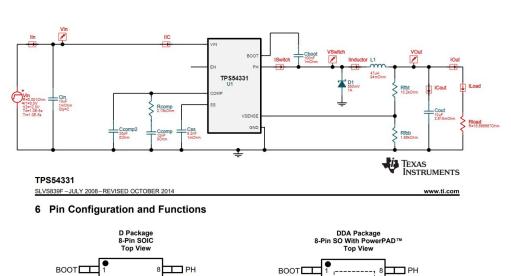
#### **Power Subsystem**

VIN 🗔

EN \_\_\_\_\_ 3

- New BC - PCB Design





Die Frenchlaue

воот 🗆

VIN 2

EN

PowerPAD<sup>11</sup>

GND GND

6 COMP

5 VSENSE

8 PH

7 GND

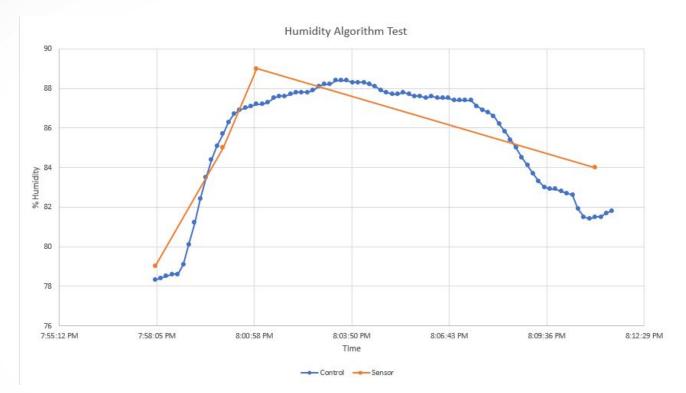
6 COMP

5 VSENSE



#### **MCU** and Sensors

 Data collection on current performance of humidity and soil moisture control



 Current irrigation solution lets water reach the bottom of pot in ~40 seconds

Current humidity control algorithm slightly overshoots humidity



## **Client Interface Subsystem**

- Current data
- Implement Client Interface

Home Greenhouse 1 Automated Greenhouse 2 Automated Greenhouse 3

Automated

Greenhouse 4

ated Auto

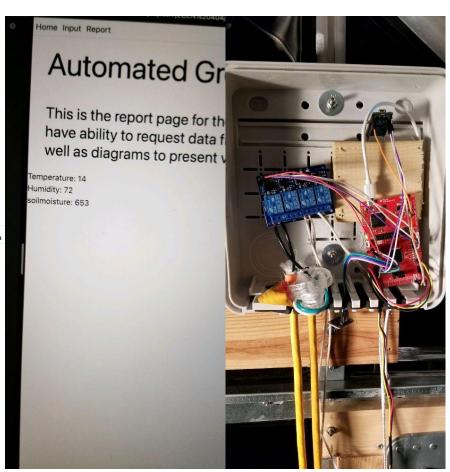
Automated Automated Greenhouse 6 Greenhouse

d Automated se 7 Greenhouse 8

#### **Automated Greenhouse**

Welcome to Automated Greenhouse







#### **Execution & Validation Plan**

	2.5	1 E C	22.5	20 5	C 0-+	12.0-4	20.0-4	27 0-4	2 N	10 N	17 N	24 N	1 0
Interface Subsystem:	8-Sep	15-Sep	22-Sep	29-Sep	6-Oct	13-Oct	20-Oct	27-Oct	3-Nov	10-Nov	17-Nov	24-Nov	1-Dec
Checked subsystem from													
403 to verify functionality													
Connect with the MCU													
and transfer data													
Design a report page to													
present data													
Report page prints out the					<i>***</i>								
value from each sensor													
Monitoring and tesing data													
from MCU to photon													
board (vice versa)													
Testing data received in the web-interface from													
the MCU and displaying													
them on the website													
Testing web-interface,												T	
photon board, and													
MCUdata as a transmission													
line													
Final integration testing													
Microcontroller													
Subsystem: Make sure subsystem													
works from 403													
Establish connection with													
wifi board Order solenoids and relay													
Order solenoids and relay board													
Connect solenoids and													
fans to relay board and													
drive through MCU Establish permanent wired				_									
connections between													
components													
Create automatic control algorithm													
Test algorithm in													
enclosure													
Monitoring and testing													
humidity sensor within													
enclosure													
Monitoring and testing soil moisture sensor within													
enclosure													
Monitoring and testing													
temperature sensor with													
enclosure													
Final integration testing													
Power Subsystem:													
Checked subsystem from													
403 to verify functionality													
of components													
Compare and purchase upgraded fans for new													
design													
Order buck converter for		1											
MCU													
Receive buck converter for													
MCU													
Connect power subsystem													
with MCU subsystem and													
relay board													
Establish permanent wired													
connections between													
components													
PCB Design completed													
Prototype built on Perf													
Board													
Bench Test Prototype													
Integrate Prototype													
PCB constructed													
PCB testing													
PCB integration MCU power testing													
Relay Board testing													
Photon Board Testing													
Final integration testing													



# Thank you! Any Questions?