E2.06 - Solar Monitor

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Sponsor: Aslan, Semih

Requirements

Requirements provided by Dr. Aslan.

Design a solar power meter.
- It can read voltage, current, and calculate power
- It can upload data wirelessly to a web server
- Displays data on a touchscreen
- Collect data from two different solar panels.

Must be able to show comparable data between technologies
- Polycrystalline versus non-crystalline
- Collect and transmit data over a week period for 2 hours/day at 10-minute intervals

Design a DC power supply
- 5V with a 1A DC charger for a cell phone.
- 12V charger for a cooling fan.
- Transmit measured data to a web server
- Data should be transmitted every 10 minutes for at least 2 hours a day.
- Web server is accessible via local network devices

Why is it Useful?

- Simplify your search for the most efficient solar panel
- Our design can help you decide on if you need fixed or tracking systems by showing you the difference between the systems
- Helps you plan for what solar panel technology is right for you by comparing the different solar technologies
- Power your phone and/or a fan while you collect data to keep you cool and your phone charged

Design Approach

- Implement a voltage, current, and power monitor
- Implement a user interface with Python 3
- Measure for 10 min for 2 hours/day and log into a CSV file.
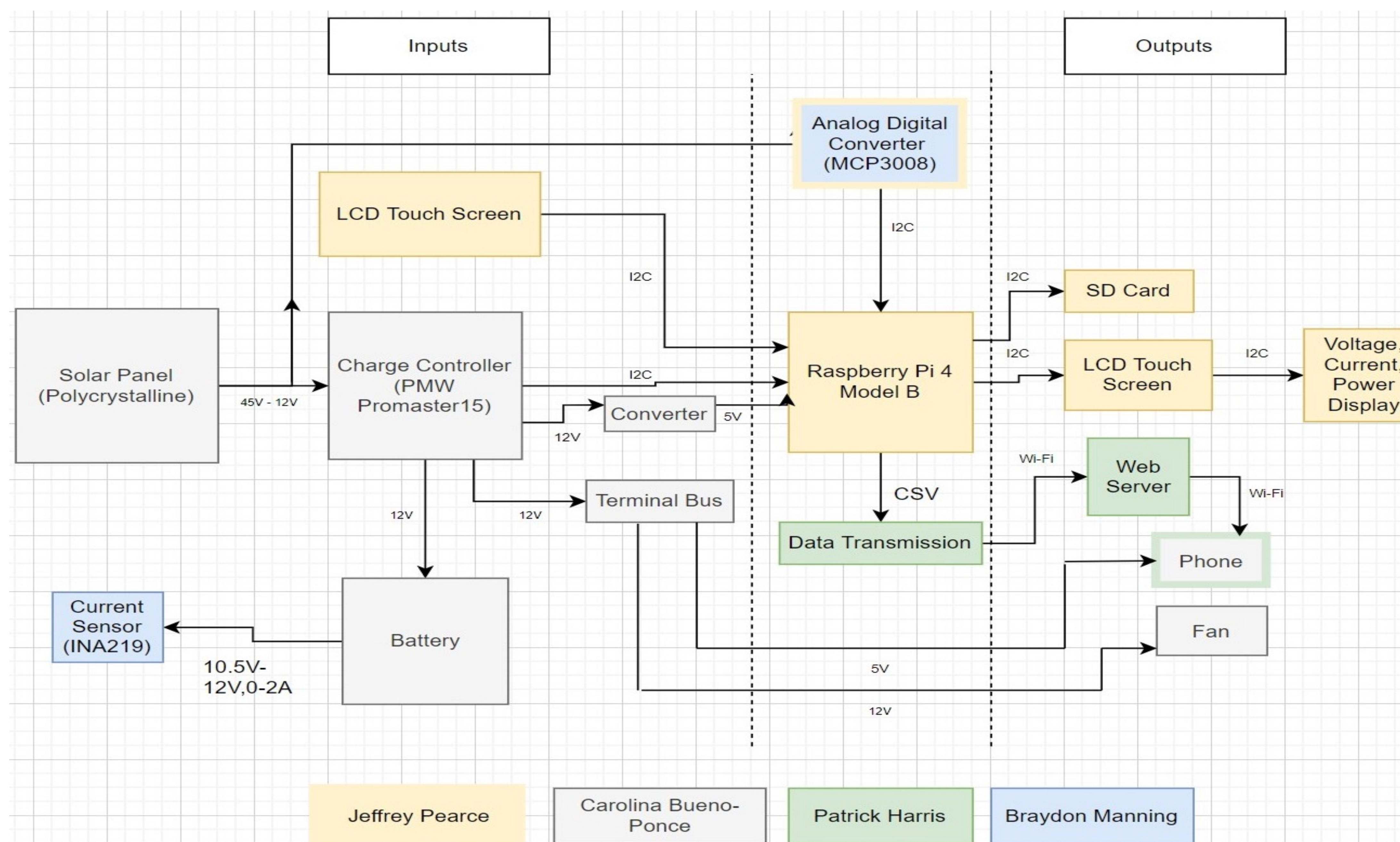- Power phone and fan while measuring data off solar panel

Acknowledgements

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Faculty: Dr. Semih Aslan
Sponsor: Dr. Semih Aslan/Texas State University

State Diagram
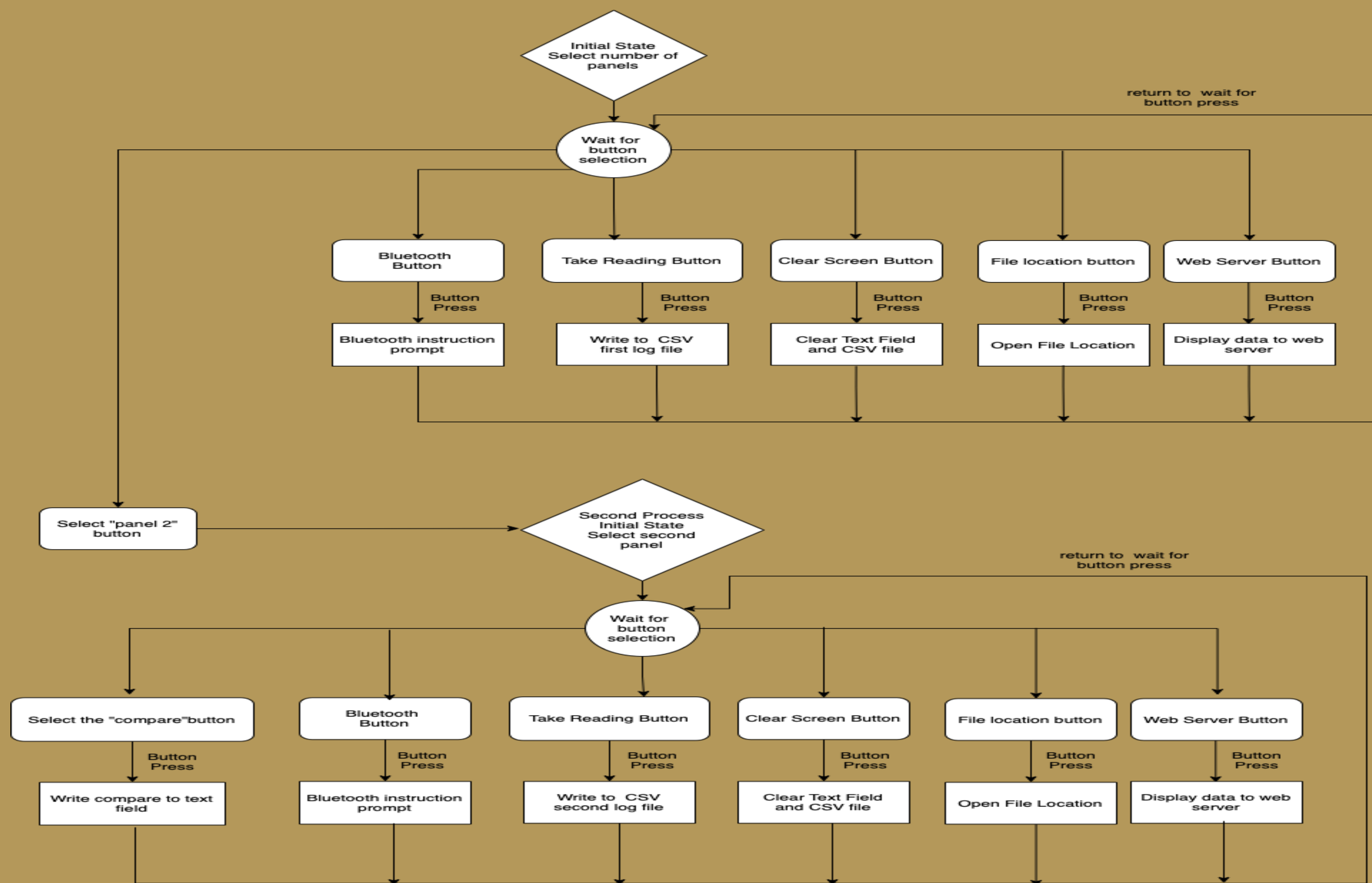
Block Diagram

Results

Test Cases	Functions	Results
Sensor Suite	Solar Panel Measurements	Panel Voltage Mean: 12.84V Range: 0.92V
	Load Measurements	Battery Voltage Mean: 12.14V Range 0.85V
		Load Current Mean: 695.86mA Range: 86.06mA
		Load Power Mean: 8.42W Range: 1.92W
	Temperature Measuring	Temperature Mean: 27.72C Range:1.02C
	Log recorded measurements	Log file successfully filled with data and stored on MCU storage.
Power:	Power a 6-inch fan and charge and cell phone	5-day test data, Time frame (2hrs.) SolarPanel:35.15V Battery:12.20V Raspberry Pi: 5.04V Phone Charger:5V Fan:12.18V
User Interface	Allow user to interact with data and view measured data	Tested by Dr. Aslan and the UI operated as programmed.
Web Server	Display graphic and tabular data.	Server was tested and approved by sponsor, Dr. Aslan.
Data Transmission	Transmit data every 10 minutes for at least 2 hours.	Transmits 15KB of data to the server every 10 minutes until the device is powered off.

Team Members

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