Dynamic Mobile Weather Station

Team Members: Trent Packer, Cayman Preston, Brendon Salido & Levi Transtrum EGR314: Embedded Systems Design Project II – Spring 2023

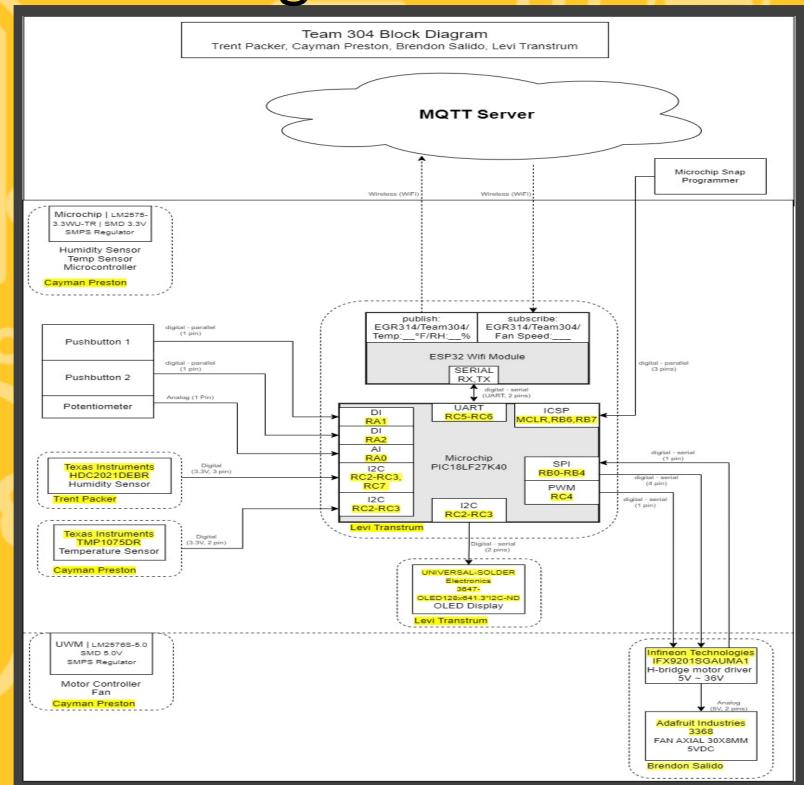


"To leverage each of our team member's areas of expertise to design and build a reliable, attractive, and functional weather station with a small form factor. The product will solve a realworld environmental problem using sensors and actuators. Our product will be similar in quality to commercially available, professionally designed products."

Customer Need Statement: •

"The product should have a durable housing for the contained electronics and provide an ergonomic point of contact for the user. In addition to the product being reliable, efficient, userfriendly, and responsive, its software should be configurable for specific use cases with sufficient documentation for troubleshooting."

Block Diagram:



Design Review Top 5:

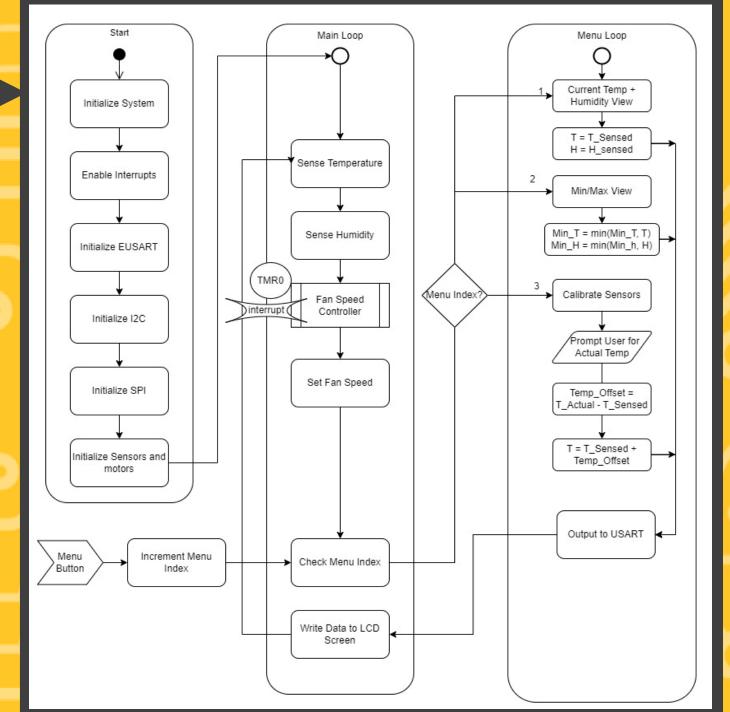
Sensing

1. Reconsider initial battery choice (short running time).

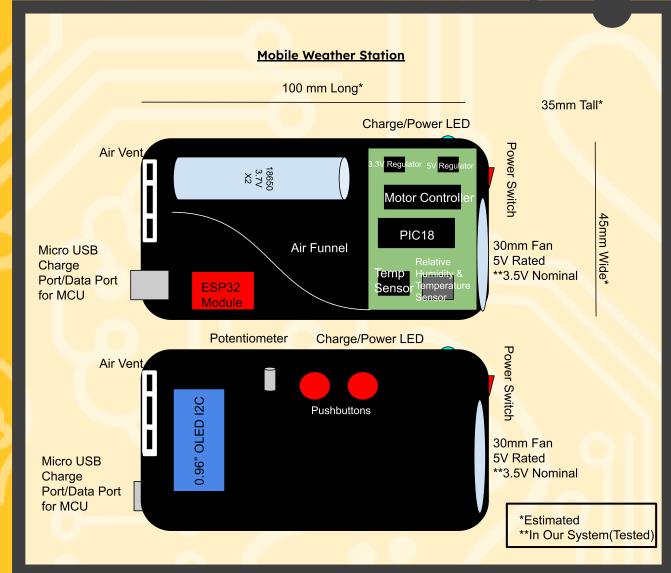
Environmental

- Determine how to mount internals inside 3D-printed shell.
- Reconfigure pins on **ESP32**.
- Revise power subsystem.
- Continue using 3D-printed shell for visualization.

Software Diagram:



Final Design Concept:



img2

img1

Power System (Battery, Buck Should be able to run on batteries (explicit) Converter, Boost Converter) Device must have reliable Power System (Explicit) 3. Battery life should be long lasting (explicit) User Interface (Wifi, Display, Needs a function to set day and time (explicit) Buttons, Potentiometer) 2. Needs a manual adjuster to calibrate sensors (latent) Device must give customer informed insights (Latent) Actuator (Motor, Motor Have a wide temperature range for all climates (latent) 2. Actuator must be reliable in all weather conditions (latent) Controller, Air Funnel, Vent)

Product Requirements: •

Components

Temperature Sensor Sensors should be compact (explicit) Readings are consistent. (explicit) Relative Humidity & Device must measure humidity (Explicit) Temperature Sensor Device sensors must be accurate (Latent) Device must inform users of results (Latent) Microcontroller The product must be low-power. (latent)

Device has multiple functionalities. (explicit)

Enclosure Should be hand held (explicit)

Device is low weight, making it easy to carry. (explicit) Device electronics should be protected from moisture as much as possible.

User Needs Satisfied

