SMART Weather Station

EGR314 Spring 2025
Embedded Systems
Design Project

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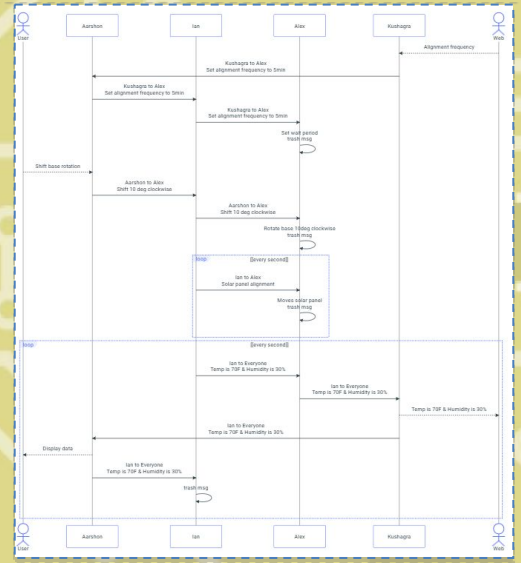
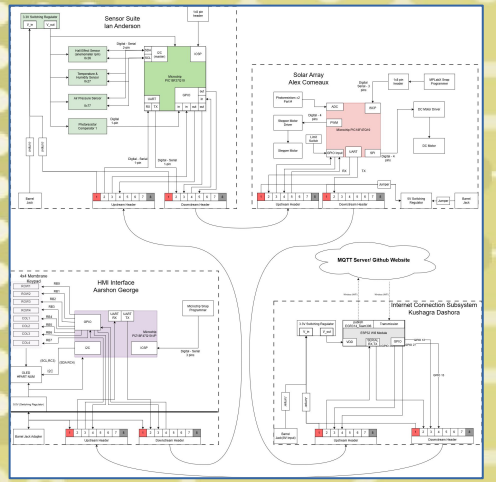


Mission Statement:

Our goal is to build an interactive, STEM-focused weather station within four months to engage K–12 students through real-time environmental data and hands-on learning. The system will highlight key meteorological concepts using an energy-efficient, modular, and user-friendly design. Aligned with educational standards, our solution aims to inspire curiosity in science, technology, engineering, and math while helping us grow as engineers and educators.



This system-level diagram represents the **Automated Weather Monitoring System** designed by Team Macrochip, comprising four interconnected subsystems: the **Sensor Suite** (Ian) gathers environmental data via I2C and UART using sensors for wind speed, temperature, pressure, and light; the **Solar Array** (Alex) uses photoresistors and a stepper motor to orient panels based on sunlight via PWM and ADC; the **Internet Communication Subsystem** (Kushagra) employs an ESP32-WROOM-S3 to publish data wirelessly to an MQTT server; and the **HMI Interface** (Aarshon) enables user interaction through a keypad and OLED display. All subsystems interface via 8-pin headers with independent power regulation for modularity and reliability.

Scan to know more!

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