THERMO BAND

Temperature Monitoring Wristband

Design Project by

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PROBLEM

In most hospitals and medical centers, there is no specific method for measuring real time body temperature periodically. Currently, temperature is measured manually using thermometers, which can be inefficient and inaccurate. We conducted a survey of nearly 70 doctors, nurses, and other medical professionals.

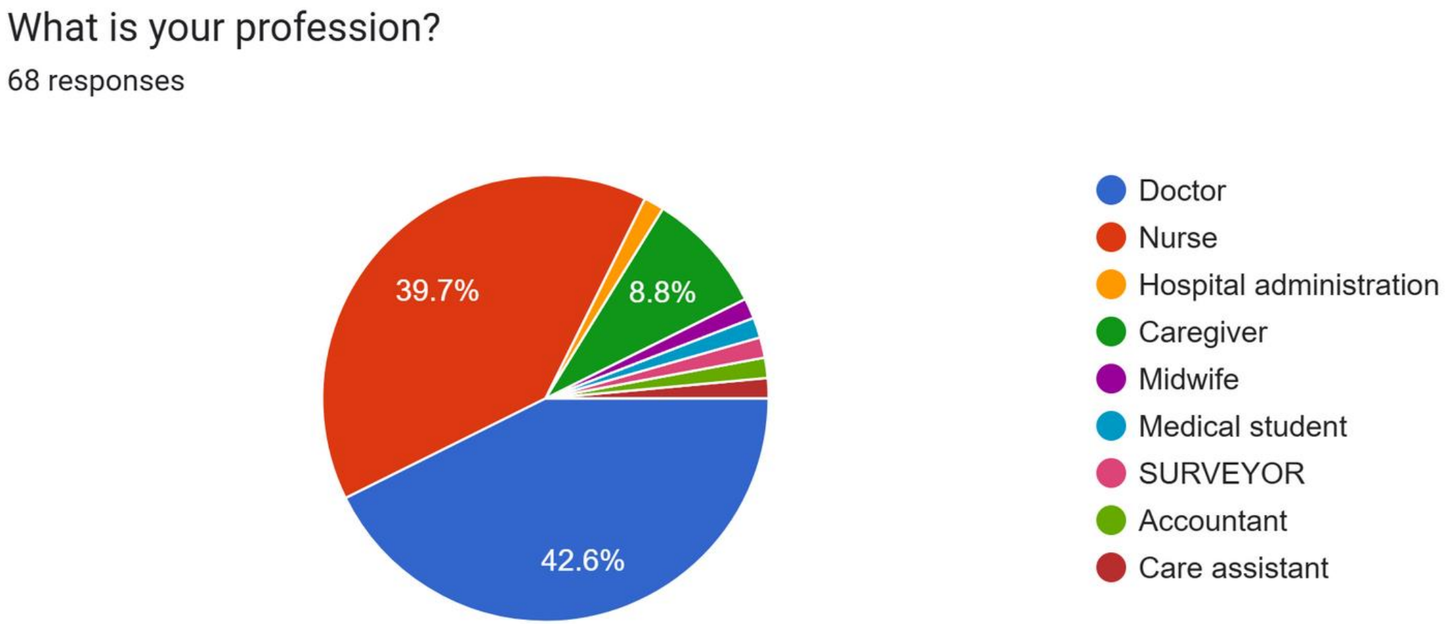
WHAT IS THERMO BAND ?

Thermo Band is a Internet Connected Temperature monitoring
Wrist Band that continuously monitors the real-time body temperature

- Provide real-time temperature tracking
- Send alerts if the body temperature is too high or too low
- Reduce the need for manual temperature checks
- In a ward one person can monitor the temperature of whole ward at once

STAKEHOLDER IDENTIFICATION

We conducted a survey on this and received responses from the following professionals

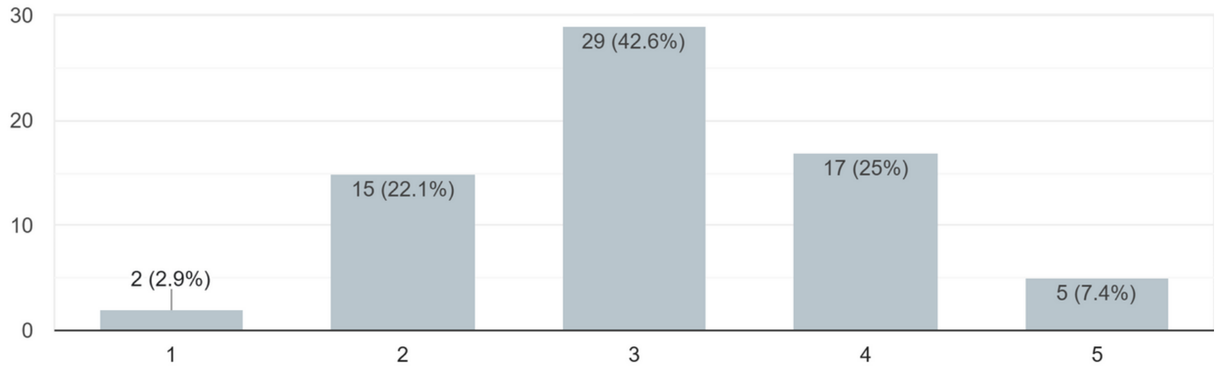


NEED FOR THERMO BAND

In our survey, we asked them about the accuracy and efficiency of the current temperature monitoring system, and the responses are as follows

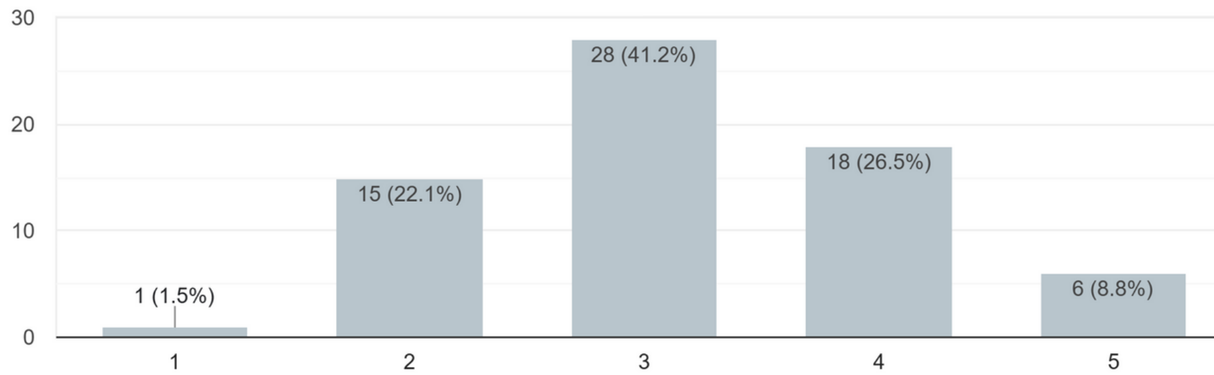
How accurate do you think the temperature monitored with the current system.

68 responses



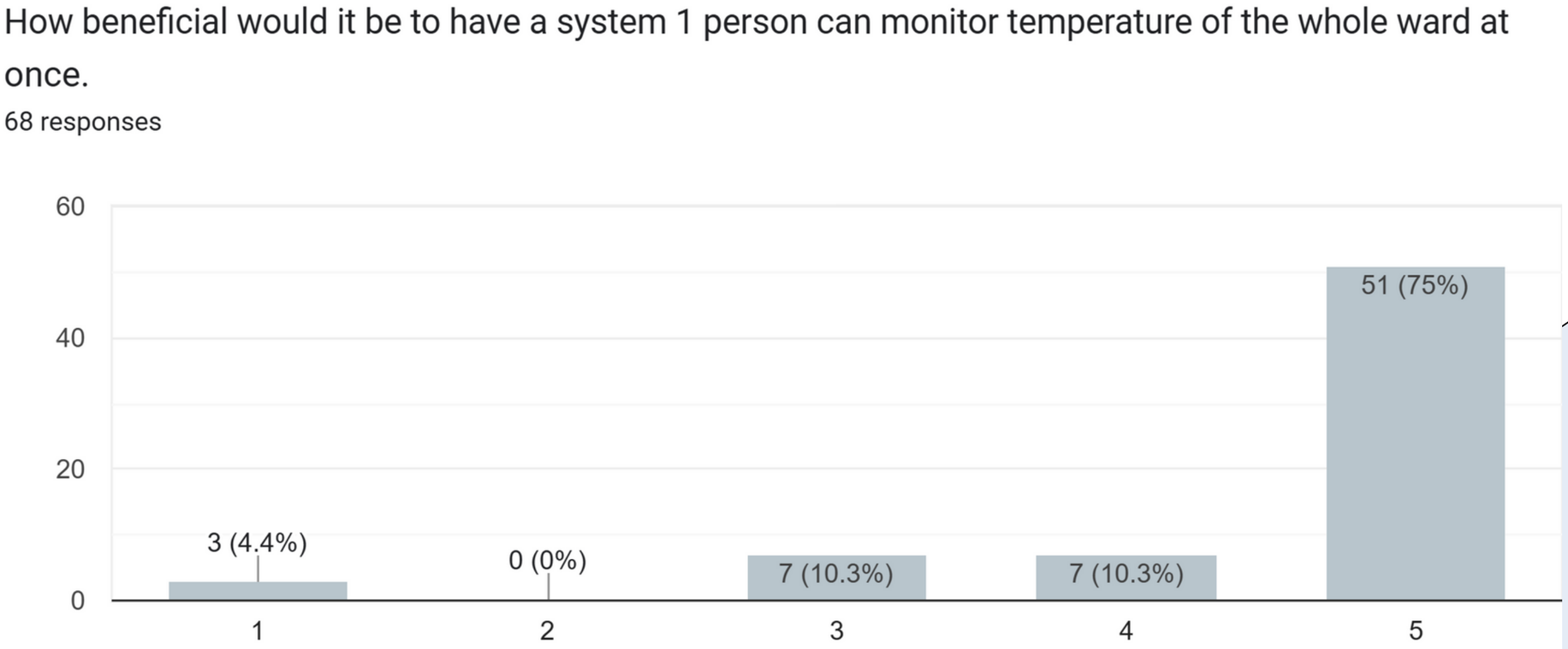
How efficient do you think the temperature monitored with the current system.

68 responses



NEED FOR THERMO BAND

And also we asked them How beneficial would it be



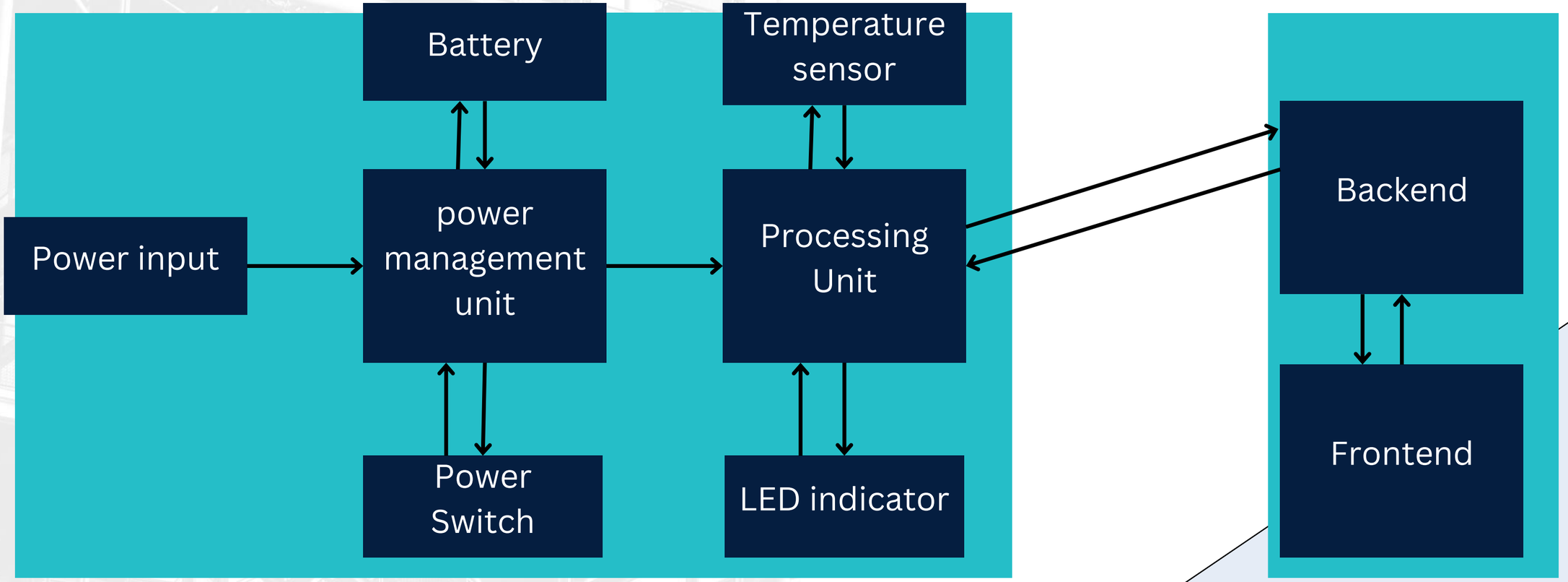
ALTERNATIVES CONSIDERED

- Manual Thermometers
- ☑ Commonly used in hospitals.
- ✗ Require frequent manual checks by medical staff.
- ✗ Risk of human error in reading and recording.
- ✗ Not suitable for continuous or remote monitoring.
- ✗ Inefficient in high-patient-load scenarios.

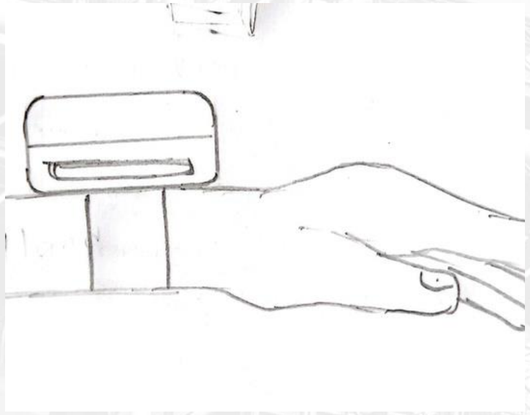
- Smartwatches with Temperature Sensors
- ☑ Provide real-time temperature data and other health metrics.
- ☑ Offer wireless data sync and app connectivity.
- ✗ Expensive and not affordable for large-scale hospital deployment.
- ✗ Not specifically designed for medical-grade accuracy.
- ✗ Limited battery life and potential discomfort for patients

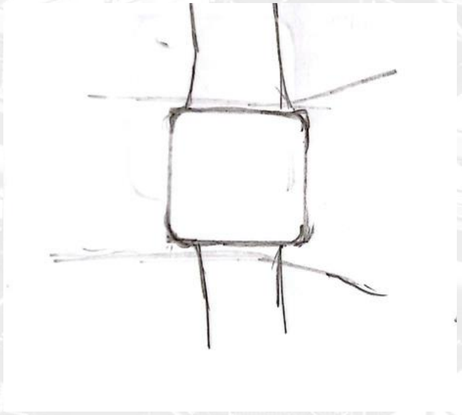
SOLUTION ARCHITECTURE

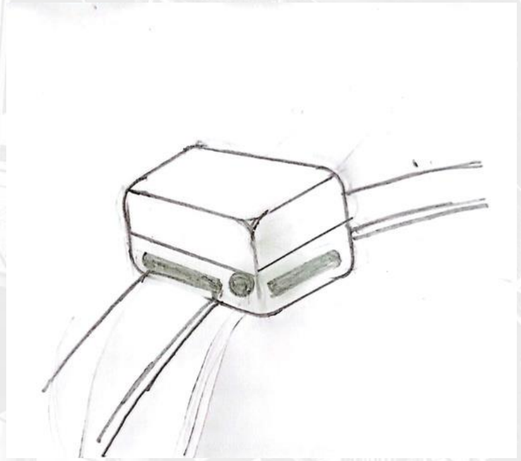
Thermo Band

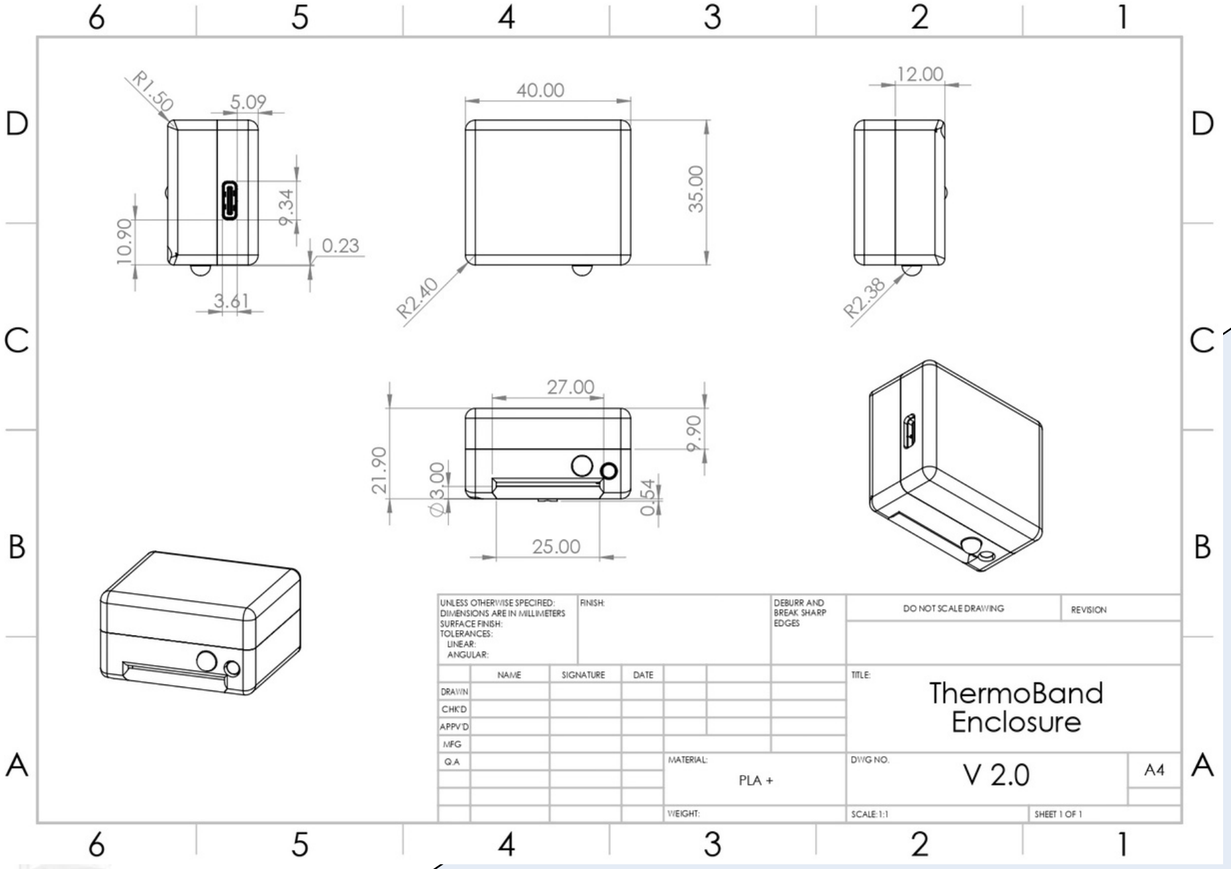


SKETCHES





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UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
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TOLERANCES:
LINEAR:
ANGULAR:
FINISH:
DEBURR AND BREAK SHARP EDGES
DO NOT SCALE DRAWING
REVISION
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MATERIAL:
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TITLE:
ThermoBand Enclosure
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V 2.0
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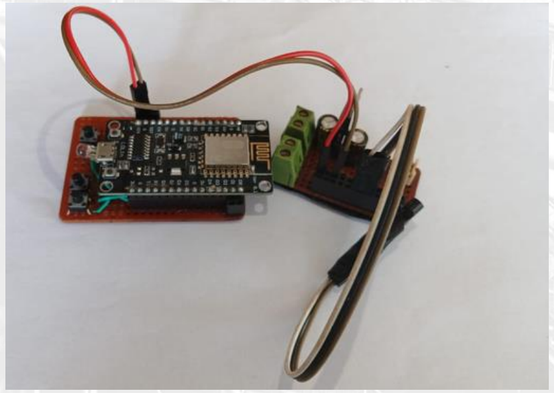
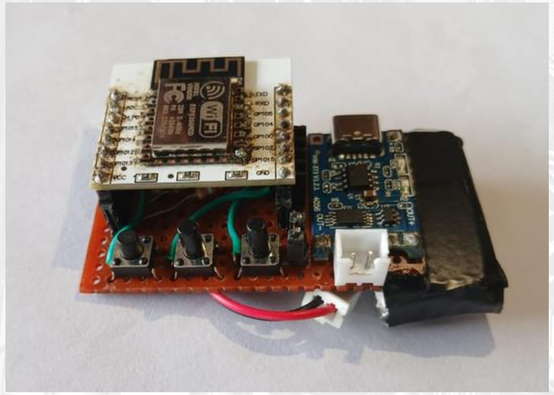
SHEET 1 OF 1

FINAL DESIGN

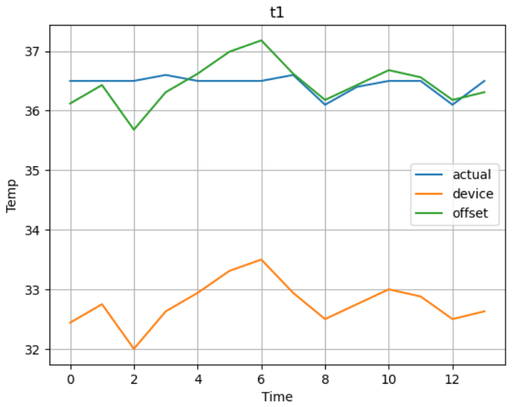
RESULTS UP TO NOW

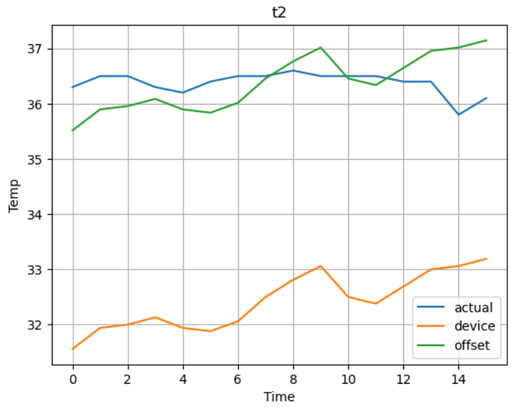


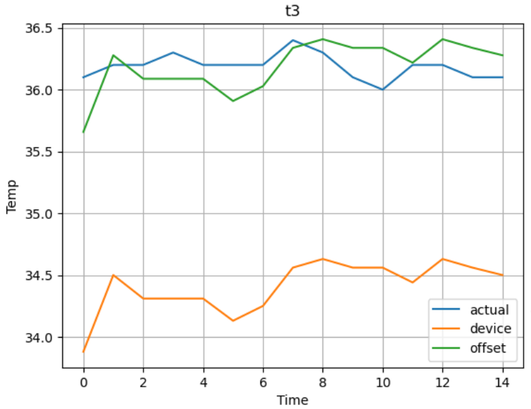
Prototype 01

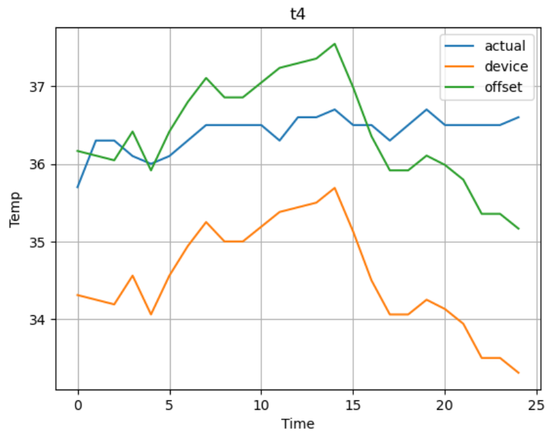


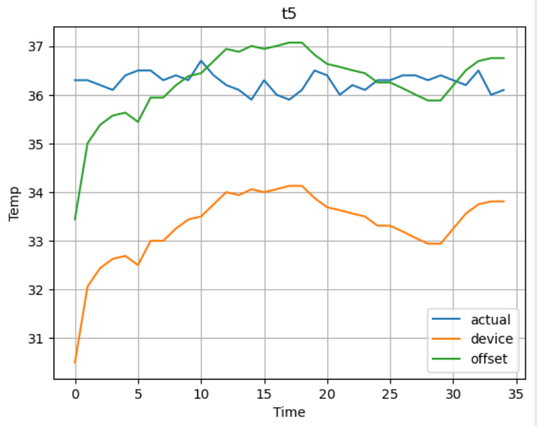
Prototype 02











CHALLENGES FACED

- **Size Constraints**
- Designing a compact, user-friendly enclosure that fits both the PCB and all required components was a significant challenge. We needed to balance ergonomics with internal hardware space.
- Solution: We adopted a modular design approach, using 3D modeling tools to create a custom enclosure that fits the PCB precisely while ensuring comfort for users. Multiple iterations and prototype prints helped us refine the form factor.

- **Battery Capacity vs. Size**
- Finding a battery that offers high capacity while maintaining a small physical size was difficult, as most compact batteries have limited power storage.
- Solution: After evaluating several options, we selected a lithium-polymer battery that offers an optimal balance between capacity and size. We also optimized the firmware for energy efficiency, extending operational time between charges.

Q/A

Survey Data

https://docs.google.com/spreadsheets/d/1vOMyJXLqMs5noxcNcRK0KVpRrKSHznhZ65DRKLxjSkI/edit?usp=sharing

Research Papers

https://pmc.ncbi.nlm.nih.gov/articles/PMC1752199/
https://www.mdpi.com/1424-8220/24/6/1944

Project Files

https://github.com/NileshAm/ThermoBand-EN1190