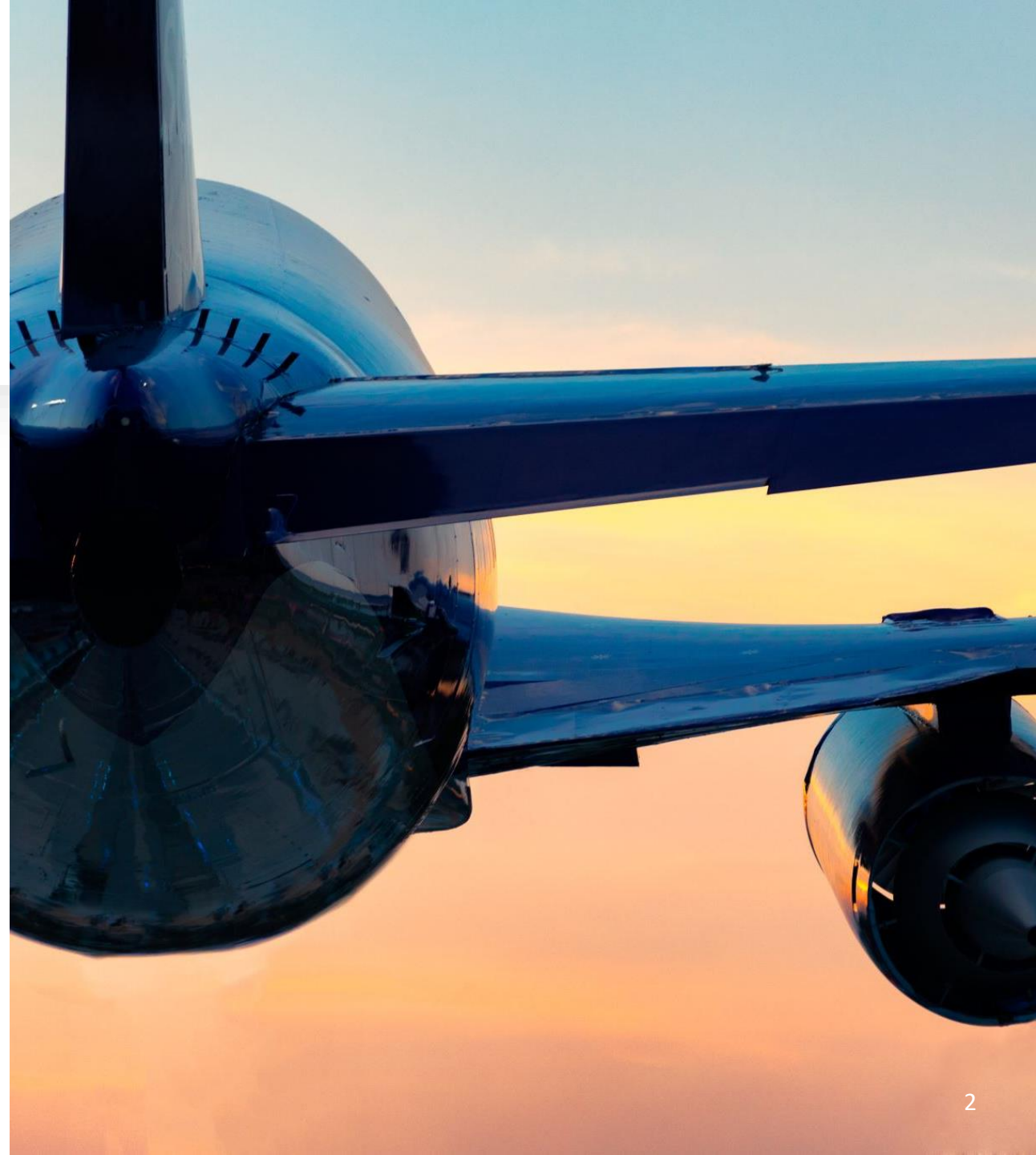UKXY

FINAL PRESENTATION

ELECTRONIQUE & SIGNAL
Final Presentation
25/01/2024

G1
LIU Yang
Petal Ketul
GUO Xiaofan
ISAH John Itopa
KOVAYCIN Umut
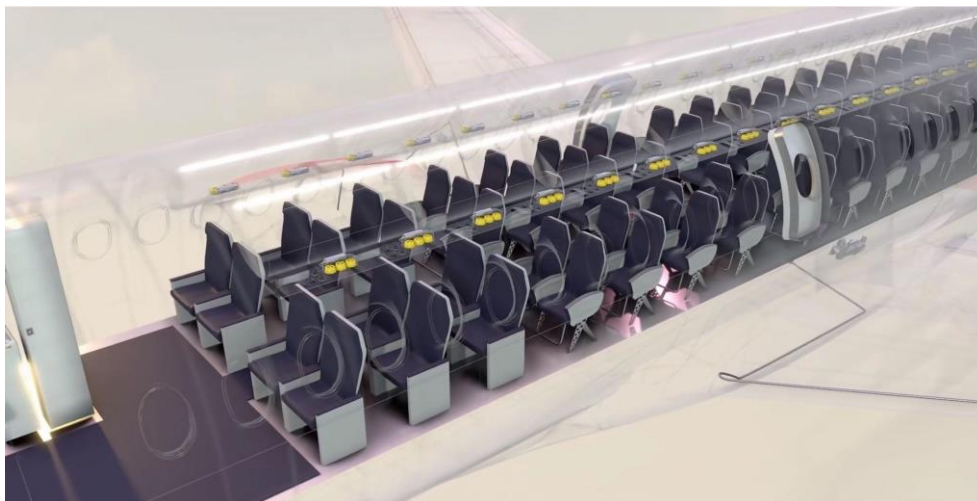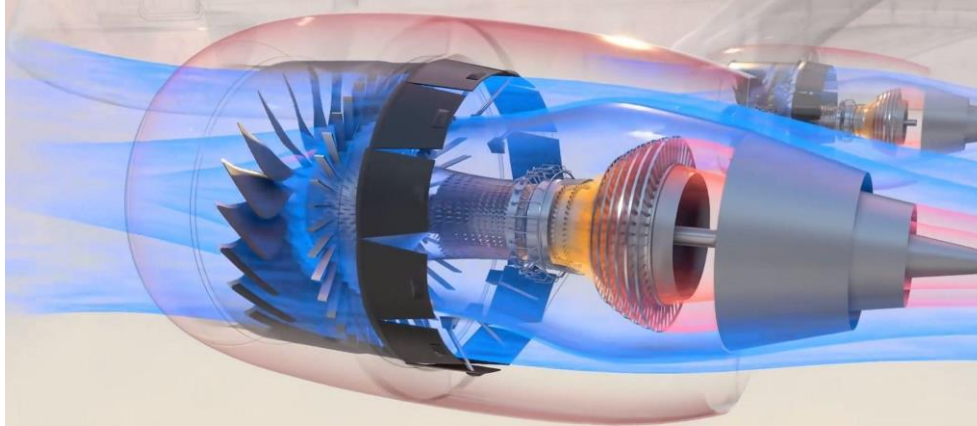
OVERVIEW

UKXY3000

UKXY3000 transforms air travel with real-time Bluetooth monitoring, ensuring passenger engagement and safety alerts for swift responses. The project introduces cutting-edge features like active noise cancellation, precise temperature control, and optimal air quality, creating a quieter and more comfortable in-flight experience.

PROJECT OBJECTIVES

MISSION 1

Concept of Operations

Verification and Validation

Operation and Maintenance

Project Definition

Requirements and Architecture

System Verification and Validation

Detailed Design

Integration, Test, and Verification

Project Test and Integration

Implementation

Time
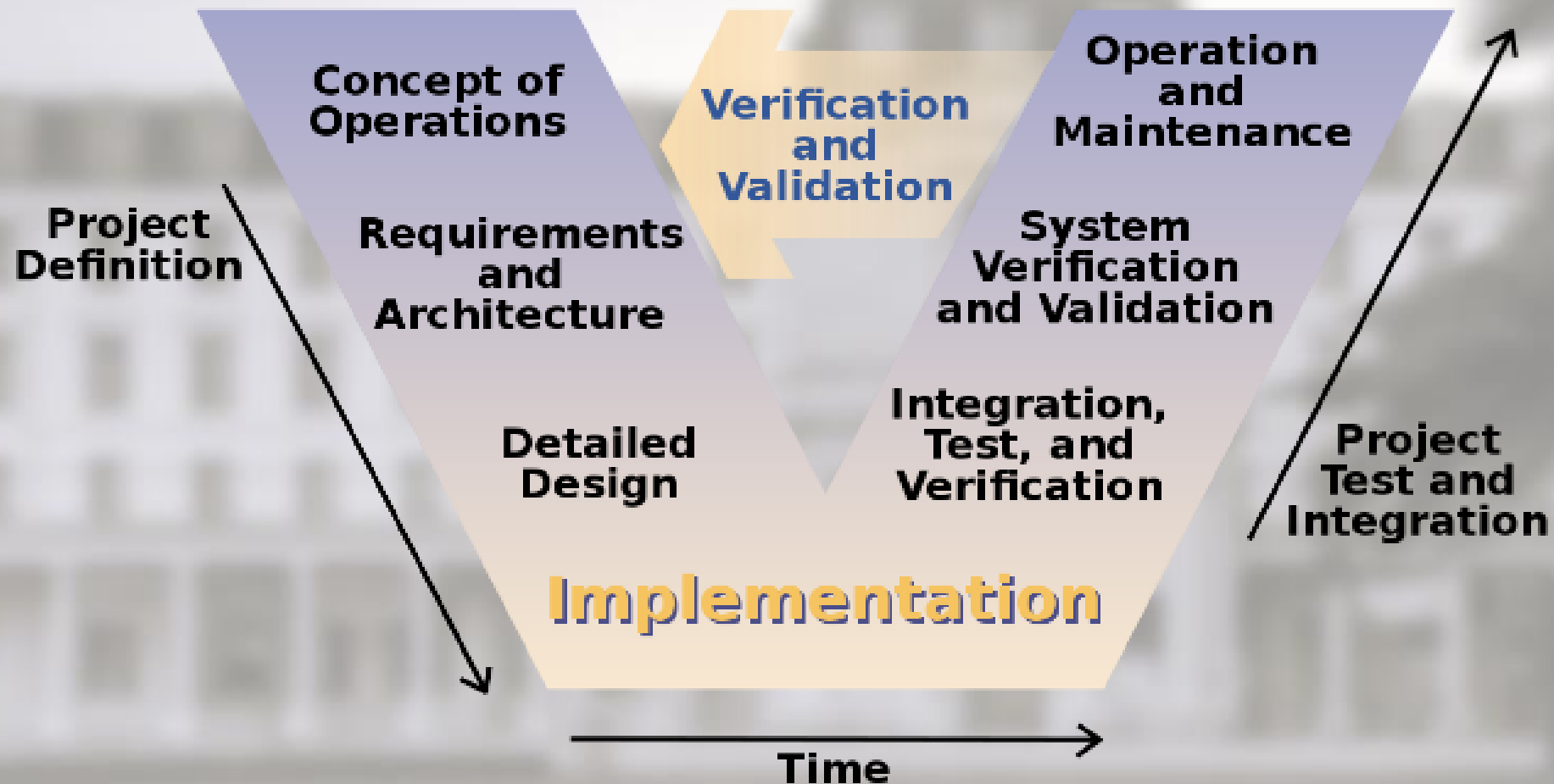
# Implementation

- **Electronics Assembly:**
  - Integrated Tiva Microcontroller (ARM® Cortex®-M4F Based MCU TM4C123G Launchpad).
  - Assembled temperature and humidity sensors, ultrasonic sensor, main board, display board, and amplifier board.
- **Software Development:**
  - Programmed using Energia IDE and C language for microcontroller functionality.
  - Developed software to display and analyze environmental parameters obtained from sensors.
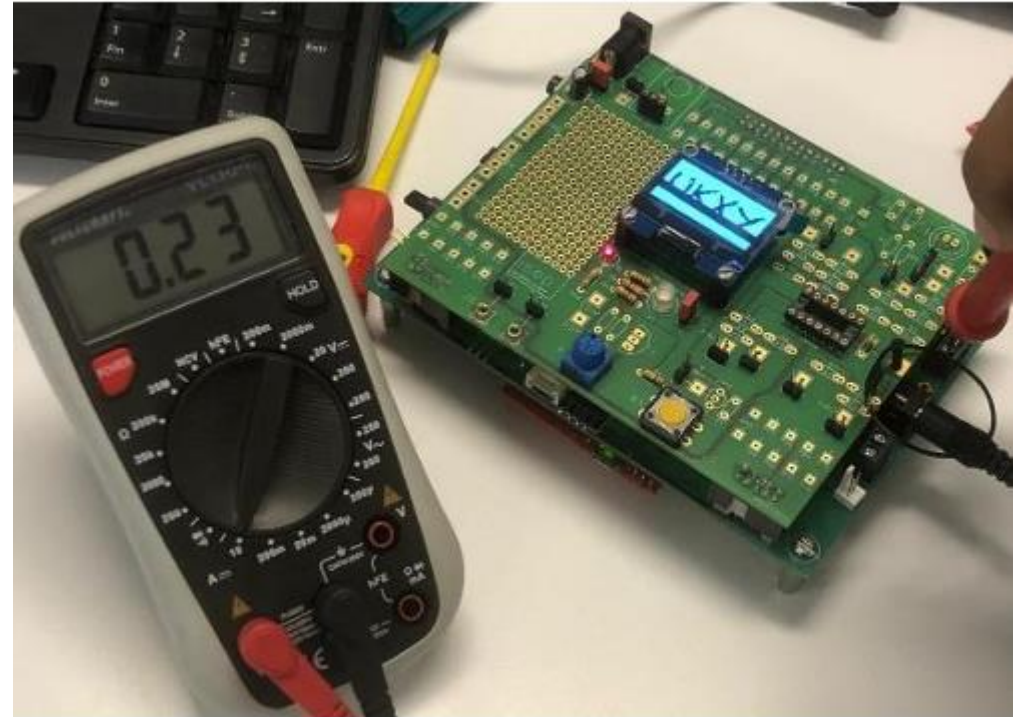
Sensors Integrated
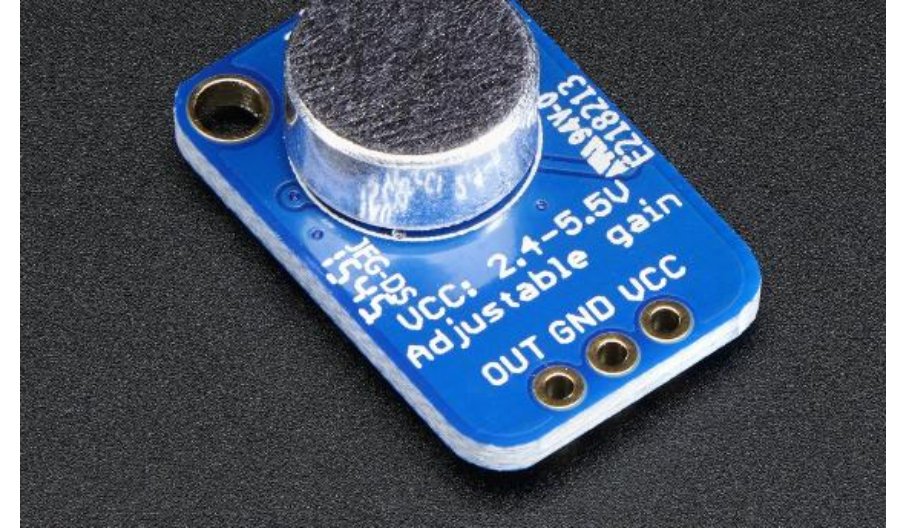
- **LM35 (Temperature Sensor):** Provides real-time temperature data for precise environmental monitoring within the aircraft compartment.

- **MiCS-VZ-98-TE (CO2 Sensor):** Ensures optimal cabin air quality through continuous measurement of carbon dioxide levels.

- **AMB-707-RC (Microphone - Omni):** Captures and analyzes environmental sound, distinguishing critical from non-critical sources.

Measuring the LED
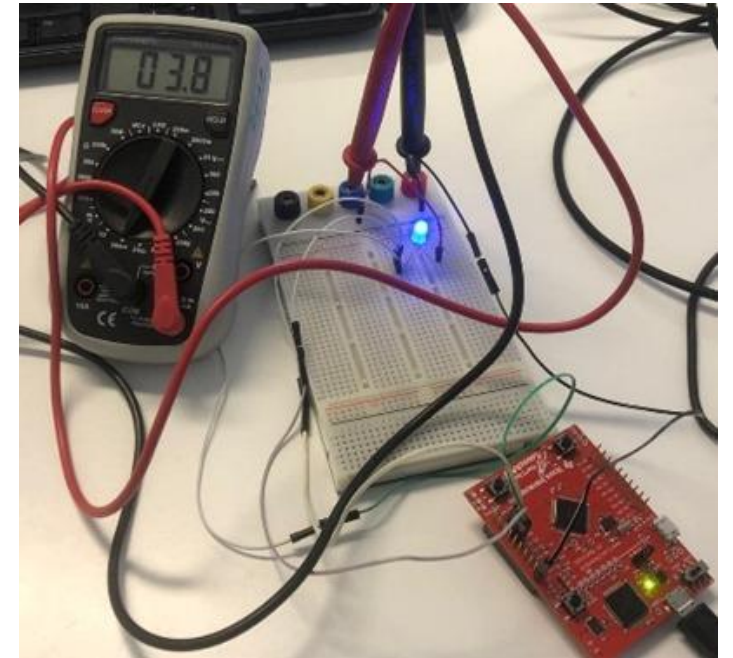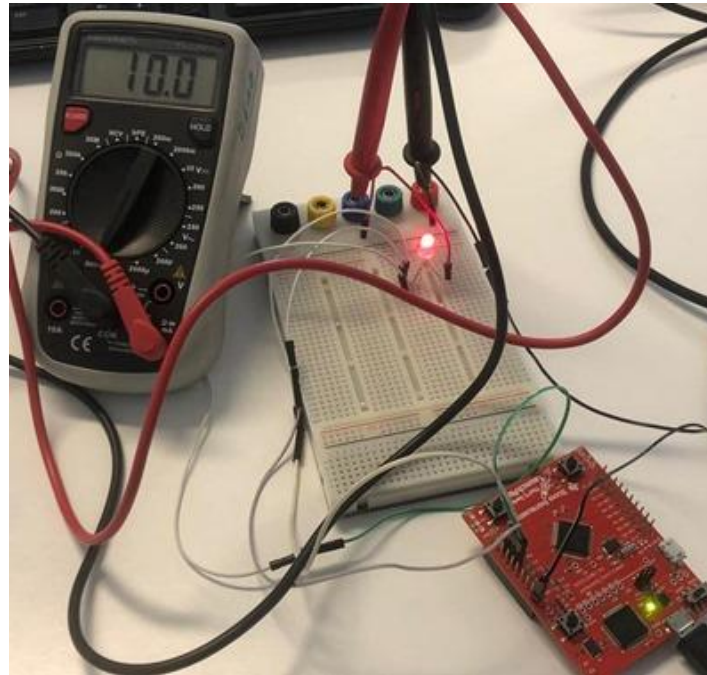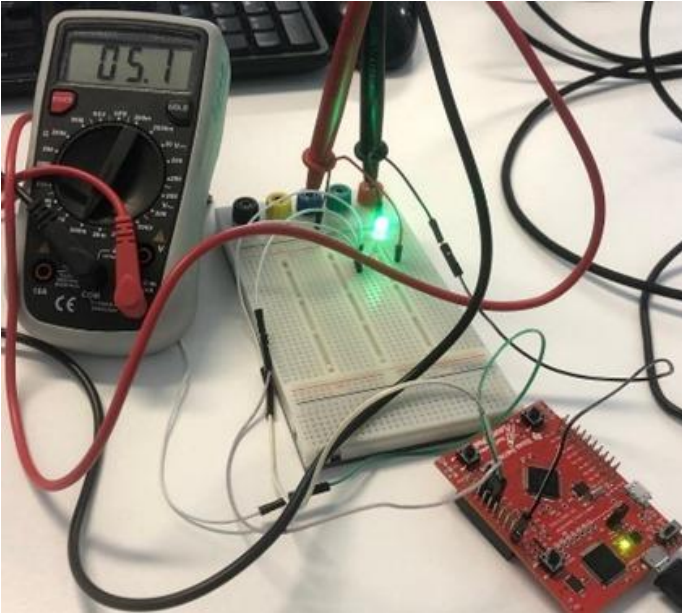
Power Consumption

- Calculate Power:

  $P = 0.23\ mA \times 5V = 0.00115$

- Calculate Total Energy Consumption:

  $E_{day} = P \times 24\ hours = 0.276\ Wh$

- Convert to Kilowatt-hours:

  $E_{day} = 0.0276Wh \div 1000 = 0.0000276\ kWh$

- Calculate Carbon Equivalent

  $E_{day} = Eday \times Carbon\ Intensity$

  $= 0.0000276kWh \times 0.35kgCO2e\ kWh$
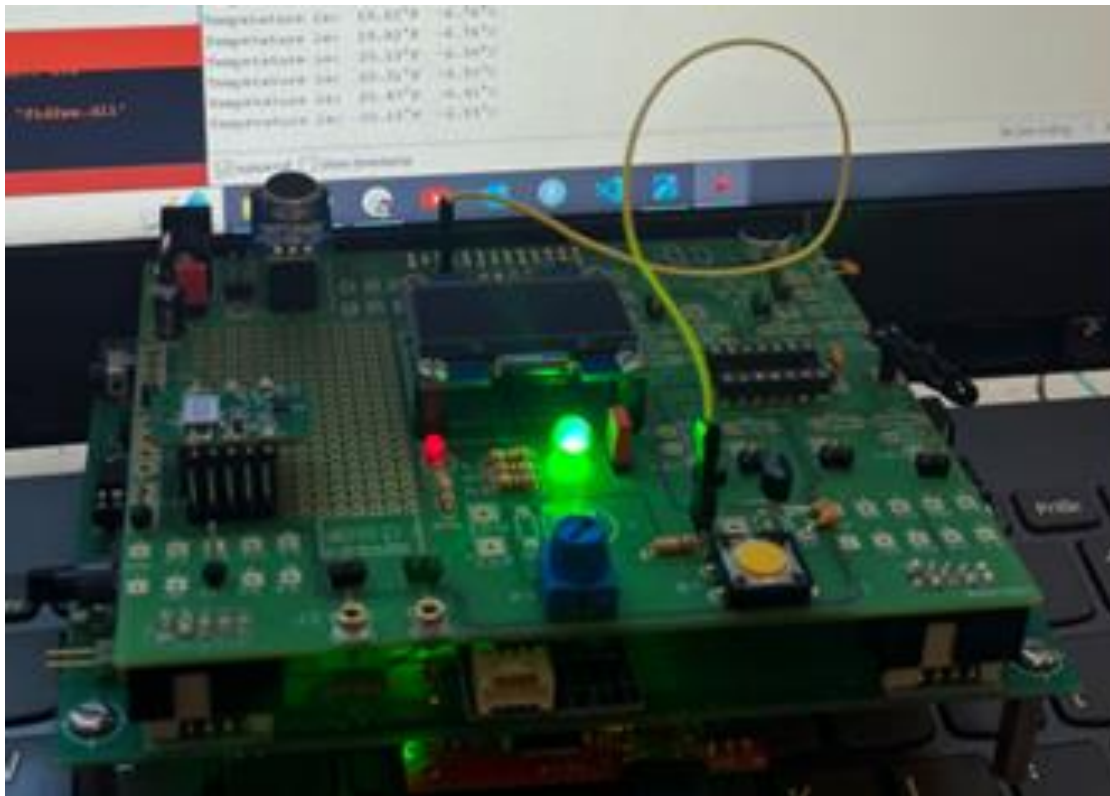
  $= 0.00000966kg\ CO2e$

OLED DISPLAY

MISSION 2

Sensor connection
And
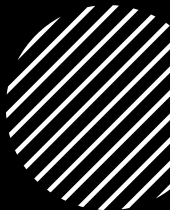# signal processing part

Temperature Display via Putty

System Operation

The device is triggered based on the power of an audio signal compared to the silence threshold.

It starts to listen for the key by passing the signal through a filter. If the key is detected by the filter, then the device begins measuring process.
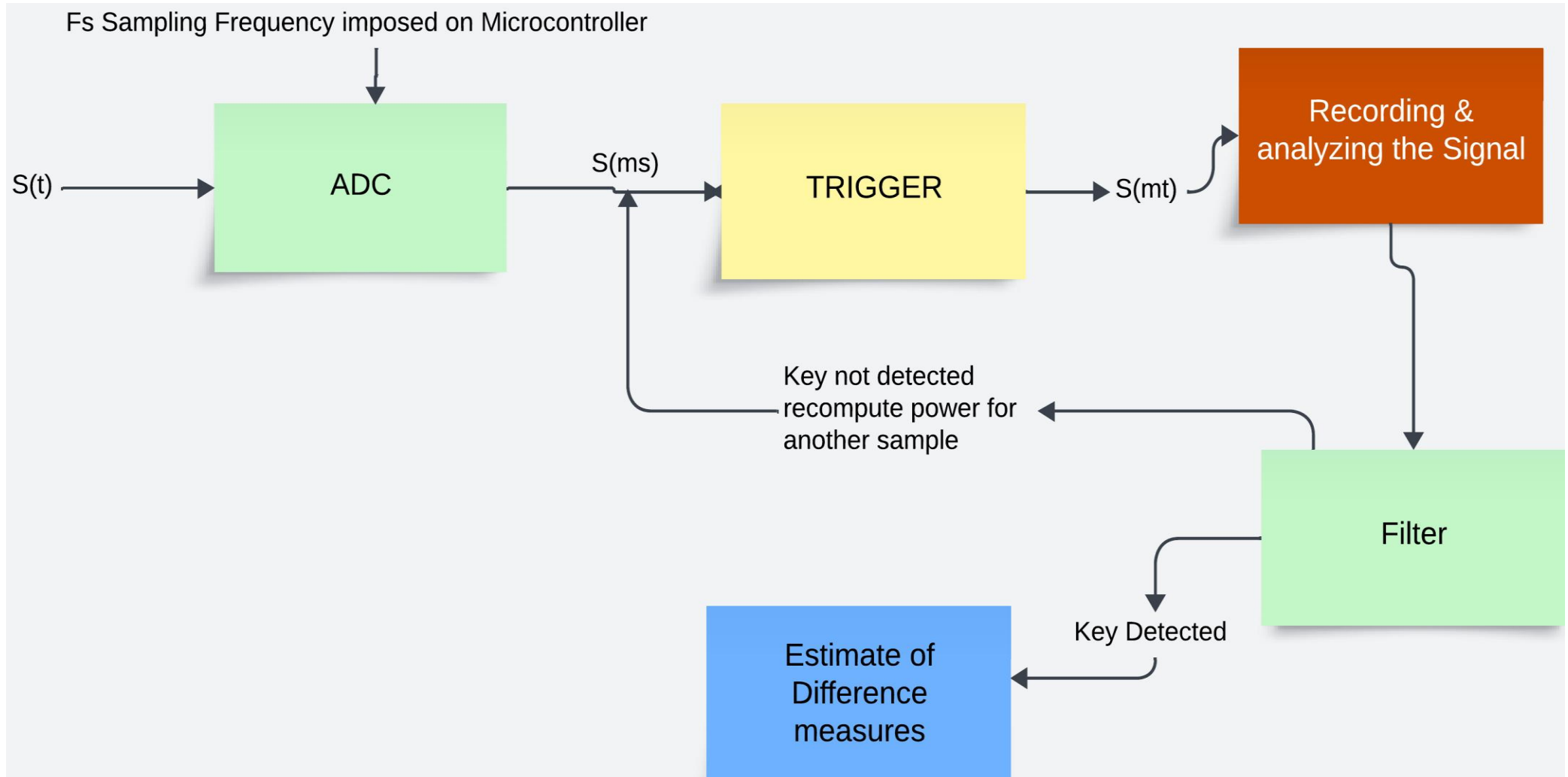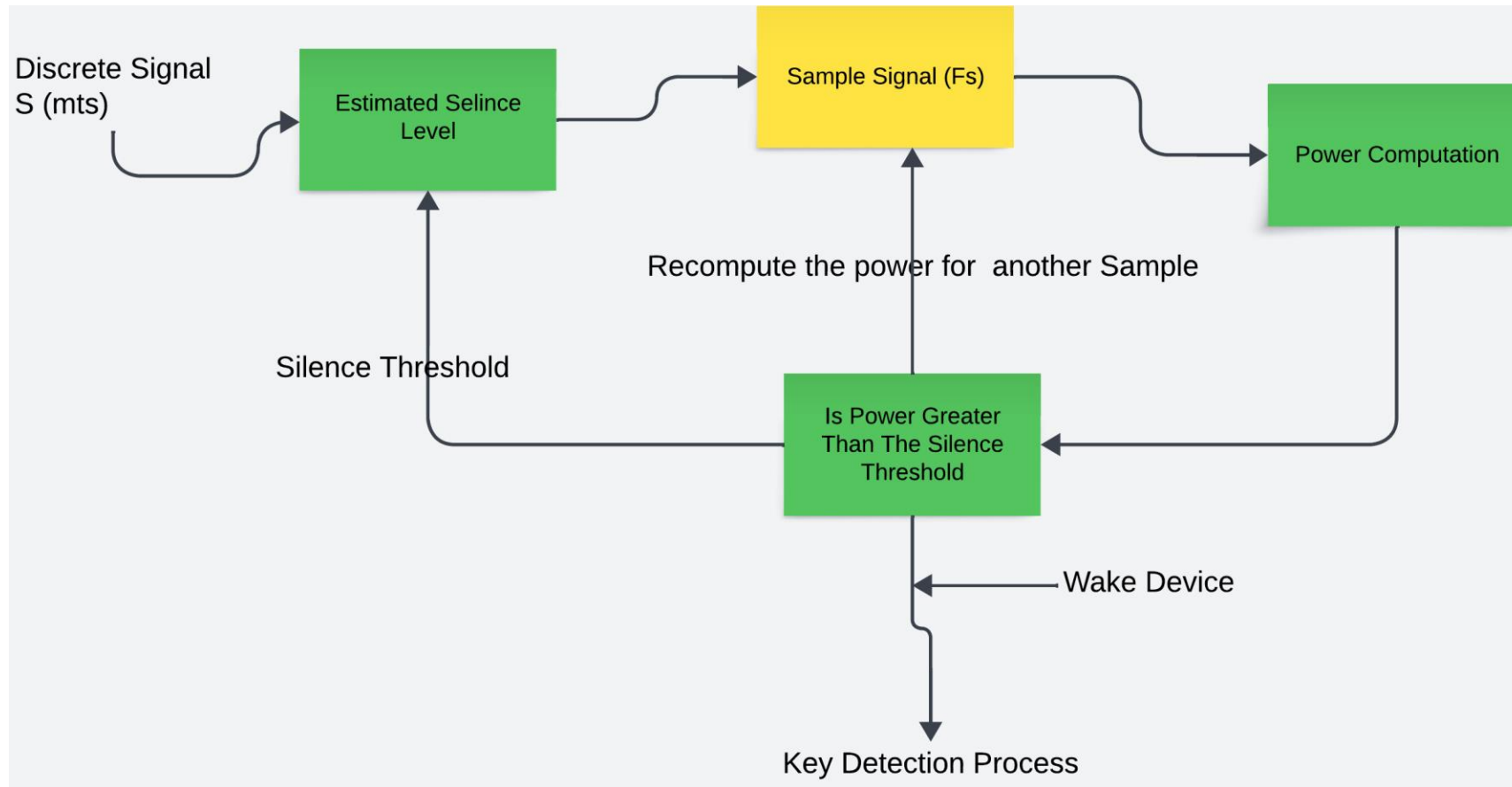
It measures the sound quality in decibels

It measures and outputs the temperature and humidity of the environment.

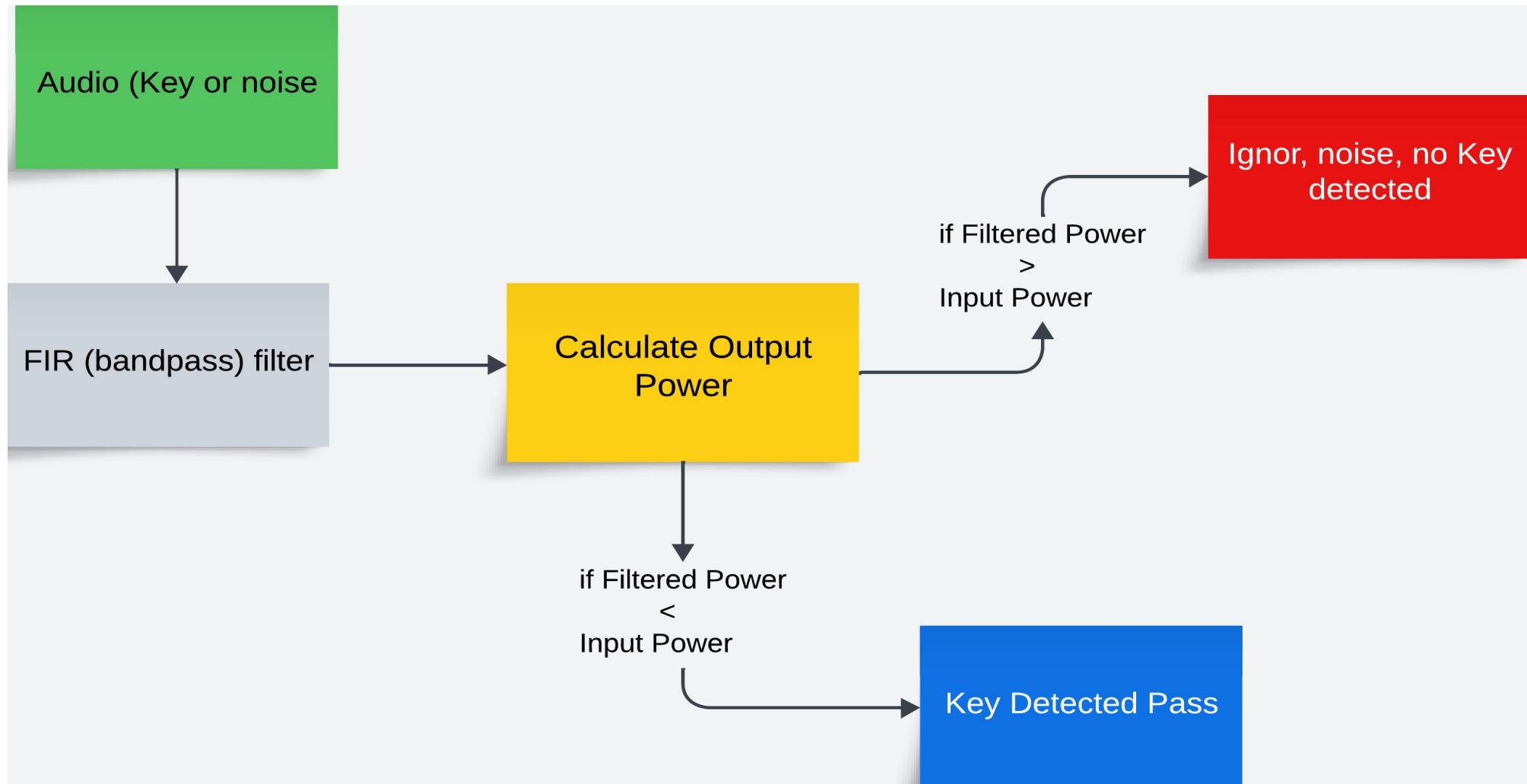# Voice Treatment

Trigger System

Filter Design and implemention

Audio (Key or noise

FIR (bandpass) filter

Calculate Output Power

if Filtered Power
>
Input Power

Ignor, noise, no Key detected

if Filtered Power
<
Input Power

Key Detected Pass

MISSION 3

Connection Between Hardware
&
Data Transmission
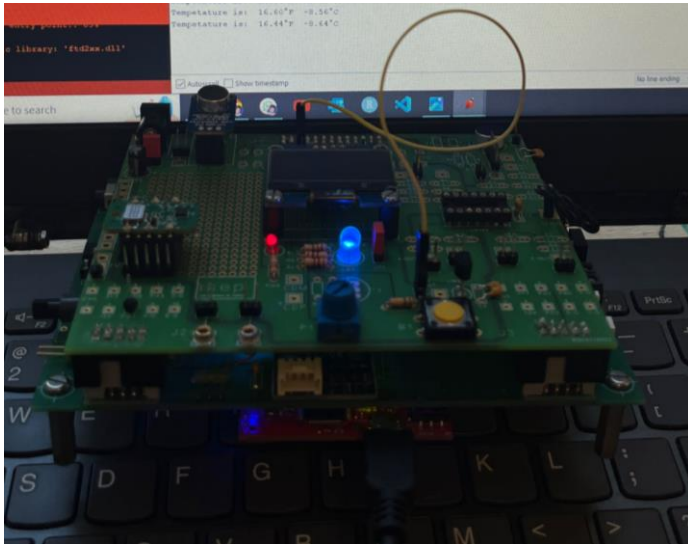
Low temperature
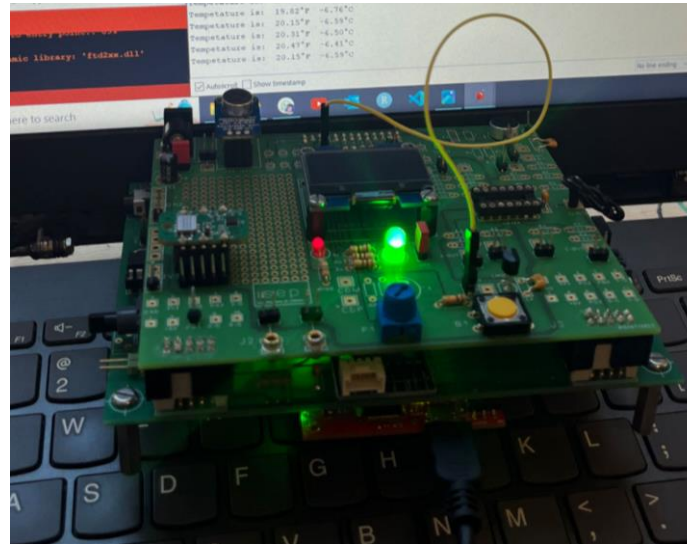
Suitable temperature
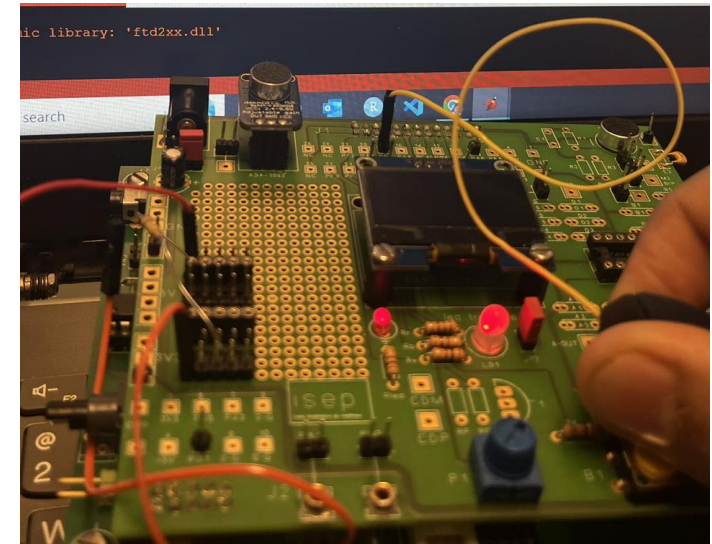
High temperature
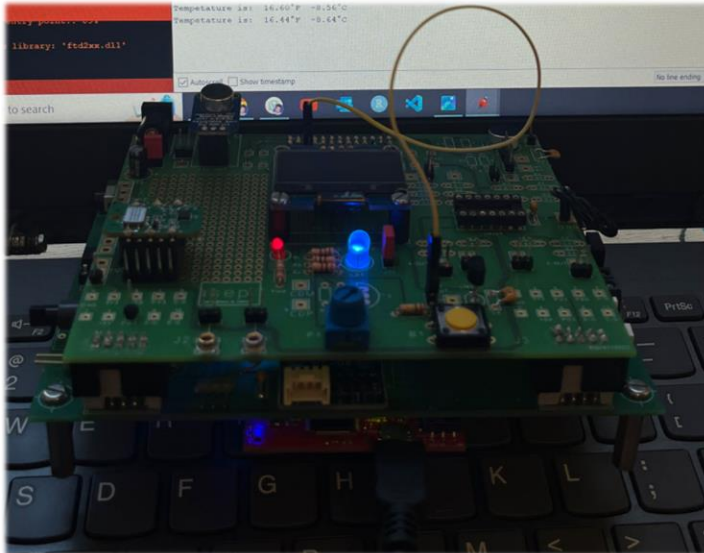
1. The micro sensor:
- **blue** light**:** the environment is very quiet
- **green** light**:** the environment is quiet
- **red** light**:** the environment is noisy, administrators need to take necessary measures to mitigate the noise.

2. The CO2 sensor:
- **green** light**:** the cabin air is fresh
- **blue** light**:** the cabin air is good
- **red** light**:** the cabin air is bad**,** administrators need to improve air circulation.
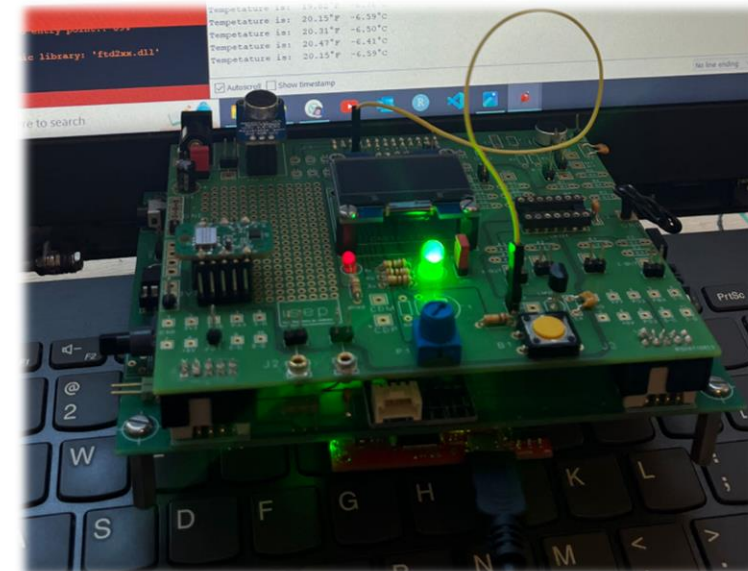
Data settings for actual application (in the cabin)

1. **The temperature sensor:**
   - **Blue :** below 16 degrees Celsius
   - **green :** 16~25 degrees Celsius
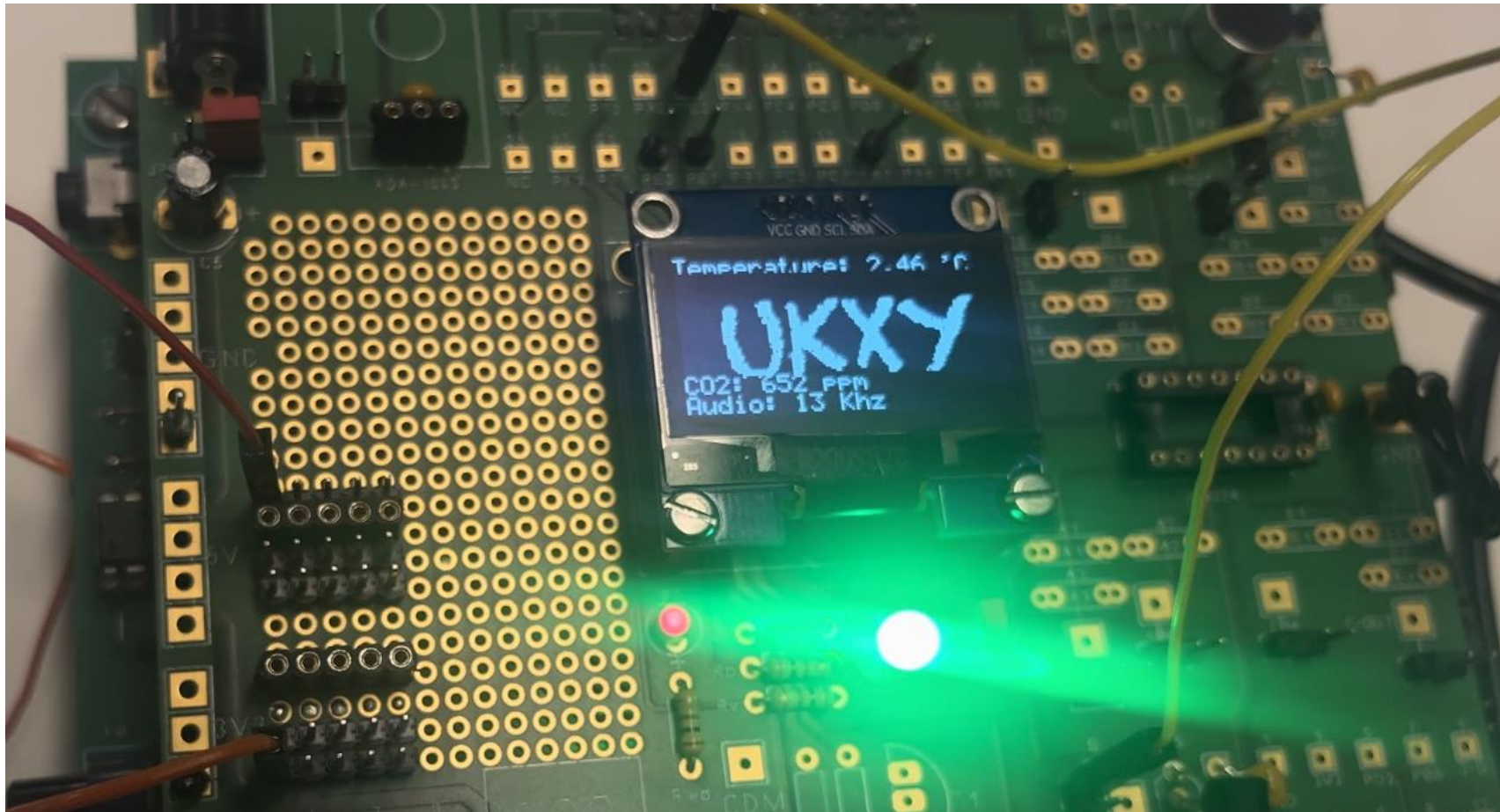   - **red :** over 25 degrees Celsius

2. **The micro sensor:**
   - **blue :** below 70 dB
   - **Green :** 70~80 dB
   - **red :** over 80 dB

3. **The CO2 sensor:**
   - **green :** below 400 ppm
   - **blue :** 400~1000 ppm
   - **red :** over 1000 ppm

Connect the sensor to the screen and print relevant information to the screen

# Real-time data transmission via Bluetooth

Information :

- Real-time
- Temperature
- Average Voice Power
- Max Voice Power
- PPM CO2

```
17:06:11.143 peakTopeak=2680
17:06:11.160 Volts=2.16
17:06:11.172  PPM Co2: 8589942_____
17:06:13.206 Tempetature is:  38.24°F
17:06:13.232 Tempetature is:  6.24°C
17:06:14.394 Average :3089
17:06:14.408 Max Power : 2.27
17:06:14.421 Index : 1000
17:06:15.468 peakTopeak=2752
17:06:15.483 Volts=2.22
17:06:15.513  PPM Co2: 8589942_____
17:06:17.541 Tempetature is:  37.64°F
17:06:17.558 Tempetature is:  5.64°C
17:06:18.714 Average :3085
17:06:18.734 Max Power : 2.27
17:06:18.753 Index : 1000
17:06:19.795 peakTopeak=2872
17:06:19.824 Volts=2.31
```
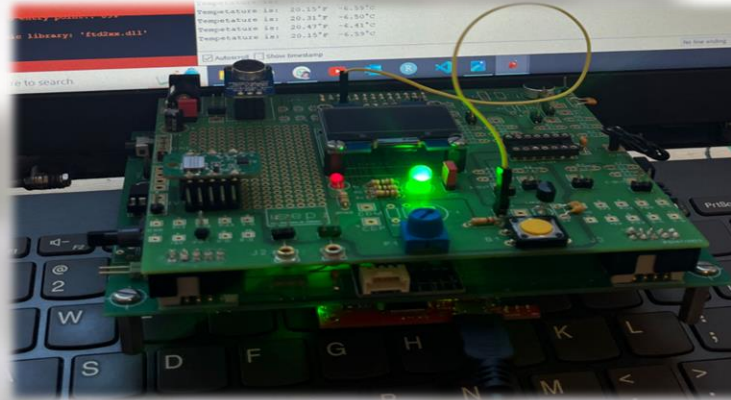
Conclusion

Technology For Humanity
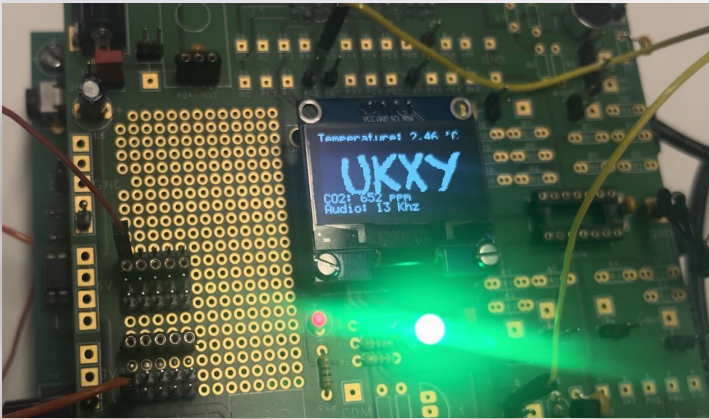
We monitor the temperature of the environment moment by moment. If we are in your environment, you can trust the green light.

We work so that you can breathe in a healthier environment. If we are in your environment, you can trust the green light.

Even though we were in your environment, did you not see the light? Just check your phone we'll be there for you.

Key points

Comprehensive Understanding

Software Proficiency

TIVA Platform Utilization

LED Indicator and Display Programming

MATLAB for Signal Processing

Visual Cues for environment data Check

Detailed Screen Display

Collaborative Effort

Thank You!