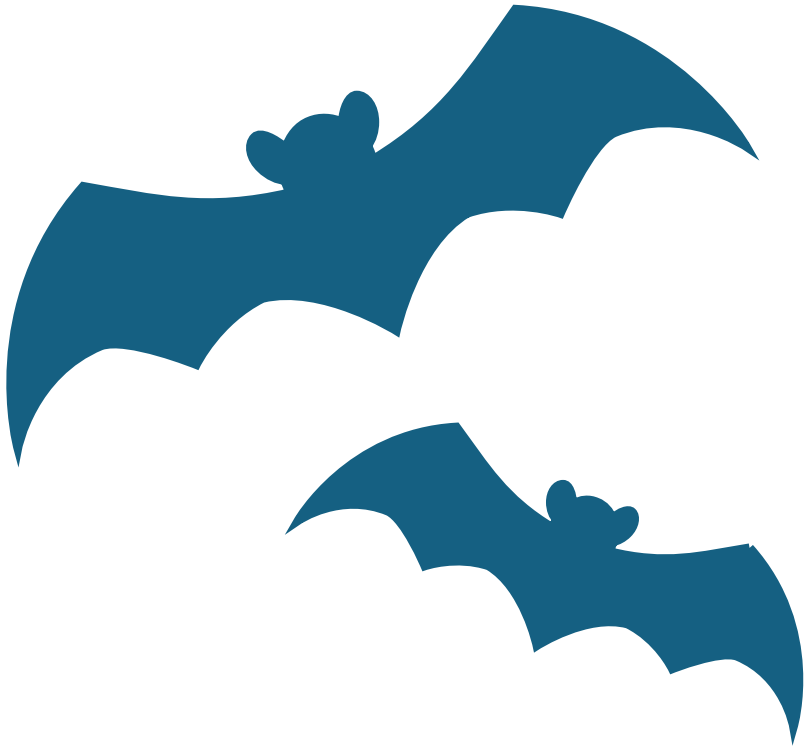

BATS

Group 15 – Up To Bat

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Problem Statement

A need exists for researchers to analyze the effectiveness of bat boxes using a device that can **collect data on total visits** and is **easily mountable**, all while maintaining the **safe and accessible** roosting site a bat box provides. Additionally, both the device and the box need to be **low maintenance** and **cost-effective** for research.

Prototype I: Plan and Tests

1. **Circuit Assembly**

   We built the basic circuit system, which was the basis for the rest of the steps and tests. This involved connecting the Arduino Nano to the sensor and capacitor.

2. **Voltage Check**

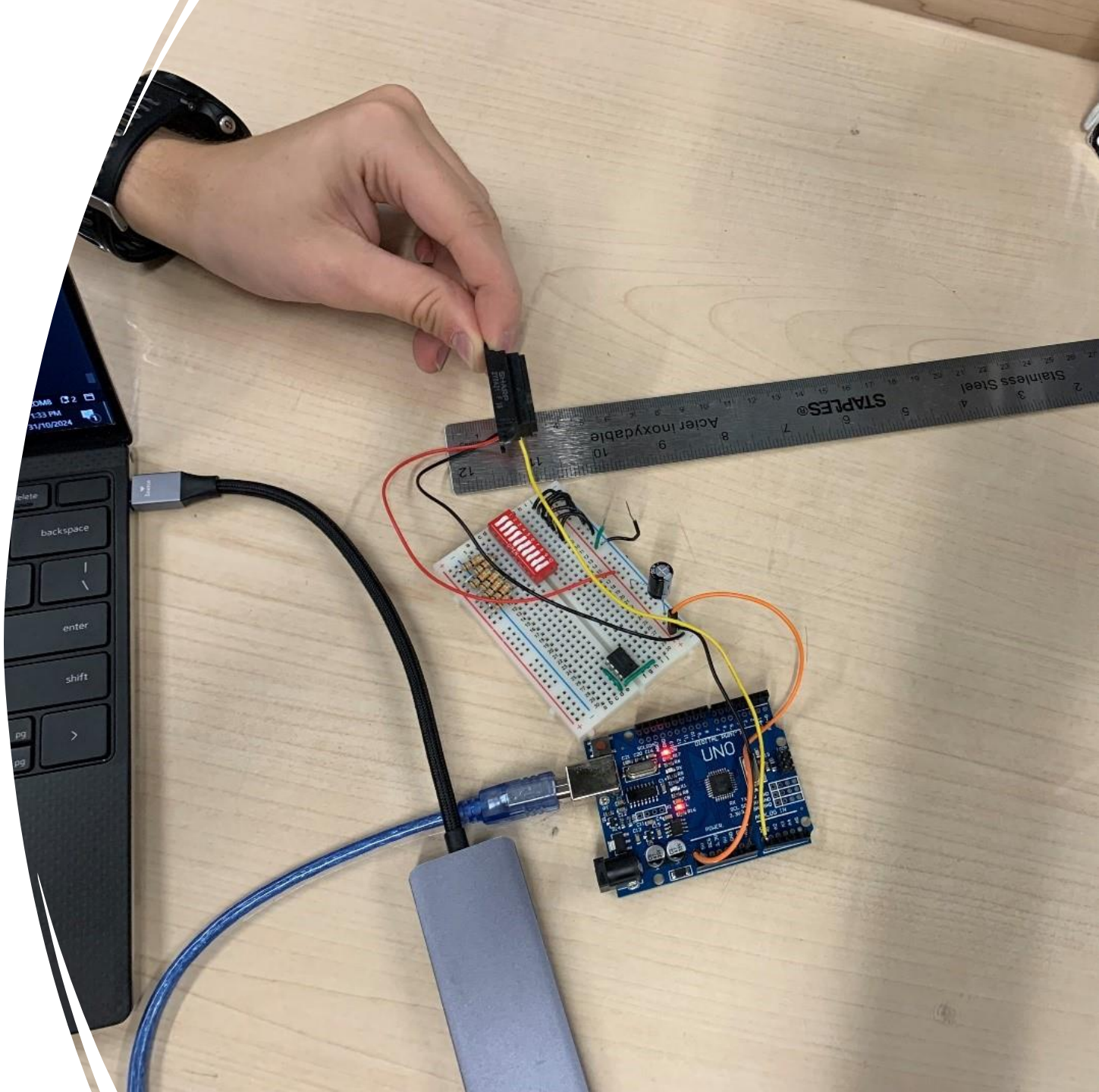
   Voltage from the Arduino to the circuit was noted (to ensure accuracy)

3. **IR Sensor Values**

   The values communicated from the sensor to the Arduino were noted (bat box conditions were simulated, with angles and different shapes)

4. **Data Intervals**

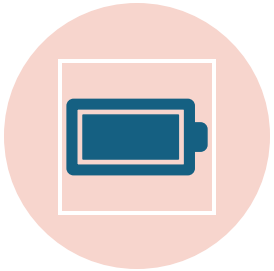
   The frequency at which the data is recorded is important for dataset accuracy



Prototype I Results

Test	Result
Voltage Reading	4.22 V
Sensor Range	10 cm to 80 cm
Detection Range	0 cm to 80 cm
Code	Successful
Accuracy	±2 cm
Interference at different speeds	Detected
Interference at different angles	Detected

Plan for Prototype II



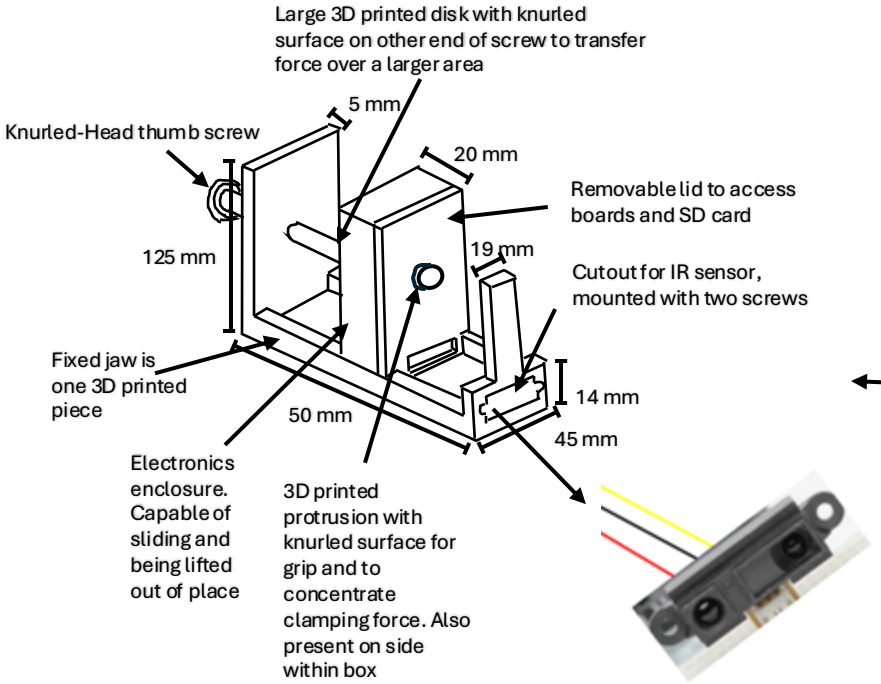
DETERMINE INPUT AND OUTPUT OF BATTERIES

DETERMINE THE OPERATIONAL LENGTH OF THE SENSORS

DETERMINE DATA EXTRACTION/EXPORTATION METHODS

DETERMINE THE EFFICIENCY OF THE FULL INTEGRATED POWER SYSTEM AND SENSOR

Clamping Mechanism

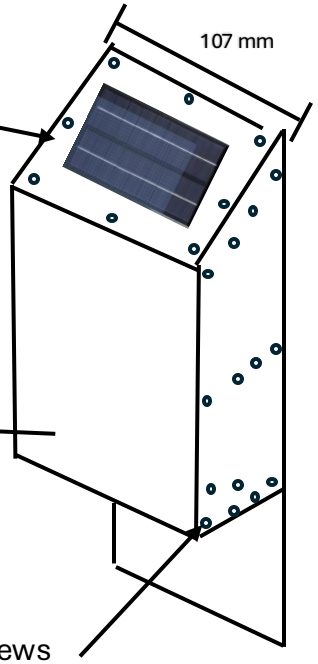


IR Sensor

Bat Box

Solar cell will be mounted on roof of bat box using a 3D printed frame for drywall screws to be drilled through

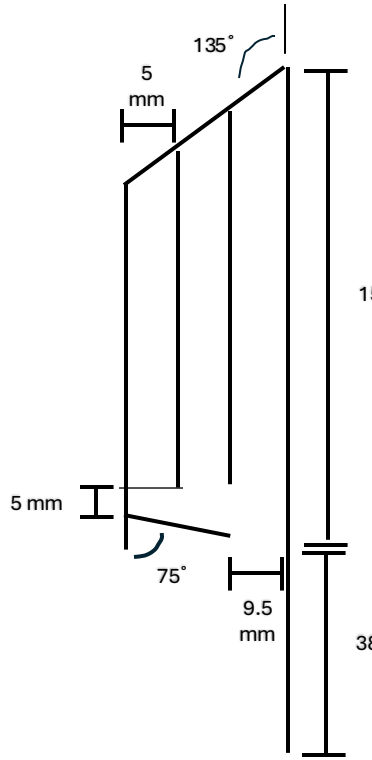
MDF will be used to represent exterior grade plywood of actual product



Drywall screws will screw directly into dividers

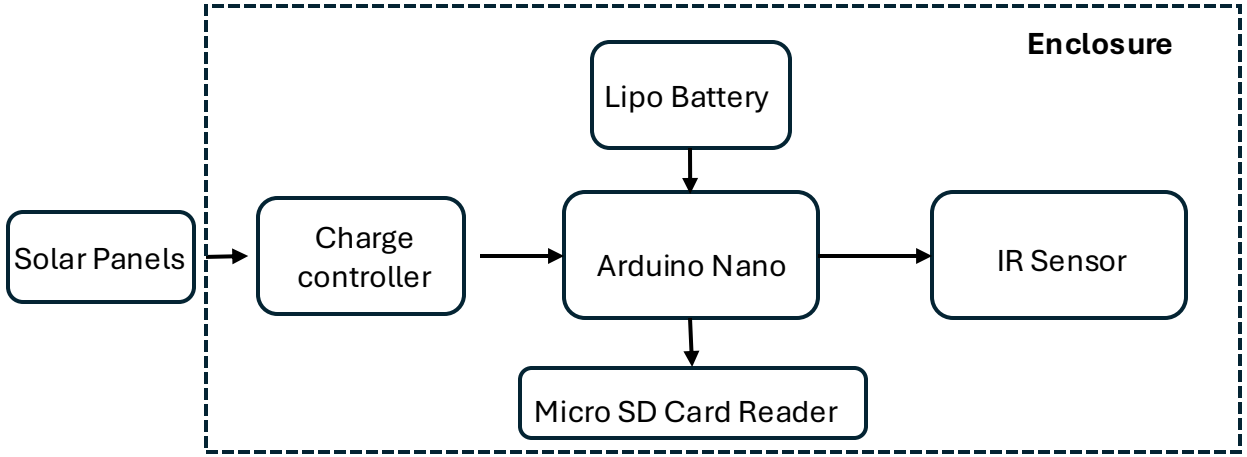
Section View

Note: Displayed dimensions are for final prototype (1:4 scale of final product)

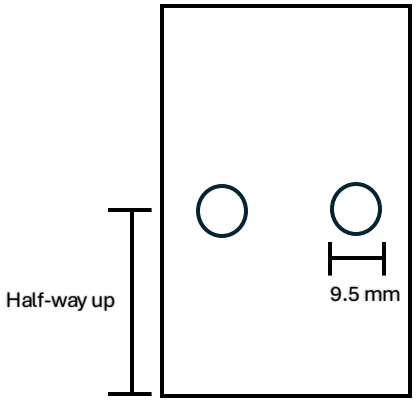


Thickness 3.175 mm

System Overview



Dividers



Landing Pad Side View

Grooves are 1 mm deep at 3 mm intervals