

PROBLEM STATEMENT

Agricultural data collection is inefficient, leading to wasted resources and lower yields. The Agricultural Data Collection Drone System automates real-time data gathering and feedback, enabling precise, immediate adjustments to optimize crop health and productivity.

PROJECT IMPACT

Green DataBee transforms agriculture with real-time data collection and analysis, reducing costs, fostering jobs in agri-tech, and providing sustainable solutions. By minimizing waste, preserving ecosystems, and lowering carbon emissions with energy-efficient drones, it addresses global challenges with practical innovation.

CONSTRAINTS

1. Physical and Performance

Weight (1–1.5 kg) and battery (400–700 Wh) balance efficiency and portability, with a 1–2 hour charge time. Power prioritizes motors (60–80%) for stable flight.

2. Financial

A budget of 6000–8000 SAR ensures advanced technology while staying cost-effective.

3. Operational and Compliance

A 180–230 meter range supports reliable data, and a 100–120 meter altitude complies with regulations for safe operation

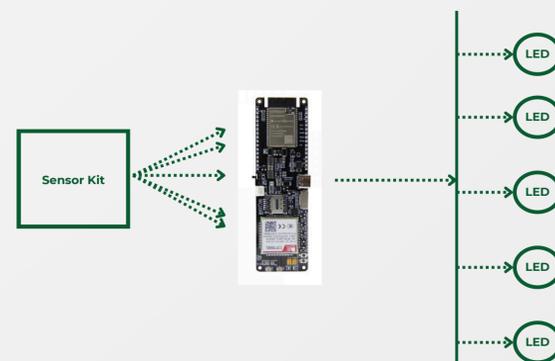
TECHNICAL SPECIFICATIONS

Battery	4000–6000 mAh capacity, 15 min flight, 60 min recharge.
Motors	850–1400 KV rating, max 50W power consumption.
Communication	LTE protocol, low power, 250 kbps data rate.
Control System	ESP32 microcontroller, automated flight path, no manual control.
Design	Quadrotor with optimized flight path to minimize power use.
Efficiency	Low power consumption for optimal performance within battery limits.

PHYSICAL PROTOTYPE - QUADCOPTER DRONE



COMMUNICATION SYSTEM



Sensors to Drone

Data is transmitted and received using Bluetooth 4.2

Drone Dashboard

Data is transmitted to the cloud using LTE

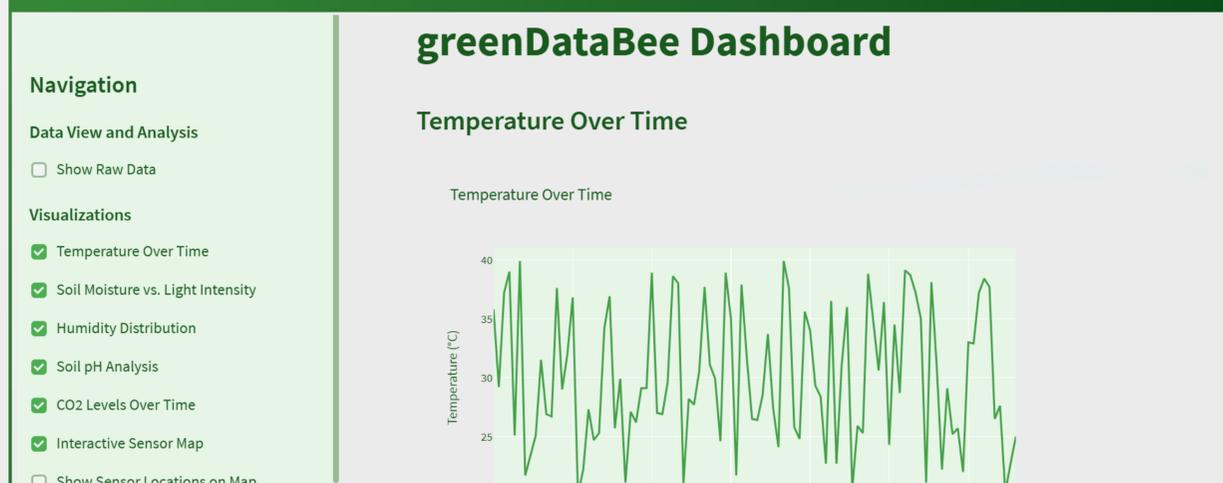
PROTOTYPE RESULTS

The drone is meticulously designed to meet all specified requirements, with a weight of 1.3 kg to ensure optimal balance and performance during operation, providing a reliable flight time of 15 minutes. The onboard microcontrollers are equipped to accommodate the LTE protocol, enabling seamless communication and data transfer in real-time. Additionally, the system incorporates a robust database capable of efficiently managing up to 512 MB of data, ensuring smooth data handling and storage for analysis and decision-making processes. This design guarantees a reliable and efficient solution tailored to meet operational needs.

VALIDAION

The target specifications were achieved using simulation results from Mission Planner software and Python-based calculations. Additionally, a comparison between these methods was conducted to ensure the accuracy and efficiency of the optimized drone flight paths and data collection processes.

PHYSICAL PROTOTYPE - QUADCOPTER DRONE



CONCLUSION

The Green DataBee project has been successfully developed, meeting the specified design and operational requirements. By integrating advanced sensors, autonomous drones, and real-time data visualization, the system enhances agricultural productivity and sustainability. It minimizes resource usage, reduces environmental impact, and empowers farmers with actionable insights, aligning with global efforts to promote precision farming and sustainable development.