Free From Smog

Drone-powered air quality monitoring for rural communities

HACKLET 2026

TEAM NEXUS

The Challenge

City-wide AQI data fails to capture local pollution exposure

Inaccurate or averaged AQI data hides real health risks and delays preventive action, affecting rural communities, outdoor workers, children, the elderly, and local health authorities.

- Limited urban-focused AQI stations
- Zero rural or village-level monitoring
- No early warnings or predictions
- Data reliability issues

The Impact

0

Rural AQI Access

Large rural populations have zero real-time air quality monitoring

100%

Urban Concentration

Most AQI stations are concentrated in cities only

Who We're Helping

Rural Residents

All age groups seeking real air quality data and early health warnings

Health Authorities

Local officials needing accurate data for preventive action

Government Agencies

Health departments and environmental NGOs monitoring rural areas

Current Solutions Fall Short

Urban AQI Stations

- Fixed location
- Very expensive
- No rural coverage

Satellite-based AQI

- Low spatial accuracy
- Cannot detect village-level pollution

The Opportunity

No affordable, mobile, rural AQI monitoring system exists. We're filling this gap with drone-based, low-cost, flexible monitoring with predictive analysis.

Our Solution: Free From Smog

A drone-powered system that collects village-level air quality data and predicts pollution trends using data analysis.

Drone-based Collection

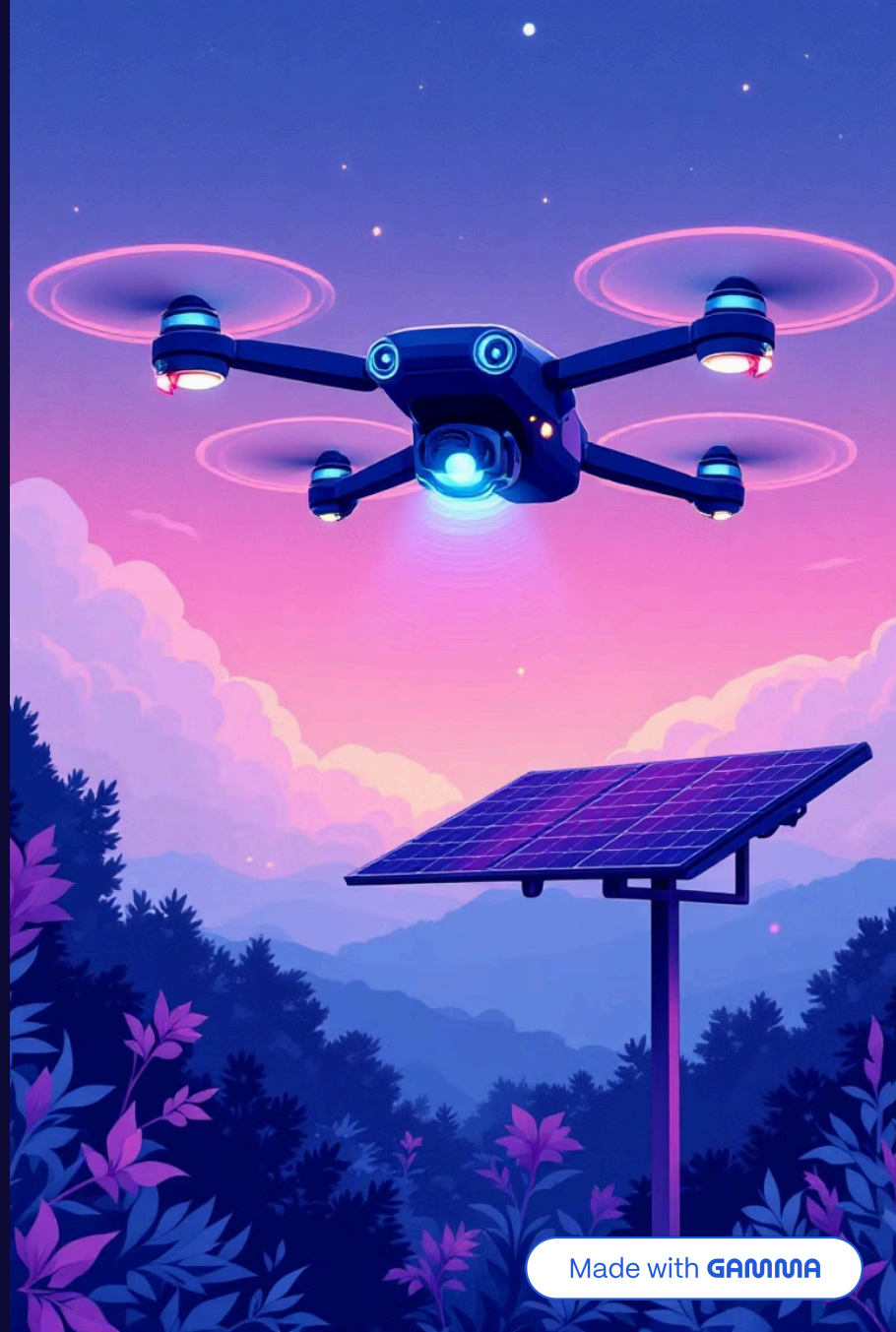
Multi-altitude pollution measurement

Solar-powered

Sustainable charging stations

Early Warnings

Alerts and countermeasures



How It Works

Collect AQI

Store & Validate

Analyze Trends

Generate Alerts

Our system combines drone technology, cloud storage, and predictive analysis to deliver real-time air quality insights.

Technology Stack

- Python-based GUI using Tkinter
- Python backend
- CSV file database
- Trend-based AQI prediction
- Data anomaly detection
- Offline data storage and upload

Overcoming Challenges

1

Challenge

No internet in rural areas

2

Solution

Offline data storage and later upload capability

3

Learning

AI integration and machine learning techniques

> Sensor reliability ensured through cross-checking and trend validation

Team Nexus

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Thank You!

We appreciate your time and consideration. Together, we can bring clean air monitoring to every village.

Project Demo

View Source Code

Contact Us

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Questions?

We'd love to hear from you