SkyHack 2025 - Round 2 Submission (DIGAMBARA)

Team Information

Team Name: DIGAMBARA

Team Leader: AYUSH KUSHWAHA

Project Name

CloudEye - Advanced Dual-Camera AI Methane Detection Satellite

Competition Tracks

- AI-Driven Autonomous Satellite Systems

- AI/ML for Space Data Interpretation

Project Overview

CloudEye is an advanced autonomous satellite system equipped with dual imaging capabilities (Normal + OGI cameras) and edge-AI technology for real-time methane emission detection and intelligent alert escalation at industrial and governmental levels.

How CloudEye Works (Advanced Dual-Camera System)

1. Satellite Orbit & Dual Camera Imaging

- CloudEye orbits Earth continuously, scanning industrial zones and powerplants

- Equipped with two synchronized cameras:

  - Normal Camera: Captures standard visible-spectrum imagery for location context

  - OGI Camera: Optical Gas Imaging camera detects methane plumes in real-time (specialized for gas visualization)

2. Real-Time Methane Detection

- As satellite passes over industrial facilities, both cameras activate simultaneously

- OGI camera identifies methane plume signatures (invisible to naked eye)

- AI compares both camera feeds to confirm gas leakage (if OGI shows plume but normal camera doesn't = confirmed leak)

- System captures multiple high-resolution images from both perspectives

3. Intelligent Industry Identification

- CloudEye's onboard AI cross-references image location data with:

  - Google Maps satellite database

  - Industry/company ownership records

  - Company contact information

  - Regulatory authority details

- AI automatically identifies which company/facility is responsible for the emission

4. Instant Multi-Level Alerts

- Direct Industry Alert: Automated message sent to detected company/plant owner

  - "Methane emission detected at your facility. Required action: repair within 39 days"

- Government Alert: Simultaneous alert to country's environmental/pollution control authority

  - Includes location, severity, company details, and photographic evidence

5. Global Escalation Protocol (Transparency & Accountability)

- If emission is NOT resolved within 39 days:
  - Alert escalates to international bodies (UN, UNFCCC, WHO)
  - Data published on social media platforms for public awareness
  - News organizations receive automated alerts with evidence
  - Creates transparent, global accountability mechanism

6. Impact & Outcome

- Speed: Detection in minutes (not hours/days)
- Accuracy: Dual-camera confirmation eliminates false positives
- Bandwidth Efficiency: Only critical alert data transmitted to ground stations
- Accountability: Full transparency enables policy action and corporate responsibility
- Climate Action: Rapid mitigation of methane emissions (major climate pollutant)

Key Features

Dual-Camera System Normal + OGI imaging for reliable detection

Edge-AI Processing“ Real-time analysis onboard satellite

Automatic Company Identification“ AI-powered database cross-referencing

Multi-Level Alert System“ Direct, government, and global escalation

39-Day Action Window“ Clear timeline for industry remediation

Transparent Accountability“ Public awareness & policy intervention trigger

Climate Impact“ Rapid response to methane (primary greenhouse gas)

Submission Details

GitHub Repository Link: https://github.com/digambara-anant/CloudEye.git

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Team Members

1. AYUSH KUSHWAHA“ Team Leader / Project Architect

2. Raju

Project Vision

CloudEye represents a next-generation approach to environmental monitoring combining satellite technology, edge-AI, dual-sensor imaging, and global accountability into a scalable, transparent system that enables real-time climate action at industrial and governmental levels.

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