IIT Tirupati Navavishkār I-Hub Foundation

भारतीय प्रौद्योगिकी संस्थान तिरुपति
IIT TIRUPATI

विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF SCIENCE & TECHNOLOGY

Self Energized NavIC Driven Air Quality Surveillance system

Breif Background

Air pollution is one of the most critical challenges in urban areas, adversely affecting public health, climate, and quality of life. Conventional stationary monitoring systems, though accurate, offer limited spatial coverage and cannot track dynamic variations in pollution across fast-changing cityscapes. Therefore, there is a pressing need for an advanced, mobile, and self-sustaining air quality monitoring system

Application Sectors

- Industries
- Government Agencies/Smart Cities
- Micro climate monitoring Research Organization

TRL  **4**

Tech/Prod. Summary

An intelligent, mobile, and energy-autonomous platform designed for real-time air pollution monitoring across urban environments. Mounted on public transport vehicles, it continuously gathers spatio-temporal air quality data and esnures a timely updates to the concerned department.

Tech/ Product Description

The product is a mobile, self-sustaining air quality monitoring platform mounted on public and private vehicles for real-time environmental surveillance. It integrates NavIC for precise geolocation, LoRaWAN for long-range data transmission, and AI-enabled sensors to detect key pollutants. Powered by ambient energy harvesting (solar, wind, thermoelectric, vibration), it ensures continuous operation without external power. With an open-source architecture and GIS integration, the system enables detailed pollution mapping, trend analysis, and data-driven decision-making, supporting smart city initiatives and sustainable urban air quality management

Market Potential

The global air quality monitoring market: expected to exceed USD 12 billion by 2030, growing at a CAGR of 7-9%.
Global Market for Air Quality Sensors & IoT Solutions: from USD 3.5 billion in 2025 → USD 6-7 billion by 2030, at a CAGR of ~12-13%

Impact - SDG:

SDG 3: Good Health and well being
SDG 11: Sustainable cities and communities
SDG 13: Climate action
SDG 15: Life on Land

Value Proposition

1. Self-sustained system with integared technology of AI and IoT.
2. Precise, real-time data for disaster management agencies, search and rescue teams, and NGOs.
3. Open-source technology and mobile compatibility.