IoT Constellation Mission Program in UNISEC-GLOBAL

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COLOMBIA CHAPTER

Air Quality

Air quality in Colombia and Bogotá remains a challenge. According to the IQAir report, no Colombian city meets WHO standards. Bogotá has an Air Quality Monitoring Network with 20 stations measuring key pollutants and providing real-time data. Strategies such as the ENCA and digital tools have been implemented to improve air quality. However, pollution continues to impact public health and the environment, making it essential to maintain effective policies and increase public awareness.


Air pollution, Bogotá. Juan Carlos Pachón

For what objectives?

Environmental monitoring for Public health protection and Citizen awareness

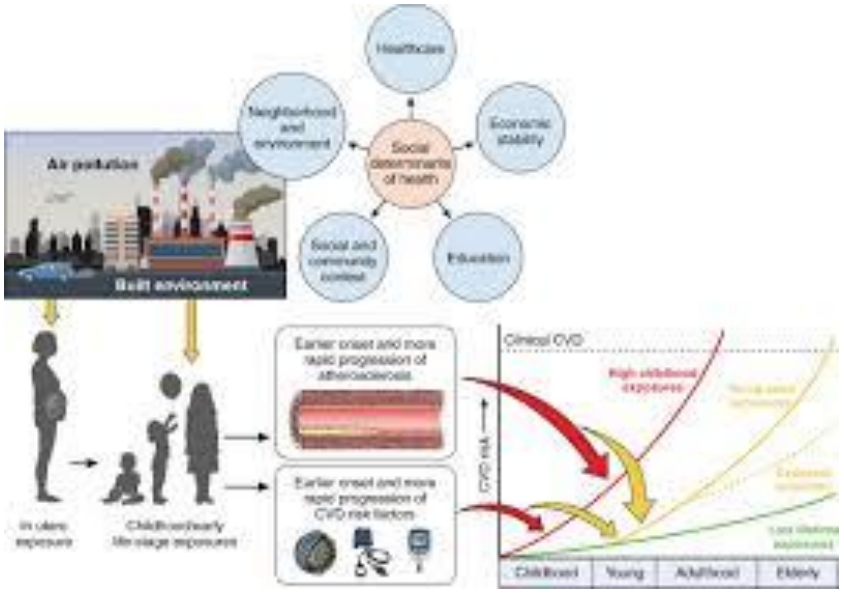
What kind of sensor is to be used for the IoT mission?

Plantower PMS5003 Particulate Matter Sensor

high-precision laser sensor detects airborne particles, including PM1.0, PM2.5, and PM10

Who will use the data?

Local, Students,
Researchers,
Environmental agencies,
Public health
organizations



Contributions to the society

By providing real-time air quality data, people can take precautions to reduce exposure to harmful pollutants, reducing respiratory and cardiovascular diseases. On the other hand, Scientists and students can use the data for research on atmospheric changes, pollution sources, and environmental sustainability.

REQUIREMENTS FOR THE IOT SYSTEM

How frequently should the data be sent to satellites?

Baseline monitoring in remote or stable regions – Once per day for general atmospheric trends.

How much size of the data is to be sent to the satellite? (byte)

Sensor ID number: 1 byte
Timestamp: 4 bytes (to ensure precise timekeeping)
Gas concentration levels (e.g., CO_2, NO_2, VOCs, etc.): 2 bytes per gas (assuming 3 gases → 6 bytes)
Particulate matter (PM1.0, PM2.5, PM10): 2 bytes per category (3 × 2 = 6 bytes)
Temperature & Humidity: 2 bytes each (4 bytes total)
Sensor status: 1 byte
Total per sensor: 1 + 4 + 6 + 6 + 4 + 1 = 22 bytes per sensor

How much delay is allowed?

One hour in a disaster situation. In normal periods, one day.

How many sensors will be put in 10km x 10km?

20 sensors per side, every 500 meters

THANK YOU