Hybrid Air Quality Monitoring Network

CAAQMS + HYPERLOCAL MICRO SENSORS

acoem

CREATING ENVIRONMENTS OF POSSIBILITY

The future of urban air quality monitoring
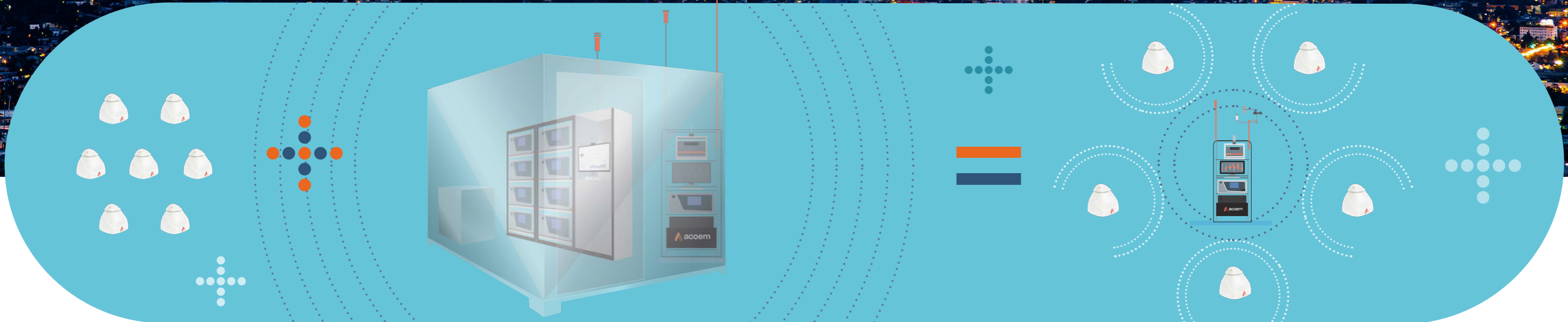## – Hybrid network monitoring

Rapid urbanisation, industrialisation and ongoing vehicular pollution continue to severely impact air quality in cities. With cascading effects on the health and wellbeing of both the natural environment and urban populations, the concern over air pollution is growing exponentially.

Urban air quality is particularly difficult to measure due to highly heterogeneous pollution distribution. It is therefore crucial to create a dense air quality monitoring network to better understand the spatiotemporal variations in pollutant concentration, with the ability to pinpoint hotspots.

The optimal solution therefore – and the logical future of urban air quality monitoring – lies in the implementation of a **hybrid air quality monitoring network.**

Combining hyperlocal air sensors with Acoem's integrated CAAQMS will transform the way smart cities and progressive thinking organisations use the power of collective environmental monitoring to measure, report and adhere to air quality standards and regulations.

Hyperlocal sensors

Continuous Ambient Air Quality Monitoring Stations (CAAQMS)

Hybrid Air Quality Monitoring Network

Acoem hybrid air quality monitoring

The Acoem Hybrid Air Quality Monitoring Network combines our trusted range of Serinus® gas analysers with the world's finest hyperlocal sensors the Kunak AIR Pro.

The hybrid network supplements the data gaps of CAAQMS by incorporating spatially dense data inputs from micro air sensors.

Hyperlocal sensors are installed in an ideal proportion around reference monitoring systems to form a hybrid air quality monitoring cluster. This cluster-based approach to establishing a hybrid air quality monitoring network at a city scale ensures accurate environmental data collection with higher density.

Why hybrid air quality networks?

· Integrate the key features of reference stations and sensor-based devices providing a robust network for a region

· Yield better data quality and spatio-temporal resolution compared to a network of individual monitoring systems

· Provide valuable data that helps identify hyperlocal pollution hotspots and accurate pollution heat maps

· High density accurate environmental data can be used to create high-resolution air quality models that consider the effect of pollution sources and meteorological conditions

· Help define and design more efficient regulatory monitoring networks.

Scalable

One to many

Cluster based approach

Spatio-temporal resolution

A cluster-based approach to establish a hybrid air quality monitoring network at a city scale ensures accurate environmental data collection with higher density.

Continuous Ambient Air Quality Monitoring Station (CAAQMS)

Industry standard for regulatory monitoring of ambient air quality

Ambient air analysers

The range includes 10+ different models monitoring:

- O_3
- NO_x
- SO_2
- CO
- NH_3
- TRS
- CO_2
- H_2S
- TS

Particulate monitors

High level performance and international approvals for PM_{10} and $PM_{2.5}$ monitoring.

Meteorological sensors

We choose the highest quality sensors to ensure trouble-free operation.

Automatic calibration system

Our air monitoring systems incorporate a state-of-the-art dilution gas calibrator, The calibration system is fully automatic and can be remotely configured.

Weatherproof enclosures

Our most popular shelter is the relocatable unit which is designed to be permanently sited but may also be easily transported from one site to another.

Optical particle counter

Solar shield

Smart gas cartridges

Temperature, humidity, dew point and pressure sensors

Power supply

Multiple connectors for external sensors

Built-in sensors

IP65 protection

ON/OFF button

LCD display

Fixing bolts

Kunak AIR Pro
The compact air quality station for hyperlocal monitoring

Main applications:

- Industrial fenceline monitoring
- Massive city deployments
- Leakage detection
- Wastewater management
- Landfill monitoring
- Environmental Health & Safety (EHS)
- Building automation.

INDUSTRY GRADE DESIGN | PROVEN ACCURACY | EVALUATED UNDER AQ-SPEC PROGRAM

Application based design
Select your targeted pollutants for industrial monitoring or massive deployments in cities.

Built-in display
Easy installation and on field diagnosis thanks to its embedded display.

Highest accuracy
Get the most reliable and accurate data without the need of additional external instruments.

Cost effective
Get the most accurate technology at a fair cost.

Cartridge system
Replace and combine gas cartridges and PM sensor with a plug & play system.

Easy data integration
Local wired integration through slave MODBUS RTU or via API through the cloud.

Rugged yet compact
The smallest air quality solution designed for harsh environments (IP65 & IK08)

Targeted pollutants
Measure up to 5 gases and particulate matter at once.

Fully autonomous
Autonomous operation with its built-in battery and solar panel.

Cloud-based dashboard

Our next generation total data control and logging hardware/software solution for air quality and continuous emission systems, Acoem Congrego®, is engineered from the ground up to achieve accurate, reliable, real-time data logging specifically for ambient air and continuous emission monitoring systems.

Strong operations & maintenance capabilities

Our operations & maintenance teams partner with you at every stage. From initial design, liaising and paperwork to moving hundreds of tons of material, across thousands of kilometers and going the extra mile for flawless operational capability - we ensure that our customers achieve their goals.

Our team operates and manages more than 3000+ real-time environmental monitoring sites across the globe.

Every day we help industry, government and academia to make enlightened decisions based on accurate data.

Bridging the gap

With real-time air quality monitoring, maps can be generated and updated in real time. However, the number of datapoints required for such exercises is very high for traditional monitoring stations to achieve.

Sensor-based, real-time monitors bridge this gap while traditional monitoring acts as a reference station. The sensor-based device is constantly collocated, calibrated and corrected against the reference station, ensuring the highest accuracy of data quality. A hybrid network provides optimal-quality hyperlocal pollution measurement at a higher spatial resolution of air quality data.

Air monitoring reference stations
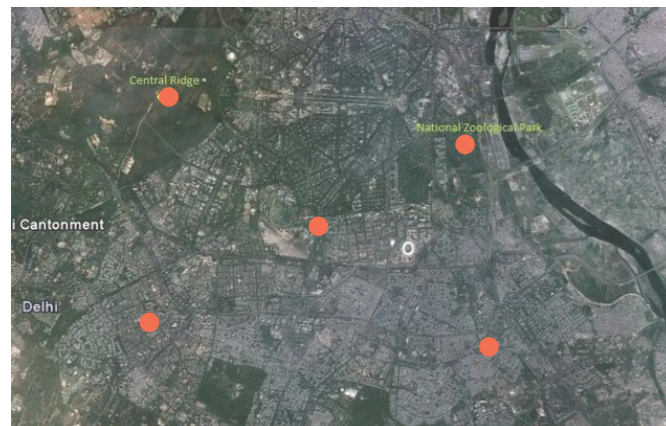
Representative image only

Typical urban city CAAQMS

- A city of 15 million
- 5 Acoem reference quality CAAQMS
- 10-20 km apart
- Mixed land use over changing topography: suburban, residential, commercial, industrial, roads and parks

Air monitoring with hyperlocal micro sensors

Representative image only

What an augmented air monitoring network could look like

- Add 25 hyperlocal micro air sensors
- Each sensor 3-7 km apart
- CAAQMS + micro sensors = Significantly increased understanding of air quality at the neighbourhood level
- Target identified pollution hotspots

Control center

Hyperlocal sensor cluster

CAAQMS Station
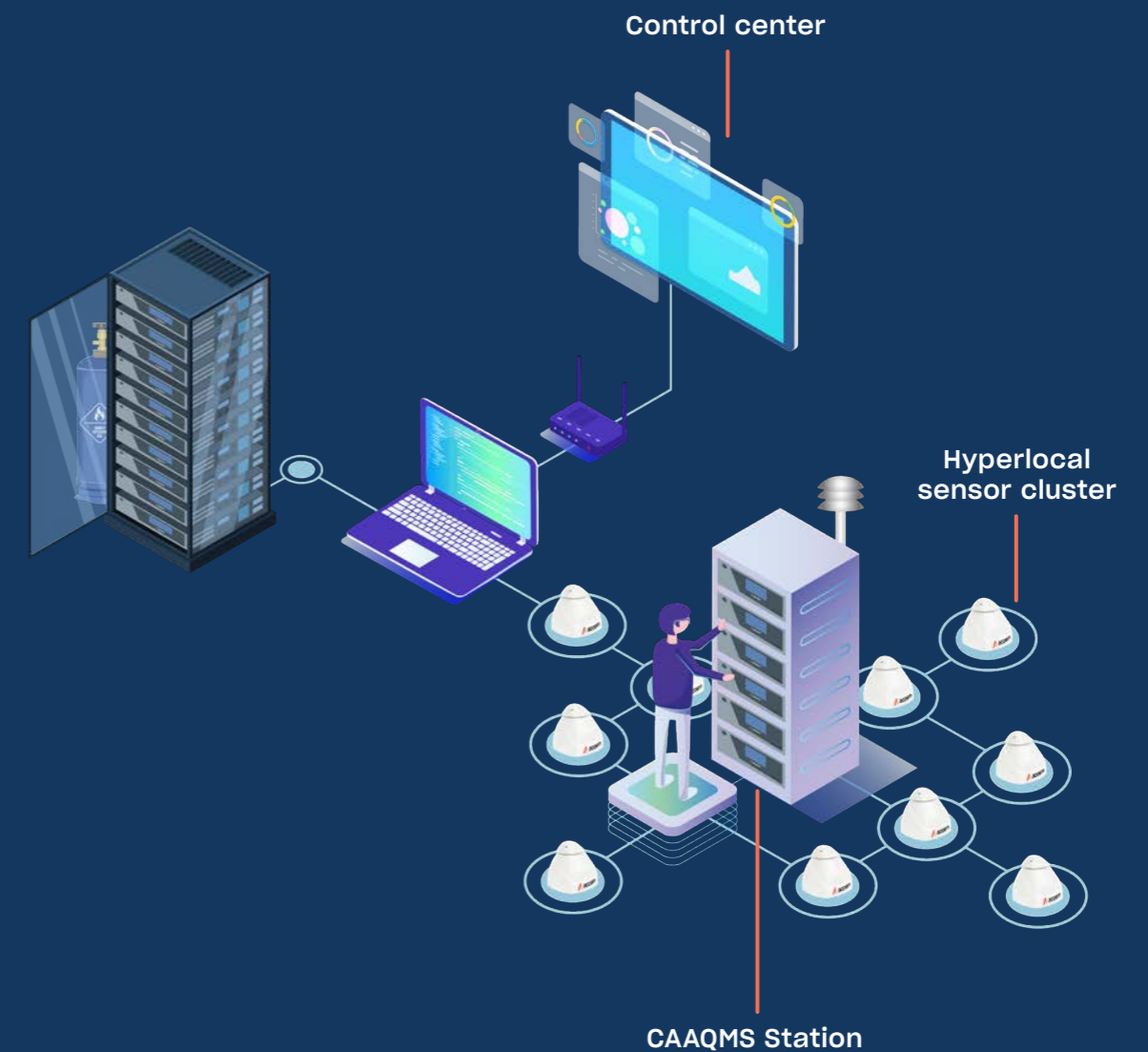
> "A combination of hyperlocal sensors and traditional reference quality is the most effective technique for planning intervention strategies and effectively monitoring real time air quality."

About Acoem

At Acoem, we **create environments of possibility** – helping organisations find the right balance between progress and preservation – safeguarding businesses and assets, and maximising opportunities while conserving the planet's resources. We deliver unrivalled, interoperable AI-powered sensors and ecosystems that empower our customers to make enlightened decisions based on accurate information.

Together with 220 distributors, our 850+ employees work across 28 offices, 6 manufacturing facilities and 5 R&D centres in 9 countries, to provide trusted, holistic data solutions for customers worldwide.

Acoem links possibilities with protection.

For more information visit acoem.com

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