# bettair®

## Mapping Air Quality


Accurate air pollution mapping on a previously unimaginable scale

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This novel smart-city technology provides a highly efficient and large-scale pollution mapping tool.

It provides insights and information that our customers need to better understand and mitigate noise and air pollution.

Our sensing cartridge design allows to easily replace all sensors when required and **it does not require in-situ calibration.**

## CUSTOM VISUALISATION TOOLS

Pollution data is provided using the latest GIS visualisation tools, and can be adapted to the individual requirements of each customer.

## THE NETWORK

The platform is built around a grid of nodes that are strategically placed to optimise map coverage. Our solution is scalable and can be adapted to any scenario.

## ADVANCED DATA POST-PROCESSING

Pollution data is run through a unique post-processing algorithm. The algorithms provide precise measurements of several air quality indicators with similar accuracy as traditional equipment but at a fraction of the price. Impressive Pearson Correlation ($R^2$ > 0.9) when compared with traditional AQM equipment.

The platform is fed by innovative sensors which are easy to install and can withstand tough climates.

## OUR NODES


IP65 rated dust tight and water resistant

Customised low-power electronics

Low-power wireless network access

## WHAT OUR NODES MEASURE

Temperature

Relative Humidity

Ambient Noise

$PM_1$ $PM_{2.5}$ $PM_{10}$

$NO_2$ NO $SO_2$ CO $O_3$ $H_2S$ $CO_2$ VOC $NH_3$ $CH_4$ HCl

Atmospheric Pressure

## ENVIRONMENTAL REQUIREMENTS


Operating Temperature Range with full accuracy -10 to 40 °C

Operating Relative Humidity Up to 95% non-condensing

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## WHAT CAN YOU DO WITH BETTAIR?

- Mitigate air pollution
- Identify unknown sources of pollution
- Potential revenue generation through fines
- Assess the impact of environmental actions
- Reduce air pollution costs
- Categorize zones per air quality
- Forecast air pollution episodes
- Climate change monitoring

## HOW DOES POLLUTION AFFECT YOU?

Air pollution is a major problem for public health.

Outdoor air pollution kills 4.5 million people annually, mostly in cities.

The problem is magnified by unprecedented urban population growth.

PM
Affects central nervous system

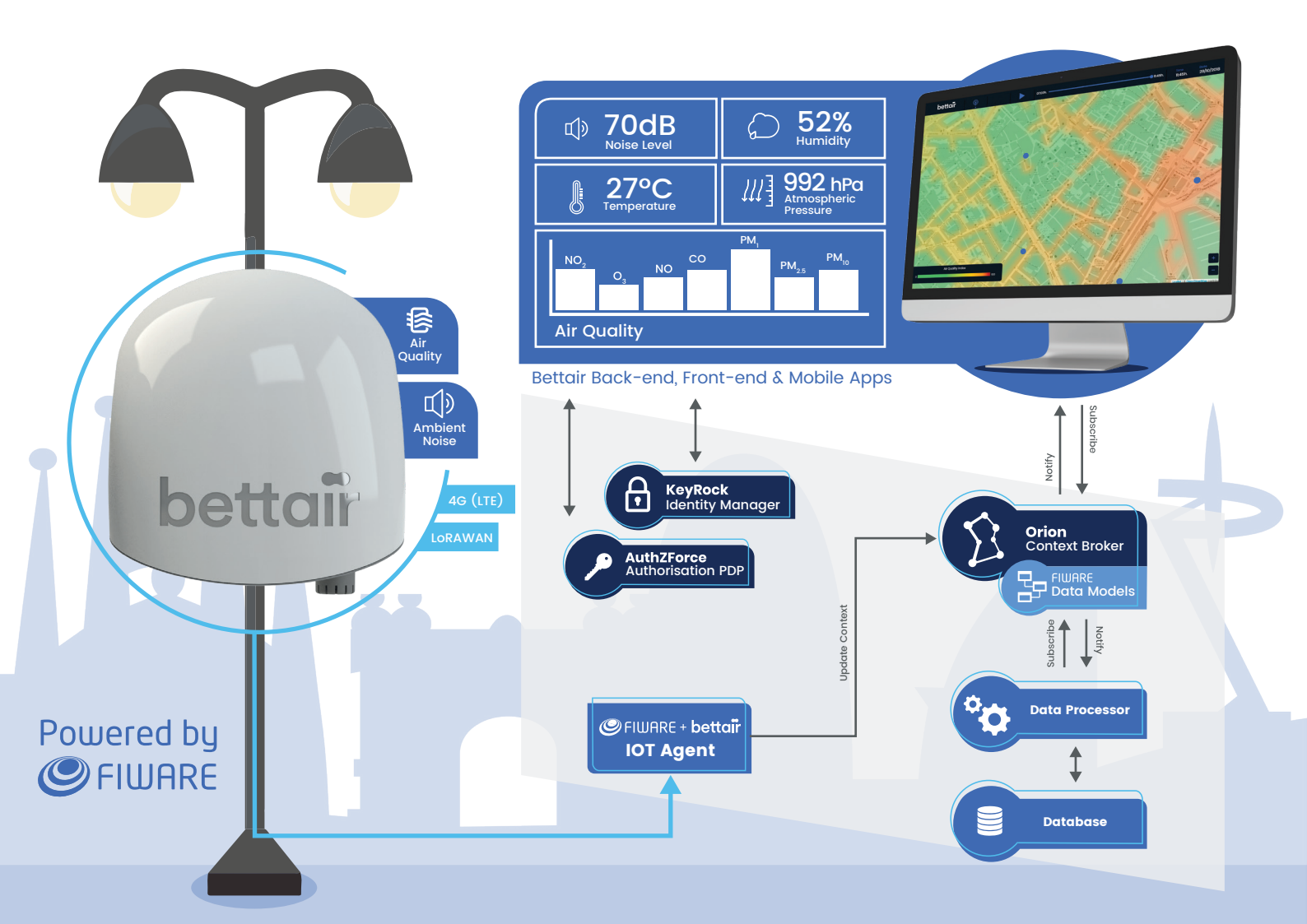
$NO_2$
Affects liver, spleen, and blood

PM
Asthma, reduced breathing capacity, & chronic obstructive pulmonary disease

$O_3$, PM
Heart diseases

$O_3$, PM, $NO_2$, $SO_2$ $NH_3$
Cause eye, nose, and throat irritation; respiratory problems

PM
Affects reproductive system

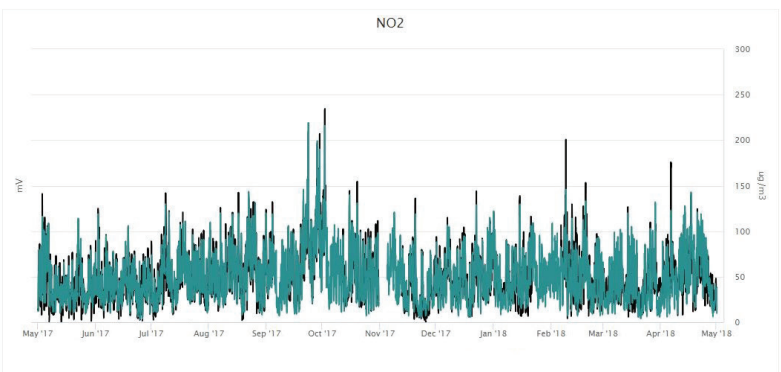

70dB
Noise Level
52%
Humidity
27°C
Temperature
992 hPa
Atmospheric Pressure
NO2
O3
NO
CO
PM1
PM2.5
PM10
Air Quality
Bettair Back-end, Front-end & Mobile Apps
Air Quality
Ambient Noise
4G (LTE)
LoRAWAN
bettair
KeyRock
Identity Manager
AuthZForce
Authorisation PDP
FIWARE + bettair
IOT Agent
Update Context
Notify
Subscribe
Orion
Context Broker
FIWARE
Data Models
Subscribe
Notify
Data Processor
Database
Powered by
FIWARE

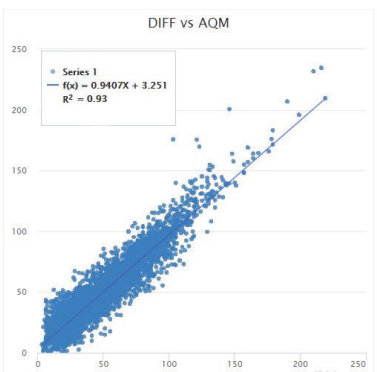
## Measurement Specifications

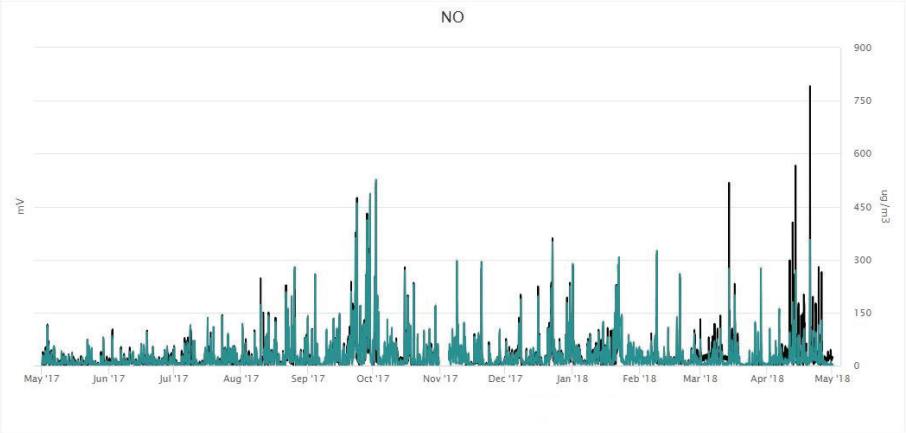
| Variable | Range | LDL* | Resolution | | Precision | Unit |
|---|---|---|---|---|---|---|
| $NO_2$ | 0 -20 ppm** | 2 ppb*** | 0.1 ppb | ± | 3 ppb | ppb or µg/m³ |
| $O_3$ | 0 -20 ppm | 1 ppb | 0.1 ppb | ± | 5 ppb | ppb or µg/m³ |
| NO | 0 -20 ppm | 2 ppb | 0.1 ppb | ± | 4 ppb | ppb or µg/m³ |
| CO | 0 -500 ppm | 30 ppb | 1 ppb | ± | 30 ppb | ppb or µg/m³ |
| $SO_2$ | 0 -50 ppm | 10 ppb | 0.1 ppb | ± | 15 ppb | ppb or mg/m³ |
| $CO_2$ | 400 - 10,000 ppm | 400 ppm | 1 ppm | ± | 30 ppm | ppm or mg/m³ |
| $H_2S$ | 0 -50 ppm | 2 ppb | 0.1 ppb | ± | 10 ppb | ppm or mg/m³ |
| $NH_3$ | 0 - 60 ppm | 6 ppb | 0.3 ppb | ± | 10 ppb | ppb or µg/m³ |
| $CH_4$ | 0 - 50,000 ppm | 250 ppb | 10 ppm | ± | 250 ppb | ppm or mg/m³ |
| HCl | 0 - 20 ppm | 5 ppb | 0.1 ppb | ± | 15 ppb | ppb or mg/m³ |
| VOC | 0 -100 ppm | 20 ppb | 1 ppb | ± | 1 ppm | ppb or mg/m³ |
| VOC**** | 0 - 500 IAQ**** | n/a | 1 IAQ | ± | 3 | IAQ |
| $PM_1$ | 0 -1,000 µg/m³ | 1 µg/m³ | 1 µg/m³ | ± | 2µg/m³ | µg/m³ |
| $PM_{2.5}$ | 0 -1,000 µg/m³ | 1 µg/m³ | 1 µg/m³ | ± | 2µg/m³ | µg/m³ |
| $PM_{10}$ | 0 -1,000 µg/m³ | 1 µg/m³ | 1 µg/m³ | ± | 2µg/m³ | µg/m³ |

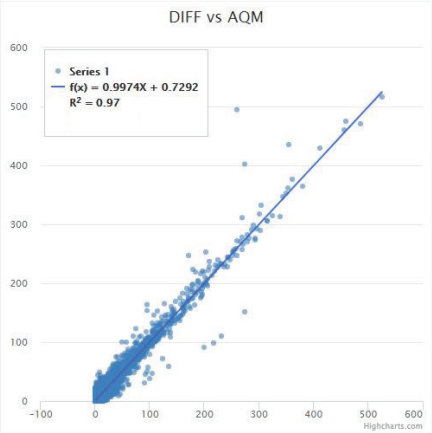
* Limit of Detection ** parts per million *** parts per billion **** Index for Air Quality

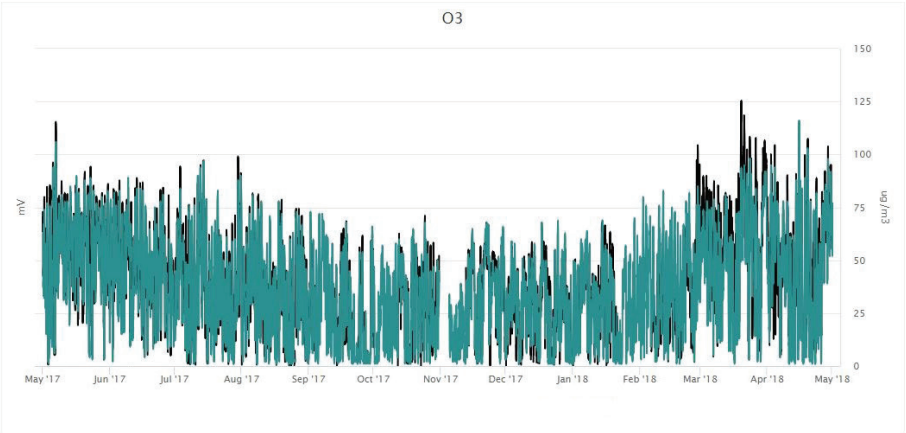
## RESULTS OF LONG-TERM IN-FIELD TEST AND COMPARISON WITH TRADITIONAL AQM STATION

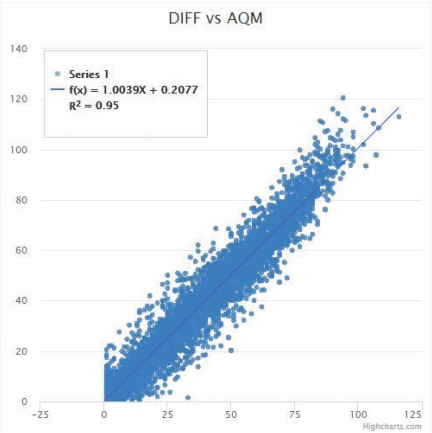





Pollutant $R^2$ correlation coefficient

| $NO_2$ | $O_3$ | NO |
|---|---|---|
| 0.93 | 0.95 | 0.97 |

The co-location period covered with this station started from 1st May 2017 until 30th April 2018

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## Mapping Air Quality

Better cities, Better life, bettair®

WINNER
AIRLAB
Microsensor
*Most accurate multi-pollutant sensor*
Outdoor - Overall
2023

WINNER
AIRLAB
Microsensor
*Best accuracy for ozone*
Outdoor - Overall
2021-2023

AIRLAB


https://bettaircities.com

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