



EARTH SENSE

EarthSense

Born from 15 years of research at the University of Leicester, EarthSense holds a rich academic heritage specialising in environmental monitoring and modelling of air pollution data; delivering products and services that enable the world to better understand and solve air quality issues.

The Air Pollution Problem

Air Pollution is a major environmental risk to health. By reducing levels of air pollution, we are able to ease the burden of disease, lung cancer and both chronic and acute respiratory diseases on a global scale.

The Facts



4.2 million

Premature deaths worldwide as a result of air pollution exposure (World Health Organisation, WHO)



91%

The world's population that live in areas where air pollution exceeds the WHO's guideline limits



40,000

Premature deaths in UK as a result of fine particle pollution & toxic gases. (Royal College of Physicians)



\$5 trillion

The economic cost of air pollution globally



Zephyr[®]

Air Quality Sensor

The Zephyr[®] is a compact and lightweight air pollution sensor that measures gases and particulate matter formed from harmful emissions.

Measures

Standard Cartridge

Nitrogen Dioxide [NO₂]

Nitric Oxide [NO]

Ozone [O₃]

PM₁

PM_{2.5}

PM₁₀

Enhanced Cartridge

Carbon Monoxide [CO]

Sulphur Dioxide [SO₂]

Hydrogen Sulphide [H₂S]



Static Zephyr powered using solar panel, Leicester

Key Features

Size:

235mm (h) x 160mm (w) x 114mm (d)

Weight:

1750g – 2000g
(dependent on cartridge)

Material:

Constructed using extruded aluminium and Polycarbonate-ABS plastics for a stronger and more durable body with a greater temperature range; ideal for outdoor climates.

Certification:

CE marked to European standards



Applications

The Zephyr® sensor can be used for a wide range of applications including local planning, enforcement and mitigation strategies as well as commercial applications.

Central & local governments
Environmental planning
Urban planning
Smart & connected cities
Healthcare
Automotive
Industrial emissions
Schools, colleges & universities
Waste



Traffic build up during rush-hour
in central London

A Thoughtful Design

Active Sampling

The only cartridge based small form sensor to draw in air using a fan into a sampling chamber.

Accurate Cartridge Calibration

Each Zephyr® unit is co-located and calibrated against EU standard reference analysers.

Measures both PM & NOx

In a single slot cartridge.

NO₂ Measurements

Each single slot cartridge contains 2 variations of the NO₂ sensor for configurable use.

Modular Cartridge System

Easily replace and install cartridges without opening the main body of the Zephyr® unit.

We Recycle Your Old Cartridges

Simply return your old cartridge back to us and we will recycle.

Mobile & Static Use

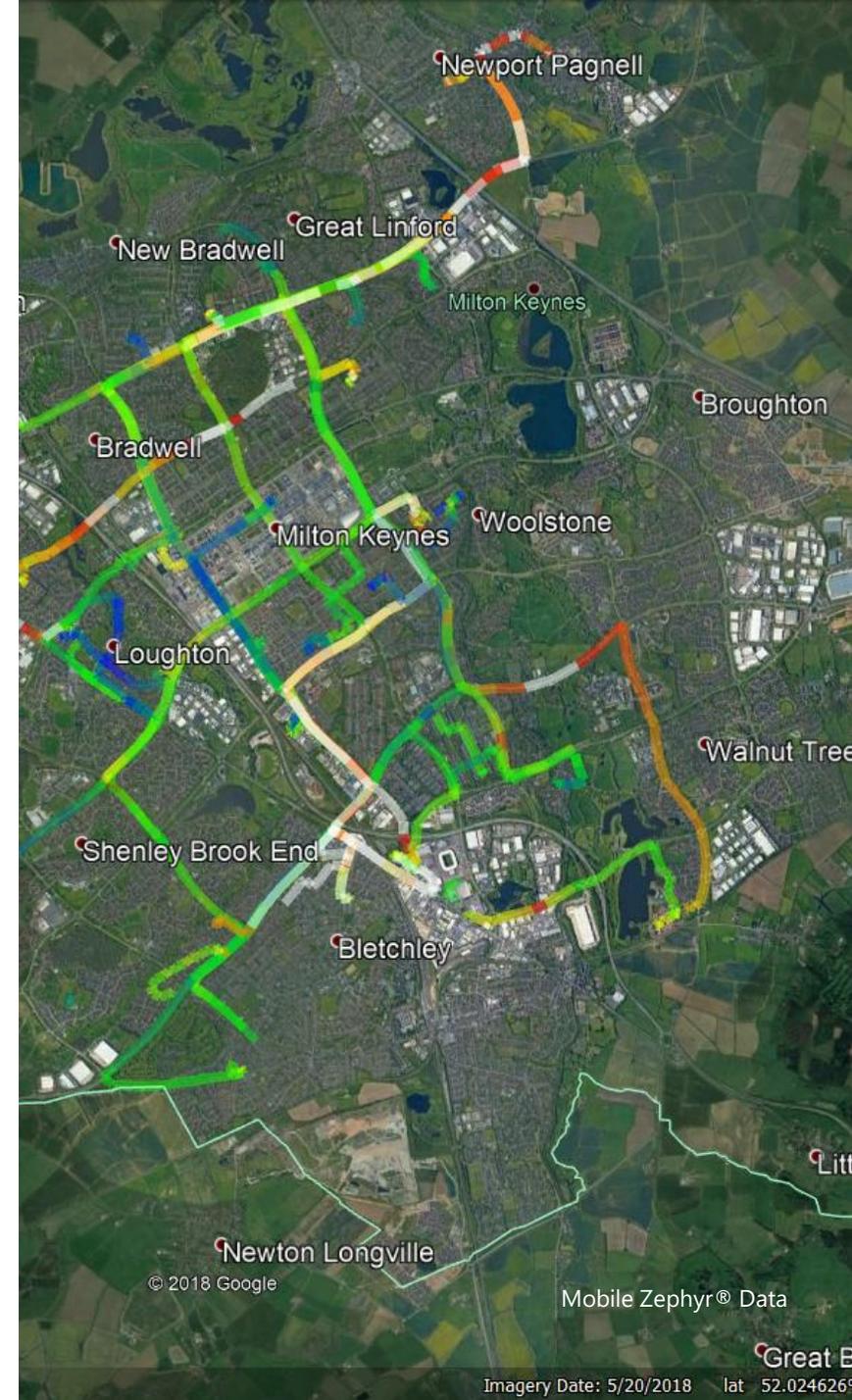
Fix to a vertical post or use as a mobile unit whilst walking, cycling or installed inside a vehicle.

Flexible Data Access

Through MyAir® - a new and bespoke web app

Solar Panel & DC Power Supply

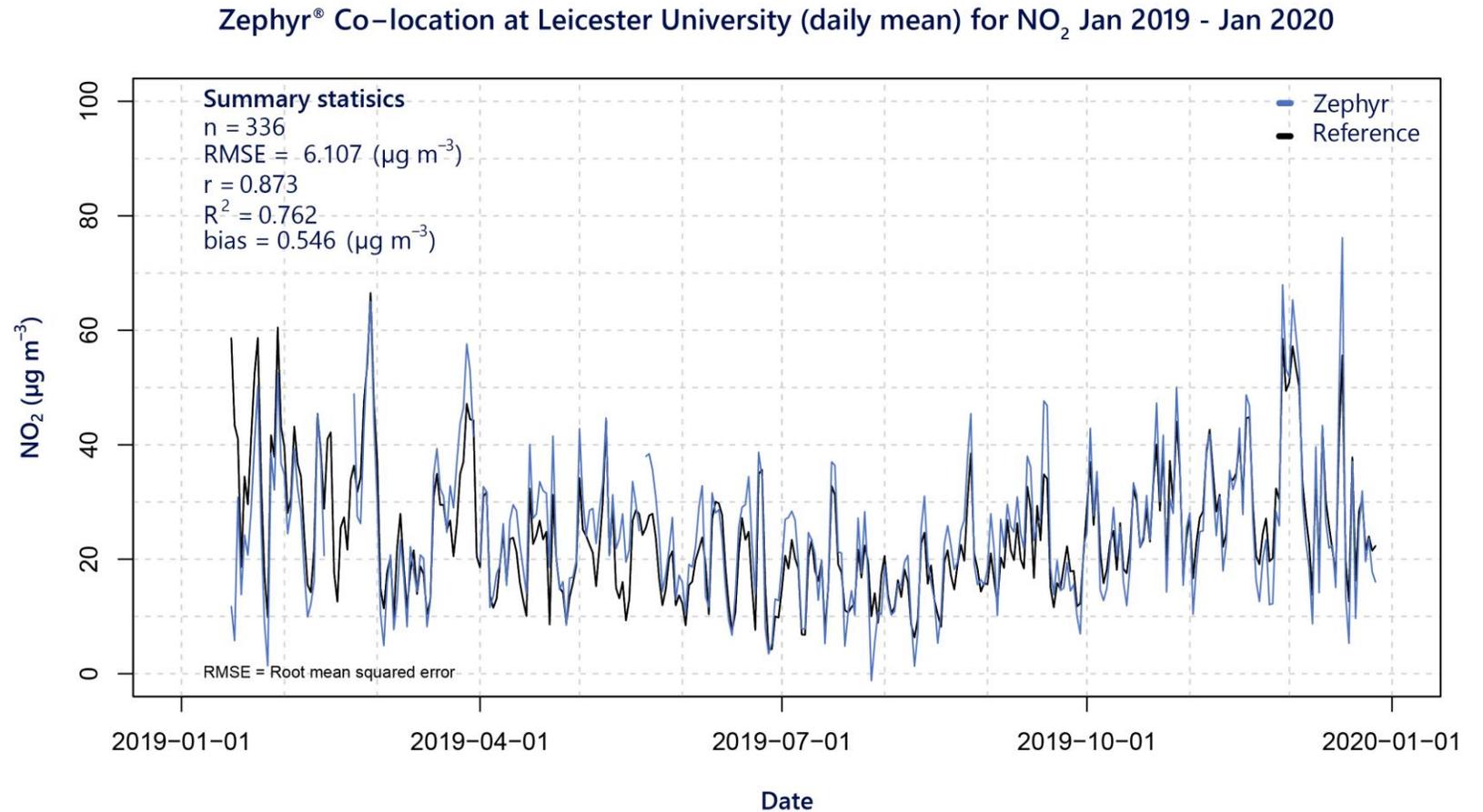
Included as standard.



Performance

Example of [cartridge performance](#) of a static Zephyr® sensor.

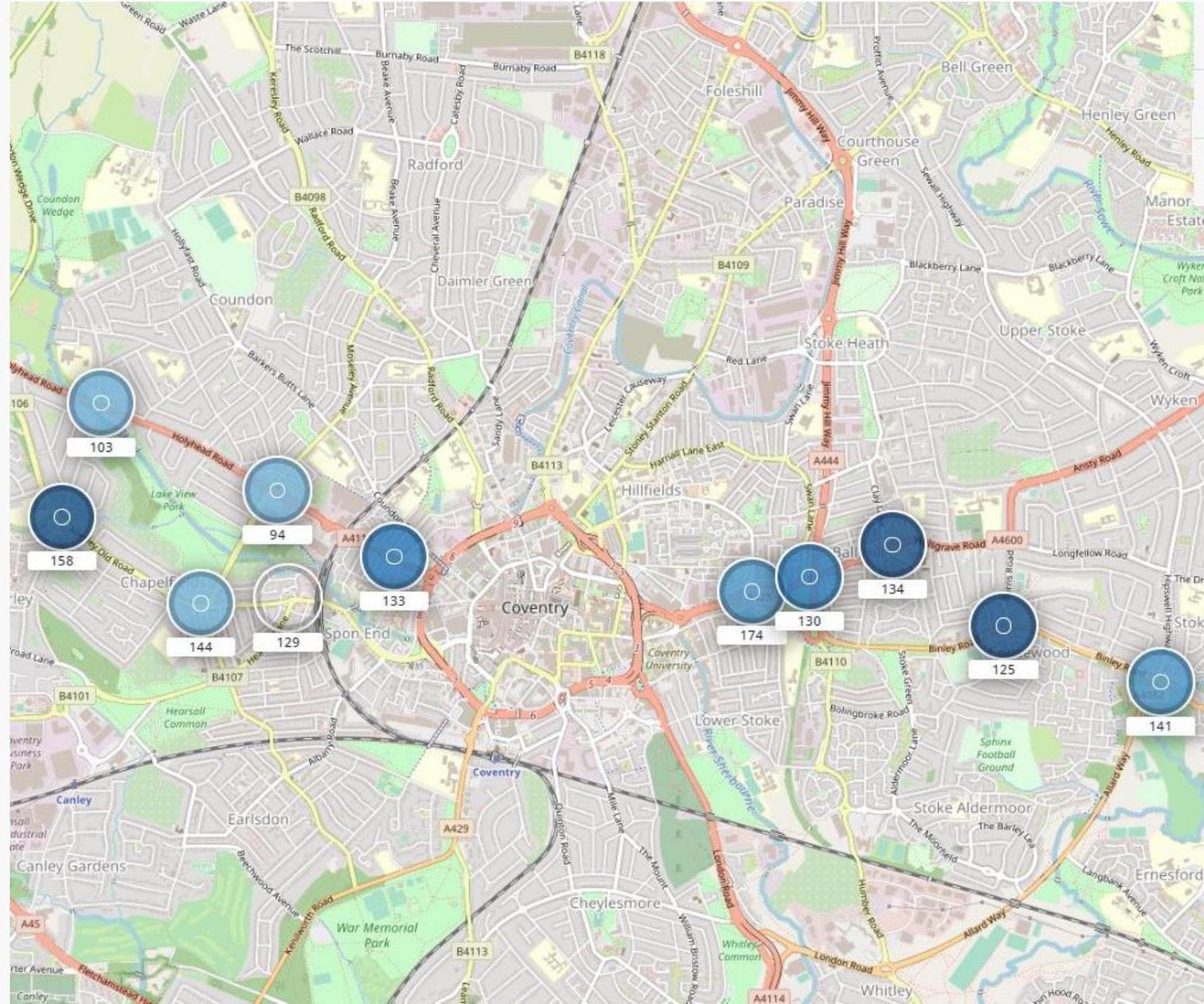
The graph shows the accuracy of NO₂ measurements when tested against a reference site throughout January 2020.



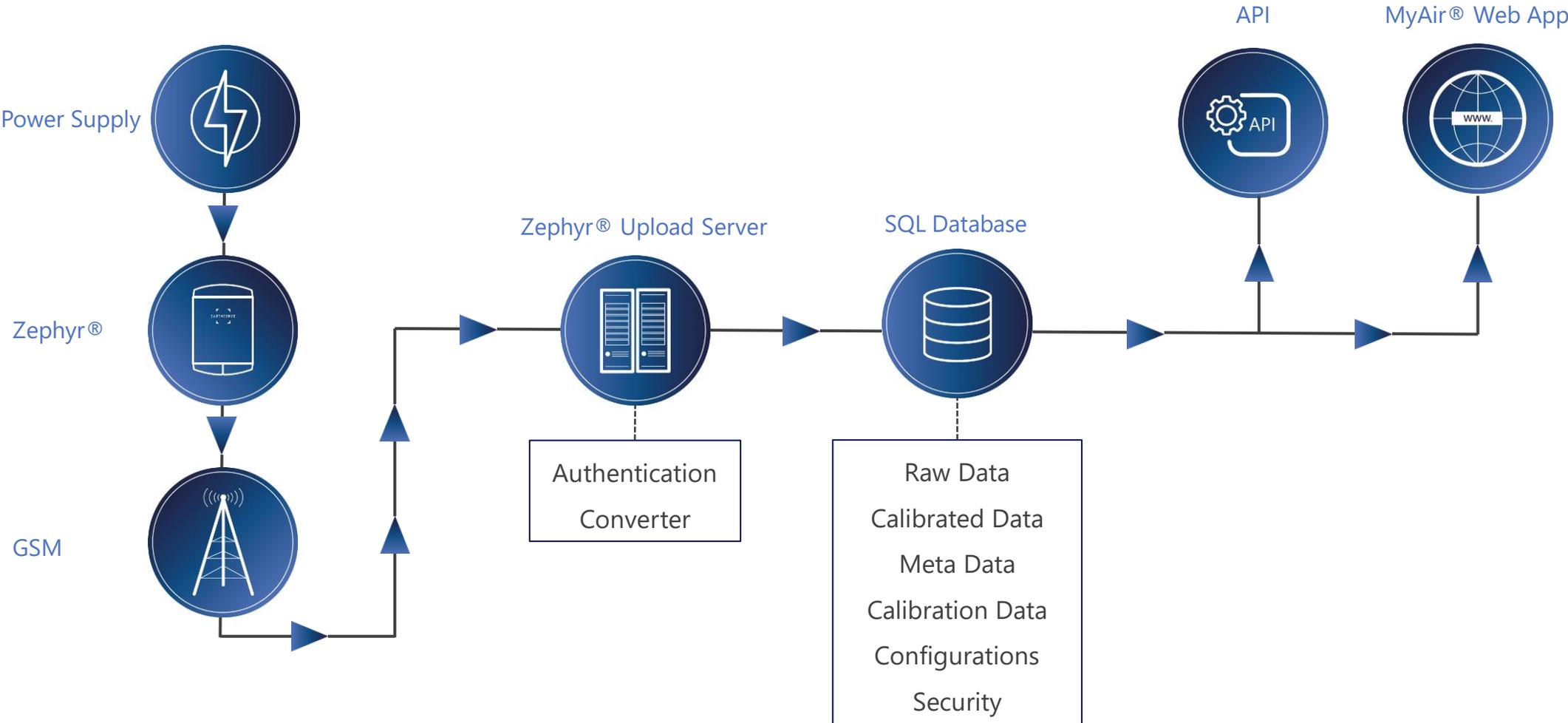
Zephyr[®] Network

Use the Zephyr[®] sensor as a single unit to measure air pollution at a specific junction or street corner for a localised understand of air quality.

Or deploy a network of Zephyr[®] sensors to identify **pollution hotspots** and trends within a whole city.



System Architecture



MyAir[®]

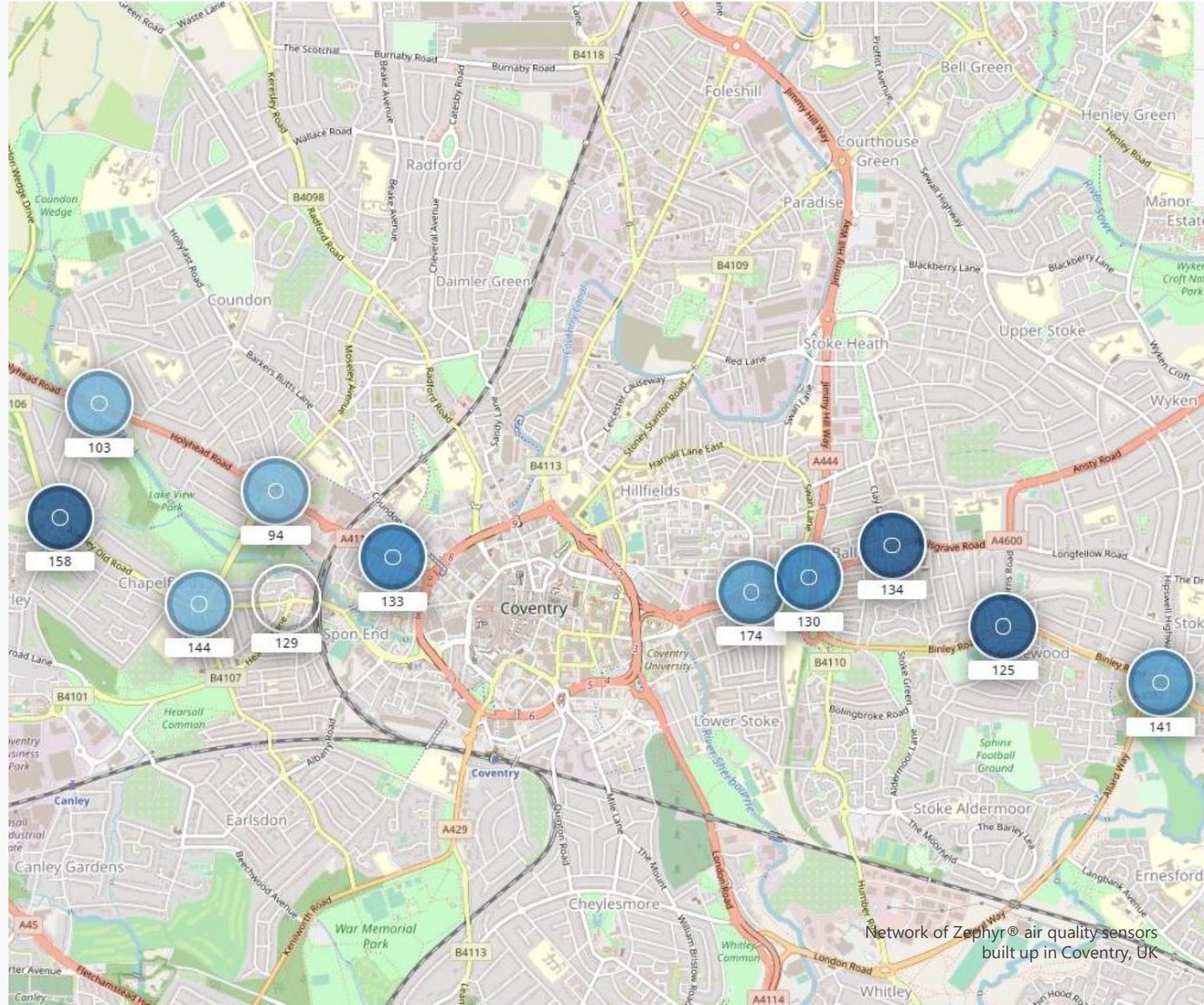
Data Access Web App

Air quality data can be viewed and downloaded via a URL link to your bespoke Zephyr[®] web app, MyAir[®]

The log-in and password will provide access to collected Zephyr[®] data.

Web API's

Utilising our API data can be integrated directly into existing an GIS, traffic management or environmental management system.



Service & Support

Full warranty

Against manufacturing faults. If the issue cannot be resolved remotely, we will replace the unit or cartridge, no quibble.

Web licensing

The MyAir® web app is included with your purchase so you can view your Zephyr® deployments and access and download your air quality data with ease.

All replacement cartridges

As part of your subscription we provide any and all replacement cartridges as needed. There is no limitations.

All data costs included

No additional SIM charges to transmit data from sensor to server.

Data calibration

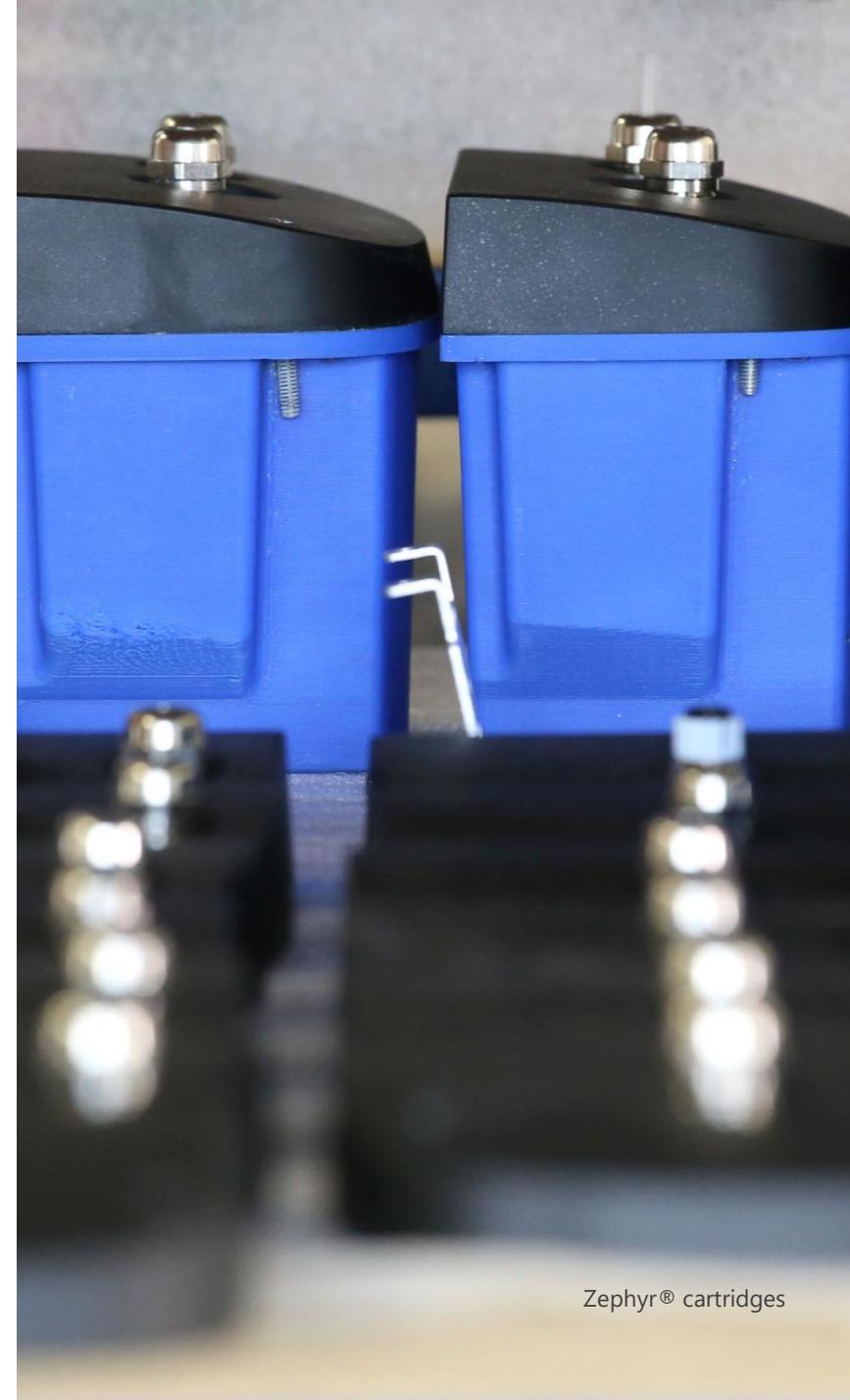
We calibrate and test every Zephyr® sensor prior to shipping and provide evidence of calibration performance.

Remote monitoring

Of any deployed sensors for performance degradation and sensor issues. Notification and solution then follows.

Service plans

Are available to purchase on an annual cycle, 3 or 5 year durations with associated discounts for commitment.



Zephyr® cartridges

Case Study | ACCRA

Autonomous & Connected Vehicles for CleanER Air, Leeds

Real-time Zephyr air quality data was used for trials into the use of low emission vehicles to improve air quality in polluted city streets.

Aims

Automatically activate zero-emission running of hybrid vehicles as they pass through some of the city's most heavily polluted streets.

The Trial

A variety of static and mobile Zephyr sensors were deployed around Leeds City Centre and in 7.5 tonne Range Extended Electric Vehicles (REEV).

Working with partners, when the Zephyr sensor detected high levels of NO₂, data was communicated to a wider system which automatically triggered the vehicles passing through the city to switch to electric mode to help reduce further air pollution.

A Successful Trial

The twelve-month trial proved the system to be a success. REEV's were successfully switched to electric mode when entering clean air zones in Leeds and EarthSense continue to work with partners to deliver these services.

[Watch ACCRA in action](#)



Case Study | TfGM

Transport for Greater Manchester
Improving local air quality for residents by trialling a series of new traffic signal interventions across heavily polluted junction of the M60.

Aims

To identify whether giving HGVs and other large commercial vehicles priority passage at traffic signals improves local air quality for residents.

The Trial Intervention

Zephyr sensors were installed onto traffic lights at busy junctions of the M60 in Manchester to measure NO_2 and $\text{PM}_{2.5}$ before, during and after the trial.

During the trial, HGVs will be given priority passage at traffic signals to identify whether the reduction in stop-starts reduces the amount of air pollution from diesel vehicles.

Zephyr installed on traffic light signals in Manchester



Case Study | BBC Fighting for Air

Kings Heath, Birmingham

A one day behavioural change experiment led by Dr. Xand Van Tulleken and the dynamic action group, King's Heath CAN, determined to reduce air pollution in their neighbourhood.

Aims

Drive behavioural change and public engagement which are both notoriously difficult to successfully implement, trial and evaluate.

The Experiment

Zephyr sensors were installed in key locations on the King's Heath High Street and around St. Dunstan's School taking air pollution

measurements before, during and after the experiment. A variety of interventions such as working with the local council and bus companies to enforce car-free zones, setting up hedges to form a shield from the air pollution and using walking buses and alternative forms of transport on experiment day were implemented in a bid to reduce air pollution.

Results

Zephyr sensors measured a huge 20% reduction in NO₂ concentration at St. Dunstan's and 10% reduction in NO₂ on the high street proving that behavioural change is key to reducing air pollution.



Zephyr deployed on lamp post outside St. Dunstan's School, King's Heath

Our Customers & Partners



Thank You

For more information on EarthSense products and services, please head to www.earthsense.co.uk

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