EARTHSENSE

# Zephyr®

## Air Quality Monitor

MADE IN BRITAIN®

mCERTS

www.earthsense.co.uk

# About EarthSense

EarthSense is a leading air quality specialist, providing services in air pollution monitoring, modelling and data through web services worldwide.

Based in the UK, EarthSense delivers innovative solutions, enabling the world to visualise and manage its air quality issues.

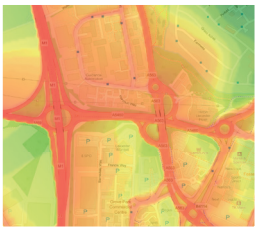
Our customers include smart city planners, environmental and occupational health officers, local authorities and systems integrators. Our highly accurate, usable data and analytics help inform strategies and secure investments through environmental evidence to make a real difference to human health.

## Air Quality Monitoring Services

EarthSense offers a complete ambient air quality monitoring solution which enables its customers to measure a variety of criteria pollutants in near real-time & at high resolution through hardware and cutting-edge web platforms and API's.

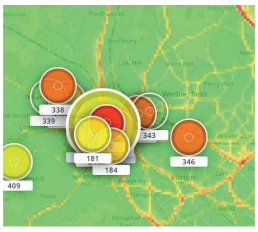
### Hardware
**Zephyr®**
**Air Quality Monitor**

A small-form, indicative ambient air quality monitor measuring harmful particulates and gases in real-time.



### Data
**MappAir®**
**Air Quality Model**

Pollution model available on a global scale, right down to a street corner with multiple data inputs.



### Software
**MyAir®**
**Air Quality App**

A web app to analyse and download your air quality data. Also available as a mobile and public facing app.

## Industry Awards

2021

10TH ANNIVERSARY WINNER 2019
beea
british engineering excellence awards

fsb
CELEBRATING SMALL BUSINESS AWARDS

## Expertise

### Dedicated In-house Experts

From our team of technical and software experts to our data scientists.

### In-house Calibration & Performance Certificates

Each Zephyr® is calibrated at the EarthSense manufacturing facility to MCERTS reference equipment standard to ensure the most accurate data & delivered with a calibration certificate.

### Complete Air Quality Monitoring Solution

From hardware, software data access & servicing all available through multi-year subscriptions or rentals to suit your project.

### Rich Academic History & Continued Growth

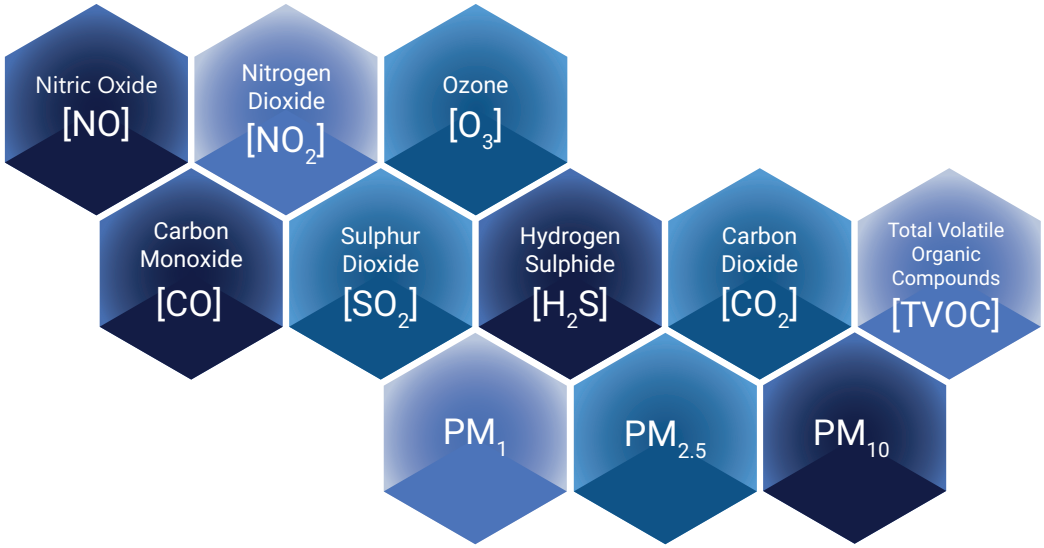
Born from 15 years of research at the University of Leicester, EarthSense has continued to grow since it's commercial inception in 2016 with Zephyrs deployed in 6 continents.

# Zephyr®

The Zephyr® is a small-form, indicative air quality monitor designed to measure ambient air pollution at localised levels at very high time-resolved resolutions up to 10 seconds. Deploying monitors helps to understand the pollution in a given area and, how local health is impacted by certain industry activities and lifestyle behaviours.

Using real-time measured air quality data enables our customers to build evidence-based mitigations, ensure compliance to regulations and drive behavioural change within communities.

## Pollutants Measured




## Data Communication

GSM 4G RS232 COMM Wi Fi NB-IoT LTE-M

## Power

Mains Solar Battery

## MCERTS Certified

mCERTS

## In the Media

The Zephyr® has been continuously featured in the press in news segments and documentatries.

BBC 4 Dispatches itv

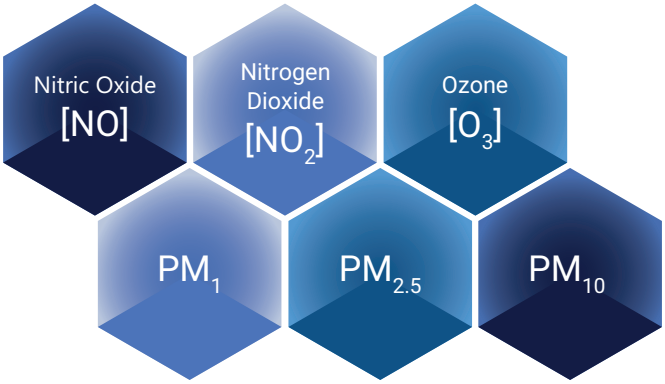
# Zephyr® Lite

The Zephyr® Lite is the compact cost effiecient version of Zephyr, boasting a bright LED beacon indicating the current pollution levels visually, with clear AQI colour bands.

Zephyr Lite inherits many of the advanced Zephyr features, sharing the same sensor technology and high levels of data quality that EarthSense has become renowned for, whilst also providing an alternative solution where power is available at the monitoring site and actionable alerts are required.

Whether its engaging the community around air quality awareness to drive positive change, or proactively alerting staff when operations are causing excessing emissions, Zephyr is the ideal tool when immediate action is needed.

## Pollutants Measured




## Data Communication

GSM

4G

Wi Fi

RS232 COMM

NB-IoT

LTE-M

## Power

Mains

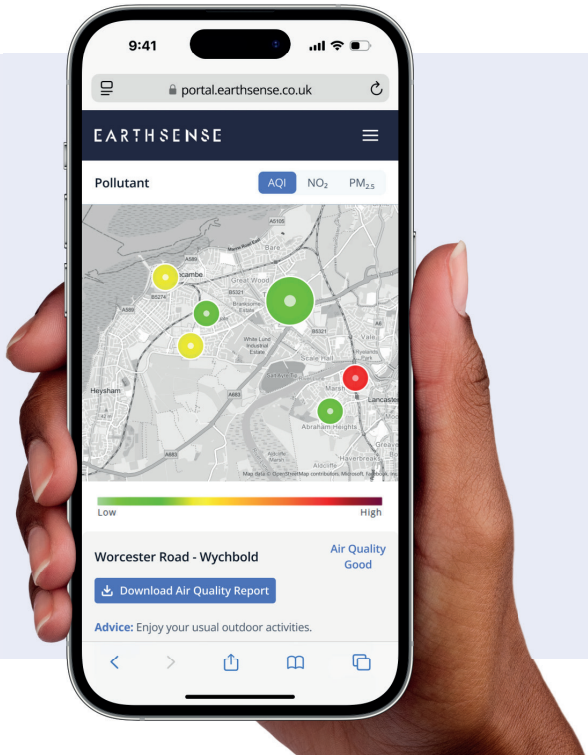
## MCERTS Certified

mCERTS

## Looking to engage your community with air quality?

Pair Zephyr Lite with a public portal to deliver positive messaging to your community.

Whether its engaging the community around air quality awareness to drive positive change, or proactively alerting staff when operations are causing excessing emissions, Zephyr is the ideal tool when immediate action is needed.



## Download Zephyr® Specification Sheet

### Monitor up to 14 Harmful Gases & Particulates

Including nitrogen dioxide ($NO_2$), Ozone ($O_3$) and $PM_{2.5}$ in one compact device including temperature, pressure & humidity.

### Build Networks of Monitors Across Cities

At congested road junctions or hotspot areas across towns, cities and counties to understand pollution trends.

### Integrate Connected Hardware

Such as Met stations for added context around pollution and wind speed, direction, temperature and humidity.

### Monitor in Hot Climates with White Zephyr®

Monitor ambient air quality in hotter climates with confidence in hardware performance.

### Use as a Static or Mobile Monitor

Fix to street infrastructure or use as a mobile device and attach to vehicles, bicycles and place inside backpacks.

### Easy to Replace Cartridge System

With dual cartridge slots to ensure no loss of data during cartridge swap over.

### Calibrated to Reference Site Standard

To MCERTS reference equipments standard for each Zephyr® at the EarthSense manufacturing facility.

### Trusted Data Quality

Our team of data scientists ensure you have confidence in your data.

## Short-term project?
## Check out Zephyr® Rentals

## Benefits of choosing a Monitoring-as-a-Service Provider

Tired of escalating maintenance charges and time consuming calibrations? Need a service which can provide long-term guarantees from day one?

**Our subscription model removes hidden charges so you can budget effectively. Capture reliable air qaulity insights with a simple yearly cost that won't let you down.**

## What's included?

**Range of power options**

**Data hosting and access**

**Intuative analysis and reporting**

**On-going remote data monitoring**

**Multi-year service plans**

**Fieldwork and warranty**

- A range of pollutant configurations
- Secure data transmission and cloud storage
- Calibrated data and sensor replacements
- On-going monitoring and remote maintenance
- Quick response warranty replacement
- Latest firmware upgrades
- Intuitive data analysis and reporting
- Actionable Email and SMS alerts
- API access for system integrations
- Multi-year packages available up to 5 years

# Data Access

Integrate your data via an API directly into an existing system or view, analyse and download your data via the EarthSense web app, MyAir®.

## MyAir®

The MyAir® web app has been developed by EarthSense acting as the hub for viewing your mapped Zephyr® locations and accessing your measured pollution data. Zephyr® subscription users can also benefit from additional features including MappAir® modelled data for forecasting, pollution trends and sources.

### View Latest Zephyr® Measurements

Quick view of your Zephyr® measurements in near-real-time in an intuitive new dashboard.

### View Additional Data Overlays

Providing added context to your measured data including, MappAir®, AURNs and Air Quality Management Areas (UK only).

### See your Mapped Zephyr® Locations

Locate your Zephyr® monitors on an interactive map with additional satellite overlay giving you context to nearby roads, mines, quarries, open space, buildings and residential areas.

### View Your Integrated Met Data

Integrate third party data with RS232/RS485 port to understand how pollution behaves based on wind speed and direction.

### Multiple App Formats Available

Versatile web app with the capability of being used as web, mobile app or streamlined public facing app for municipalities.

### Air Pollution Alerts

Configure alerts and receive SMS and/or email notifications, so you know where and when breaches occur.

### Access Historcial Zephyr® Data

Access historical measured data through a variety of filters such as time averaging and key pollutants.

### Monitor Battery Levels & Access Certificates

View your Zephyr® location, battery levels and access your calibration certificates.

### Complimentary MappAir® Modelled Data

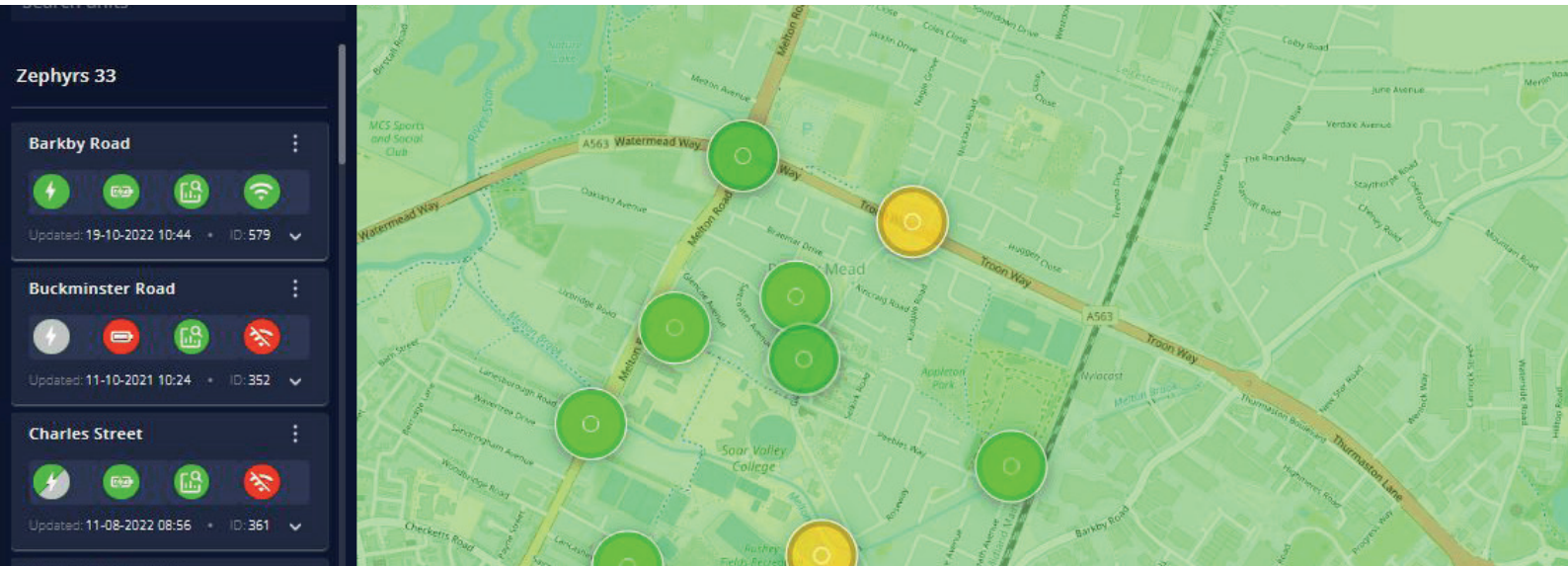
Global modelled MappAir® data included to provide added context to your measured data and help identify pollution trends for the wider area. Compliant to EU Directive 50.

### In-house Developers

Focused on continuous product development and dedicated to creating new and useful features within the app

### 5 User Licenses Included*

*Per Zephyr® subscription; allowing you and your team to access data anytime, anywhere.



# Applications

## Governments & Environmental Monitoring

Local Authories and government play a big part in managing ambient air pollution for the local area and helping to meet their air quality targets as set out by the World Health Organisation (WHO).

Real-time data equips environmental and occupational health officers, city planners and transport professionals with detail of how their city is living and breathing. Highlighting congested and polluted hotspots within towns and cities to help drive behavioural change in the community, implement road closures, ULEZ and CAZ.

## Intelligent Transport Systems

Dynamically manage traffic flow with integrated air quality and traffic management technolgies to improve congestion and resulting pollution in towns and cities. Use a network of Zephyrs across cities to send alerts to Variable Message Signs (VMS) to inform motorists of elevated levels of pollution and suggest cleaner routes. Install mobile sensors for geo-fencing of hybrid vehicles

Measured Zephyr® pollution data is compatible with traffic management systems such as Aimsun Live and Siemens Mobility Stratos.

## Smart Cities & IoT

Deploy networks of Zephyrs and integrate with other data specialists that work across council departments, highways, town centre planning, strategic planning, and economic and regeneration development.

Identify how each dataset affects another to support future decisions about how to best manage footfall in shopping centres, traffic congestion, vehicle numbers in car parks, and their impact on air quality levels in cities and towns.

## Chemical Manufacturing & Oil and Gas

Chemicals and petrochemical manufacturing and processing including the exploration for and refining of crude oil, produce airborne Volatile Organic Compounds (VOC) that may result in fugitive emissions of VOCs which catalyse the production of ozone, as well as immediate health risks for compounds such as benzene.

Zephyrs are capable of measuring Total Volatile Organic Compounds (TVOC) inside these facilities as well as in communities surrounding such facilities; identifying exposure to improve public and occupational health.

# Applications

## Construction & Engineering

Construction sites emit particulate matter emissions as a result of machinery, ground and demolition work. The Zephyr® has received MCERTS (indicative PM), and can be used as both static sensors for building networks across construction sites or as mobile sensors to place around different locations of smaller sites. Particulate matter sampled in real-time gives construction companies, site managers and project managers insight into how their activity is impacting on the environment, the health of staff and the public. Data can be used to ensure compliance to environmental standards and requirements.

## Industrial Processes

Processes such as waste treatment plants are synonymous with foul odours and smells. Community concerns can be appropriately investigated through monitoring and evidence-based strategies can be put to action for residents of surrounding areas.

Smelters are well known for the release of CO, $CO_2$, and Particulate Matter (PM). Through combining personal exposure with environmental sampling using the Zephyr® sensor, employee and community health risks can be closely monitored and managed.

## Mining & Quarrying

Activities at mines and quarries create fine particle matter (PM) emissions and its therefore important ensure local and national air quality standards and surrounding communities are not adversely affected by these types of industries. This type of air pollution can have a direct impact on the health of workers communities and given the remote location of mines and quarries, it may be difficult to accurately measure such emissions. Requiring little infrastructure to install & operate, the Zephyr® is capable of measuring $PM_1$, $PM_{2.5}$ & $PM_{10}$. Data can help occupational health & safety officers and ventilation officers.

## Power Plants

Coal fired power plants can produce significant airborne particulate matter (PM) and greenhouse gas emissions.

The Zephyr® air quality monitor can closely monitor the emissions in real-time from these sources and data can be used to illustrate pollution patterns and create alerts for the generators and receptors of these emissions of imminent exposure risk.

# Case Studies

**Want to learn more?**
Head to www.earthsense.co.uk/case-studies to view full case studies.

## Leicester City Council

EarthSense worked with Leicester City Council to create a pollution map of Leicester which focused on identifying wood burning smoke emissions within the City.

Using a combination of the MappAir® 10-metre resolution city model, a wood burning smoke estimate, traffic data, Computational Fluid Dynamics (CFD) and a network of Zephyr® air quality monitors, the Council were able to identify particulate levels within the City, enabling improved guidance towards reduced smoke emissions and improved public health.

## NEVFMA

Network Emissions/Vehicle Flow Management Adjustment (NEVFMA), is a project funded by Highways England, led by Aimsun with EarthSense, Oxfordshire County Council and Yunex Traffic. The project saw the consortium work together to enhance traffic flow and reduce emissions in Oxford through integration of the MappAir® city pollution model and a network of 18 Zephyr® air quality monitors with Aimsun's traffic model. Integrating real-time, historic and forecast pollution data helped to identify sources and trends to understand the impact of traffic congestion on air quality around the city.

## Coventry City Council

EarthSense worked alongside Coventry City Council to integrate Zephyr® air quality data with existing traffic management systems. A network of 12 solar powered and hard-wired Zephyr® air quality monitors were deployed in areas of the city centre identified as having high levels of congestion and air pollution.

This data was used to trigger messaging about pollution (nitrogen dioxide, $NO_2$) levels and encourage usage of alternative routes via Variable Messaging Signs (VMS) to divert motorists away from heavily congested roads and pollution hotspots.

# What our Customers Say

This ambitious project will play a vital role in helping us build a clear picture of the sources of $PM_{2.5}$ pollution, which parts of the city are most affected and the impact that domestic wood burning is having on local air quality.

This important study will put us ahead of the curve and help us take decisive local action to tackle potentially harmful effects. It's fantastic that we have been able to benefit from the skills, expertise and knowledge of our local partners EarthSense.

Cllr Adam Clarke | Deputy City Mayor
**Leicester City Council**

Poor air quality is an ever-increasing problem, with road transport contributing significantly to urban pollution. That's why Siemens Mobility Limited exclusively partnered with air quality experts EarthSense, fully integrating the Zephyr® air quality sensor with our traffic signals and systems.

Local authorities can now monitor air quality in real time and make meaningful and timely interventions through Siemens Mobility's traffic management system, implementing strategies based on reliable pollution data and prevailing air quality levels.

Matthew Vincent
**Yunex Traffic (formerly Siemens Mobility)**

Air pollution is a growing public health concern. We're taking early measures with the aim of encouraging motorists to make small changes to help reduce the pollution levels and traffic congestion before it's too late and we're forced to introduce chargeable clean air zones.

We are keen to use the Zephyr® air quality sensors on a long-term basis to better manage our air quality going forward.

Shamala Evans
**Coventry City Council**

Working with over 100 towns and cities, we are heavily involved in helping places become more digitised and using data to help benefit local visitors, residents, and the business community.

Intelligent data sets are crucial for the management of economic growth and regeneration, and the focus on the environment, means air quality will play a very big part in all our futures. Adding this data to set to our already established services will be an integral part of our reporting going forward.

Dan Coombs
**Proximity Futures**

# Want to discuss your air quality monitoring project with us?
# Get in Touch!

info@earthsense.co.uk

www.earthsense.co.uk/contact

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