Airborne
Underwater
Geophysical
Signals

DASTEC
30 AÑOS AL SERVICIO DE LA INDUSTRIA

AirSENCE

ADVANCED
ACCURATE
AFFORDABLE

AirSENCE™

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Underwater
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Continuous Ambient Air Quality
Micro-Monitoring Station
(*caaqMMS*)

Low-cost sensor-based air monitoring systems are ready to meet the ambient air quality monitoring needs of today

AirSENCE is an Advanced, Accurate & Affordable continuous ambient air quality Micro-Monitoring Station- caaqMMS which provides continuous, real-time, accurate and reliable measurements of air pollution and local weather data.

AirSENCE provides concentrations for gaseous pollutants including NO, NO_2, CO, O_3, SO_2, VOC, H_2S, and CO_2 in addition to all particulate matter fractions such as PM_{10}, $PM_{2.5}$, and PM_1. Local weather and environmental data, such as wind speed and direction, noise, rainfall, and light, can also be measured.

AirSENCE has been developed in collaboration with the Southern Ontario Centre for Atmospheric Aerosol Research (SOCAAR) at the University of Toronto, a leading-edge research institute. It incorporates a fast-response, multi-parameter sensor array and robust machine learning-based signal processing and data fusion to provide an Industrial Internet of Things (IIoT) network for real-time, 24/7 ambient air monitoring.

AirSENCE is applicable for many kinds of ambient air monitoring applications including:

- Urban pollution monitoring
- Industrial fence-line monitoring
- Ambient air quality research
- Air monitoring linked to quick action plans
- And many more….

AirSENCE is highly effective for applications that demand a fast response to air pollution events like school air quality measurements, particulate monitoring on railway stations and/or loading stations, air monitoring of airports and seaports, etc. It is also an ideal and economical solution for large, critical projects like urban baseline data collection.

AirSENCE can be a cost-effective partner for your air monitoring needs as it provides accurate data, simple operation, portability, advanced communication, and secured cloud storage with minimal maintenance requirements. It is everything that you expect in a low-cost air monitoring station.

AirSENCE is ideally suited by design to complement and support stationary ambient air quality stations by enabling efficient and accurate ambient air mapping.

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AirSENCE

AirSENCE – SALIENT FEATRES

ACCURATE DATA
Data generated by AirSENCE shows high correlation with reference system data.

HIGH RESOLUTION DATA
AirSENCE provides high temporal resolution by generating continuous real-time data every minute. User may opt for data with shorter or longer intervals, depending on requirements.
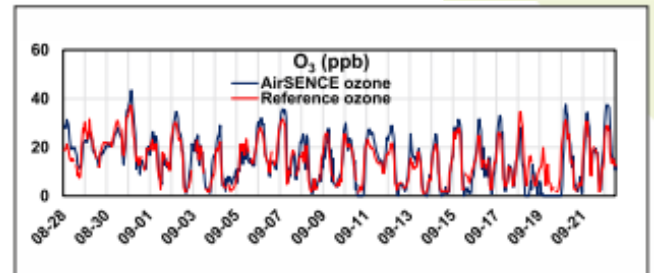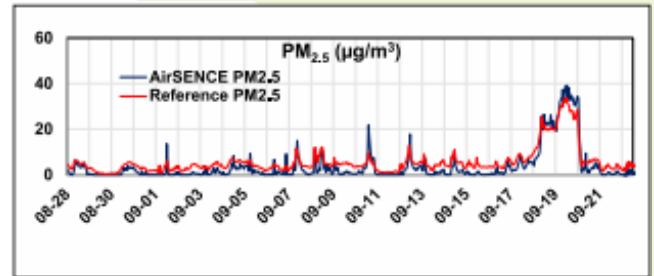

LOW POWER CONSUMPTION
AirSENCE has an average power consumption of only 6 Watts and can be operated using solar power or external battery.

MODLAR DESIGN
AirSENCE has a plug-and-play sensor design and sensors can be replaced in the field in minutes.

TINY FOOTPRINT
AirSENCE is small and lightweight, making it portable and easy to install.

ANYWHERE INSTALLATION
AirSENCE can be installed on a pole or on any vertical surface.

WEATHERPROOF ENCLOSURE
AirSENCE has an IP55 rated weatherproof polycarbonate enclosure that allows installation in virtually any climate.

MULTIPLE COMMUNICATION MODES
AirSENCE offers 3 different communication modes including Wi-Fi, local area network (LAN) and 4G-LTE GSM.

DATA STORAGE & ACCESS
Every AirSENCE device stores data on a cloud server with web-browser based secure access having individual user-ID and password. Users can access data anytime from anywhere using a computer or any mobile device.

GENERAL SYSTEM SPECIFICATIONS

Physical

Dimensions	322mm × 239mm × 177 mm (12.7" × 9.4" × 7.0")
Weight	2.2 kg (4.8 lbs]
Operating Temperature Range	-35–+55°C
Operating Pressure Range	30–110 kPa (4.35–15.95 psi)
Humidity Range	0–95% RH
Communication	Ethernet, Wi-Fi, 4G LTE Cellular with fallback to 3G
Enclosure Details	
Material	Polycarbonate
Rating	NEMA 4 / NEMA 4 x IP55 sealing
Mounting Options	Pole mount or wall mount (kits available)

Electrical

Power Supply	9–36 VDC at 5 A or Power over Ethernet (PoE)
Power Consumption	Typical 6 W, Max 10 W; w/Cellular: Max 15 W
Certification	C E

DATA MANAGEMENT

Data Computing and Storage

AirSENCE has an on-board micro-computer with the following specifications:

Computer Type	Micro-computer for IoT applications
Brand	Onion Omega
Mounting	Surface Mount
Computing	Drop-in Wi-Fi-enabled Linux computing
Dimensions	34 x 20 x 2.8 mm
Components	Built-in CPU, memory and flash storage
Processor	580 MHz MIPS MT7688AN CPU
Other feathers	USB, Ethernet, 2xUART's, 12C, GPIOs interfaces
Storage	35 GB (stores data for >5 years)

Data Accessibility

- Data is recorded at 1-minute intervals and is user-configurable for longer intervals.
- Finalized data is transferred from AirSENCE to AUG's cloud server or user's private server.
- Data is never handled by external software during transfer from AirSENCE to cloud server.
- Data can be viewed on AUG dashboard using individual secure login credentials.
- Users can view and compare data of multiple AirSENCE devices on a single dashboard.
- Downloading data can be averaged over configurable intervals such as 1-minute, 2-minute, 15-minute, 30-minute, or 1-hour.

SENSORS SPECIFICATIONS

Parameter/Pollutant	Detection	Optional Weather Sensor
Particulate Matter <10 μm (PM_{10})	0–1,000 μg/m^3	Wind Speed & Direction
Particulate Matter <2.5 μm ($PM_{2.5}$)	0–1,000 μg/m^3	Rain Gauge
Particulate Matter <10 μm (PM_1)	0–1,000 μg/m^3	Noise
Nitric Oxide (NO)	0–6,000 ppb	Solar & UV Radiation
Nitrogen Dioxide (NO_2)	0–10,000 ppb	
Carbon Monoxide (CO)	0–8,000 ppb	
Ozone (O_3)	0–10,000 ppb	
Sulfur Dioxide (SO_2)	0–10,000 ppb	
Carbon Dioxide (CO_2)	0–10,000 ppm	
Hydrogen sulfide (H_2S)	0–2,000 ppb	
VOC	0–40 ppm	

RECONFIGURED MODELS

AirSENCE DUST-WATCH

Configuration:
PM Sensor (PM_{10}, $PM_{2.5}$, PM_1),
Temperature, humidity, wind speed and wind direction, ambient noise

AirSENCE STANDARD

Configuration:
NO, NO_2, CO, O_3, SO_2, PM (PM_{10}, $PM_{2.5}$, PM_1),
Temperature, humidity, wind speed and wind direction

AirSENCE PRO

Configuration:
NO, NO_2, CO, O_3, SO_2, PM (PM_{10}, $PM_{2.5}$, PM_1),
Temperature, humidity, wind speed and wind direction, ambient noise

AirSENCE ELITE

Configuration:
NO, NO_2, CO, O_3, SO_2, VOC, CO_2, H_2S, PM (PM_{10}, $PM_{2.5}$, PM_1),
Temperature, humidity, wind speed and wind direction, ambient noise, rainfall

URBAN CITY MONITORING

Air monitoring in urban areas has become a necessity due to the exponential growth of cities. Emissions from increasingly dense vehicular and infrastructure activities are the major sources of air pollution in these areas and have completely changed the air quality characteristics of major cities around the world. Most of these cities still lack comprehensive air pollutant baseline data which is a major hurdle in formulating development strategies and infrastructure planning.

Conventional air monitoring systems have severe limitations for creating spatial and temporal pollution maps because of their size and cost. Cities currently in need of air mapping require networks of low-cost air monitoring systems rather than measurements at just a few locations.

The Advanced, Accurate and Affordable features of AirSENCE are the perfect fit for creating urban air mapping networks. Its small footprint, low initial cost of procurement, accuracy of results, ease of installation, operation and maintenance, and autonomous operation and data handling make it an ideal choice for urban air quality monitoring.

Recommended Model: AirSENCE PRO

THERMAL POWER PLANT

Coal-based power plants continue to be operated on a massive scale around the world. They are major contributors to the world's air pollution because of the sheer volumes of coal they burn coupled with insufficient treatment of their emissions.

Major air pollutants emitted to the atmosphere from coal-based thermal power plants are particulates, NO_X and SO_X. Particulate matter generated during coal combustion includes fly ash as well as fine particles of sulphate, nitrate, and un-combusted coal. Due to the great height of power plants stacks, severe effects of these emissions show up several kilometers downwind of these plants and can extend for several hundred kilometers.

As a caaqMMS, AirSENCE provides real-time continuous measurements of all PM fractions and other gaseous pollutants along with essential weather parameters. Its unique features make it an ideal solution to monitor ambient air around thermal power stations.

Since most of these plants are situated at remote locations, features like low cost of procurement, ease of installation, autonomous operation, low maintenance cost, remote data storage, accessibility of data on smartphone, and networking of devices make AirSENCE the best solution for this highly critical application.

Recommended Model: AirSENCE STANDARD

CEMENT PLANTS

While cement is an essential raw material for the development and continued growth of any country, its production is a major contributor to the world's total air pollution load. Every aspect of the cement industry contributes to the problem, including extraction & transportation of raw materials, manufacturing, and transportation of the finished product.

The cement industry heavily emits both gaseous as well as particulate pollutants. Major gaseous pollutants emitted during the manufacturing process are CO_2, CO, NO_x, and VOCs. Particulate pollutants are produced at every stage of cement manufacturing from raw material extraction to finished product transportation, and include all PM fractions: PM_{10}, $PM_{2.5}$, and PM_1.

As a caaqMMS with sensors for NO, NO_2, CO_2, VOC and PM, as well as wind speed and direction, AirSENCE provides a tailor-made solution for real-time continuous monitoring of ambient air in and around cement industries. Features like cost effectiveness, operational simplicity, lack of routine maintenance protocols, and ease of data storing and viewing makes it the complete air monitoring solution for cement manufacturers.

Recommended Model: AirSENCE STANDARD

CHEMICAL INDUSTRIES, REFINERIES & INDUSTRIAL AREAS

Chemical industries and refineries are major global sources of many gaseous pollutants, particularly VOCs. These industries are critical contributors to the world's overall air pollution load as they emit pollutant gases not only during their manufacturing processes but also during the transportation of raw materials and finished products.

VOCs emitted from such plants are now a major cause of concern for authorities and citizens situated around them, as these compounds are an indirect but major contributor in smog generation. VOCs and NO_2 in ambient air generate tropospheric O_3 in the presence of sunlight. This tropospheric O_3 generates smog when combined with $PM_{2.5}$ particles and NO_2, and is a major nuisance around the world as it leads to road accidents and respiratory diseases.

AirSENCE is a caaqMMS with a full range of gas sensors making it an ideal solution for continuously monitoring ambient air in and around such chemical plants and refineries. AirSENCE can be effectively used by authorities to carry out air pollution monitoring of areas with chemical industries as well as residential areas in their vicinities. Data provided by AirSENCE can be best utilized by authorities to understand how and to what magnitude these air pollutants infiltrate into residential areas and take appropriate remedial measures.

Recommended Model: AirSENCE ELITE

AIRPORTS / RAILWAY STATIONS / SEAPORTS

Nowadays it has become essential to monitor air in and around mass commuting areas like airports, railway stations, and even seaports.

Ambient air around any airport usually has high concentrations of particulate matter and gaseous pollutants like NO, NO_2, and VOCs, which are emitted as a result of aircraft operation as well as transportation and fueling. These pollutants are able to infiltrate into airport terminals and severely affect the well-being of travelers and employees. High commuter turnouts also elevate CO_2 and noise levels inside the terminals.

AirSENCE, with sensors for all gaseous and PM pollutants combined with ambient noise sensing, provides a tailor-made solution for airport authorities to monitor external and internal air. The advanced features and accurate data of AirSENCE allow authorities to take immediate corrective actions.

Railways and seaports also have remarkably high concentrations of particulate & noise pollution. Continuous movement of trains causes particulate matter to enter inside railway stations, while high commuter volumes, public address announcements, and train horns increase noise pollution and affect commuters adversely. Similarly for seaports, the continuous loading and unloading of ships generate substantial amounts of particulate pollution, as well as very high levels of noise coming from high decibel ship horns.

Recommended Model: **For Airports** AirSENCE ELITE
For Railway Stations & Seaports AirSENCE DUST-WATCH

SCHOOL PREMISES MONITORING

Various studies by well-known universities have explicitly shown that air pollution in schools is a major cause of poor performance and attendance of students since they spend much of their time on school premises.

Due to increased social awareness, parents around the world are now knowledgeable of the high health hazards associated with air pollution and they are raising their concerns with school authorities regarding this issue.

AirSENCE, with its small footprint, ease of operations and maintenance, and the capability to display air monitoring results on LCD screens, is a first-rate solution for school management. Online displays of air quality measurement results impart much-needed confidence to parents and enhance a school's reputation.

Recommended Model: AirSENCE STANDARD

AIR QUALITY RESEARCH

In recent decades there have been major technological developments in air monitoring instrumentation and methods. Air quality research institutes are working on various applications like determining the sources and compositions and transportation of air pollution, conducting exposure assessments, improving monitoring capabilities, and supporting public health research.

The extensive research done at these institutes enables the formulation of more effective and targeted air quality management solutions. Researchers are developing, evaluating, and applying measurement and monitoring capabilities to better characterize source emissions, air quality, and human and environmental exposures for both individual pollutants and mixtures of air pollutants.

AirSENCE, a comprehensive caaqMMS with all relevant gas, particulate, and weather sensors, provides a powerful tool for researchers to carry out short- and long-term studies at various locations. Features like small footprint, light weight, easy portability, ability to operate in all climates, accurate data, easy operation, low maintenance, and smartphone accessibility make AirSENCE a premium tool for modern air quality research.

Recommended Model: AirSENCE ELITE

AIR MONITORING AROUND LANDFILL SITES

Megacities produce vast quantities of solid waste, and landfills create major headaches for municipalities around the world. In addition to obnoxious odours, major components of landfill emissions include CO, NO_X, SO_2, CO_2, particulate matter, and VOCs.

AirSENCE, a caaqMMS, provides an effective solution for fence-line monitoring of landfill sites. All relevant gas and particulate sensors are integrated in a small and lightweight enclosure, making AirSENCE the perfect tool for monitoring landfill air emissions. Easy installation, autonomous operation, low maintenance, and smartphone accessibility enable authorities to measure air pollutants of such hazardous sites very effectively from remote locations.

Recommended Model: AirSENCE ELITE

Get in touch with us!

📞 +1 416-923-4425
+1 877-756-4628 (fax)

✉️ airsence@augsignals.com
www.airsence.com

📍 **Corporate Headquarters**

A.U.G. Signals Ltd.
73 Richmond Street West, Suite
103, Toronto, Ontario,
Canada MSH 4E8

Manufacturing Facility

A.U.G. Signals Ltd.
60 Clarkson Avenue
York, Ontario, Canada
M6E 2T6

Distributors

India (Exclusive)
Eco Ventures Pvt. Ltd.

7/8 Bhaveshwar Bhuvan,
Near Dindayal Upadhyay
Udyan, Portughese Church,
Gokhale Road (North)
Dadar West, Mumbai
India - 400 028

+ 91 22 2437 0520 / 6672
info@eco-ventures.in

UK, Ireland (Exclusive)
Netherlands (non-Exclusive)

Ambisense Ltd.

DCU Alpha,
Glasnevin, Dublin 11,
Ireland

+ 353 1 9072790
info@ambisense.net

**China - Provinces - Shanghai,
Shandong, Jiangsu,
Hubei (Exclusive)**
The rest of China — (non-Exclusive)

**Shanghai EHSroad
Environmental S&T Co.Ltd.**

7/F, Block 2, No.300
Yuankang Road, Baoshan
District, Shanghai, China

+86 13817512016
james.xue@ehsroad.com

Korea (non-Exclusive)

Taesung Global Co., Ltd.
4th Floor, DUBO Bldg., 83-1,
Dasan-Ro, Jung-Ku,
Seoul, Korea (04599)

+82 2 2238 6544
jh.lee@taesung-global.com

Mexico (non-Exclusive)

Eduardo Arturo Rodriguez
Vite Ricardo Margain 575-420,

Torre C. Santa Engracia. San
Pedro Garza Garcfa, Nuevo
Leén. C.P. 66267, Mexico

+52 55 2299 5000
er.vite@gmail.com

DASTEC S.R.L.

Representantes / Distribuidores Autorizados

🇦🇷 **Argentina**

Tel: (+54 11) 5352 2500
Email: info@dastecsrl.com.ar
Web: **www.dastecsrl.com.ar**