

AirSENCE FIRE-WATCH



**ADVANCED
ACCURATE
AFFORDABLE**



Airborne
Underwater
Geophysical
Signals

**Air Surveillance System *for*
Early Wildfire Detection**



AirSENCE FIRE-WATCH

A highly effective and affordable “Early Wildfire Detection” system for continuous surveillance of wildfire marker pollutants which enables prompt, decisive action for the protection of human lives and property.

Catastrophic destruction due to uncontrolled blazes has increased dramatically in recent decades. Wildfires disrupt transportation, communications, and supplies of power, fuel, and water while damaging property, crops, and resources. Air pollution resulting from wildfires causes a range of health issues like eye and respiratory tract irritation, reduced lung function, bronchitis, cardiovascular problems, and premature deaths.



Smoke produced by wildfires is a significant contributor to global air pollution and a major threat to public health as it contains a mixture of gaseous pollutants such as carbon monoxide (CO), carbon dioxide (CO₂), nitrogen oxides (NO, NO₂), and volatile organic compounds (VOCs), as well as suspended particulates (e.g., PM_{2.5} and PM₁₀). Particulate matter are the primary constituent and the principal health hazard of wildfire smoke.

AirSENCE FIRE-WATCH was developed in accordance with AUG Signals’ commitment to aiding society through technical expertise. It retains all the hardware, software, communication, and computational capabilities of the well-established “Advanced, Accurate and Affordable” caaqMMS system AirSENCE, thus making it equally advanced, accurate and affordable.

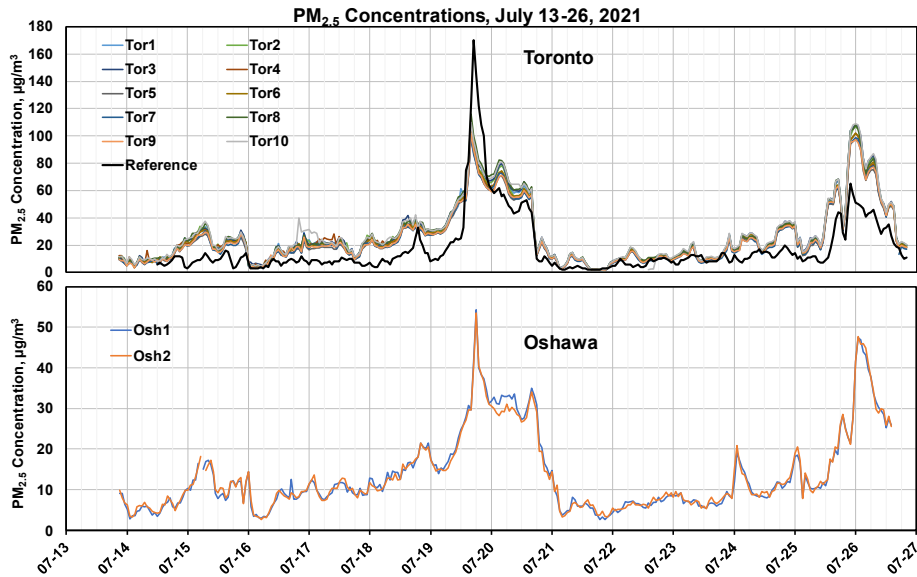
Distributed network of AirSENCE FIRE-WATCH in wildfire prone regions provide continuous surveillance and accurate measurement of key combustion-related pollutants. Accurate concentration data is communicated to users in real-time to facilitate immediate emergency protocols or fire control measures. Users also have the option of configuring real-time alerts via E-mail or SMS when pollutant concentration thresholds are exceeded.

AirSENCE FIRE-WATCH features a small footprint, low cost, autonomous operation, cloud data storage, and accurate data, making it the ideal solution for creating Air Quality Surveillance Networks for early wildfire detection.

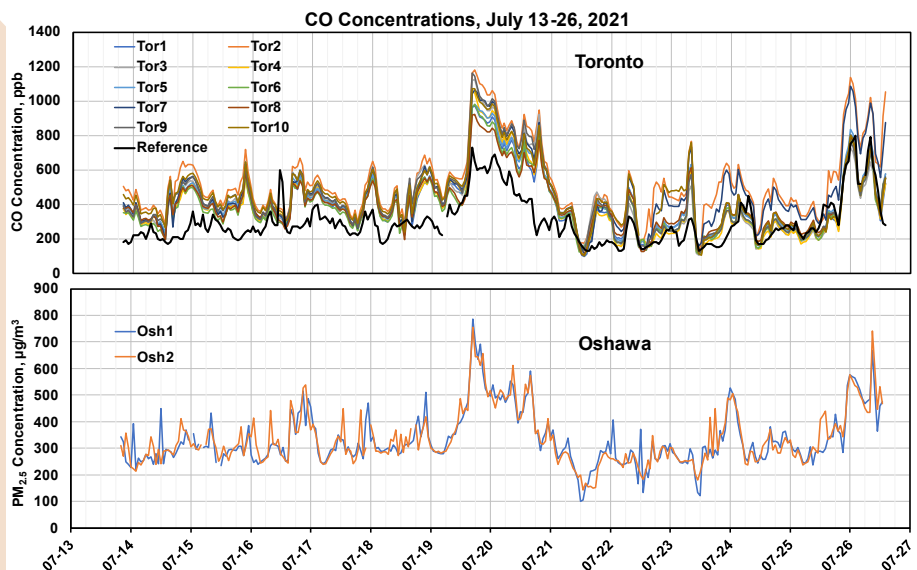


AirSENCE FIRE-WATCH – IN ACTION

A total of 3,925 wildfires were recorded across Canada in the first 7 months of 2021, which is above the 10-year average according to the Canadian Interagency Forest Fire Centre. Smoke plumes and particulate matter from fires in northern Ontario drifted more than 1,000 km southeast into the Greater Toronto Area (GTA) in the month of July 2021, badly affecting its air quality despite the great intervening distance. Significant deterioration of air quality was accurately observed by AirSENCE devices installed in Toronto and in the adjacent city of Oshawa.



Data of marker pollutants of wildfires—namely PM_{2.5} and CO—were collected over a 13-day period by 10 AirSENCE devices installed in Toronto and 2 installed in Oshawa. The measurements (shown along with government reference data in the charts below) clearly demonstrate elevated concentrations. PM_{2.5} levels in the GTA are usually below 30 µg/m³, but increased to well above 60 µg/m³, with a peak value over 100 µg/m³, during two periods: 1. July 19–20 and 2. July 25–26. Elevated concentrations observed corresponded to two wildfire surges reported more than thousand kilometres away in northern Ontario and are corroborated by the reference station data.



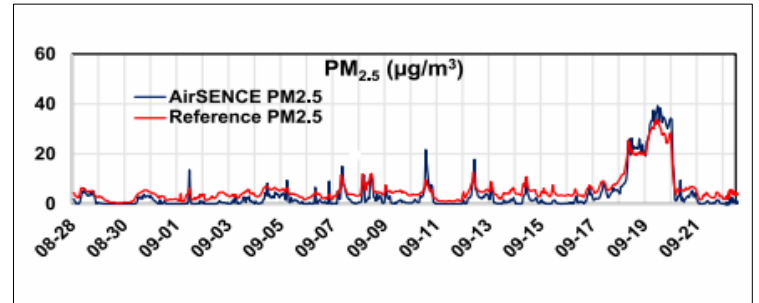
AirSENCE FIRE-WATCH – SALIENT FEATRES

ACCURATE DATA

Data generated by AirSENCE FIRE-WATCH exhibits high correlation with that of standard laboratory methods.

HIGH RESOLUTION DATA

AirSENCE FIRE-WATCH provides high temporal resolution by generating continuous real-time data every minute. Users may opt for data with longer intervals, depending on requirements.



TINY FOOTPRINT

AirSENCE FIRE-WATCH is small and light weight making it portable and easy to install.

ANYWHERE INSTALLATION

AirSENCE FIRE-WATCH can be installed on a pole or on any vertical surface.

WEATHERPROOF ENCLOSURE

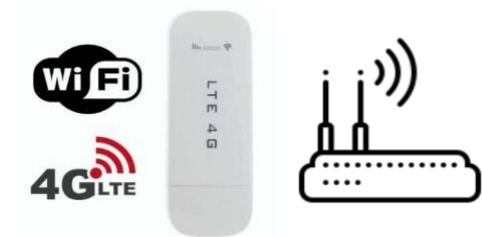
AirSENCE FIRE-WATCH has an IP55 rated weatherproof polycarbonate enclosure which allows installation in virtually any climate.

LOW POWER CONSUMPTION

AirSENCE FIRE-WATCH has an average power consumption of 6 Watts and can be operated using solar power or external battery.

MODULAR DESIGN

AirSENCE FIRE-WATCH has a plug-and-play sensor design and sensors can be replaced in the field within minutes.



MULTIPLE COMMUNICATION MODES

AirSENCE FIRE-WATCH offers 3 different communication modes including WiFi, local area network (LAN) and 4G-LTE GSM.

DATA STORAGE & ACCESS

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



GENERAL SYSTEM SPECIFICATIONS

PHYSICAL

Dimensions	322mm x 239mm x 177 mm (12.7" x 9.4" x 7.0")
Weight	2.2kg (4.85 lbs)
Operating Temperature Range	-35°C—+55°C
Operating Pressure Range	30–110 kPa (4.35–15.95 psi)
Humidity Range	0 to 95% RH
Communication	Ethernet, Wi-Fi, 4G LTE Cellular with fallback to 3G
Enclosure Material	Polycarbonate
Enclosure Rating	NEMA 4 / 4X & IP55 sealing
Mounting Options	Pole mount or wall mount (kits available)

ELECTRICAL

Power Supply	9-36 VDC, 5A or Power over Ethernet
Power Consumption	Typical 6 W, Max 10 W; w/Cellular: Max 15 W
Certification	CE

DATA MANAGEMENT

Data Computing and Storage

AirSENCE FIRE-WATCH 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 WiFi-enabled Linux computing
Dimensions	34 x 20 x 2.8mm
Components	Built-in CPU, memory and flash storage
Processor	580MHz MIPS MT7688AN CPU
Other features	USB, ethernet, 2xUART's, I ² C, GPIOs interfaces
Storage	32GB (Store's data for more than 5 years)

Data Accessibility

- Data is recorded at 1-minute intervals and is user-configurable for longer intervals.
- Finalized data is transferred from **AirSENCE FIRE-WATCH** to **AirSENCE** cloud server or user's private server.
- Data is never handled by an external software while it is transferred from **AirSENCE FIRE-WATCH** to cloud server.
- Data can be viewed on **AirSENCE** dashboard using individual secure login credentials.
- User can view and compare data of multiple **AirSENCE** devices on single dashboard.
- Downloading data can be averaged over interval of 1-minute, 2-minute, 15-minutes, or 1-hour.
- Data gets downloaded in CSV format.

SENSORS SPECIFICATIONS

Parameter/Pollutant	Detection	Optional Weather Sensor
Particulate Matter <10 µm (PM ₁₀)	0–1,000 µg/m ³	Rain Gauge
Particulate Matter <2.5 µm (PM _{2.5})	0–1,000 µg/m ³	Noise
Particulate Matter <1 µm (PM ₁)	0–1,000 µg/m ³	Solar & UV Radiation
Carbon Monoxide (CO)	0–8,000 ppb	
Carbon Dioxide (CO ₂)	0–10,000 ppm	
Ambient Temperature	-40–85°C	
Ambient Humidity	0–100% RH	
Ambient Pressure	300–1,100 hPa	
Wind Speed	0–40 m/s	
Wind Direction	0–359.9°	

OTHER PRECONFIGURED AirSENCE MODELS

AirSENCE DUST-WATCH

Configuration:

PM Sensor (PM₁₀, PM_{2.5}, PM₁),
Temperature, humidity, wind speed and wind direction, ambient noise

AirSENCE STANDARD

Configuration:

NO, NO₂, CO, O₃, SO₂, PM (PM₁₀, PM_{2.5}, PM₁),
Temperature, humidity, wind speed and wind direction

AirSENCE PRO

Configuration:

NO, NO₂, CO, O₃, SO₂, PM (PM₁₀, PM_{2.5}, PM₁),
Temperature, humidity, wind speed and wind direction, ambient noise

AirSENCE ELITE

Configuration:

NO, NO₂, CO, O₃, SO₂, VOC, CO₂, H₂S, PM (PM₁₀, PM_{2.5}, PM₁),
Temperature, humidity, wind speed and wind direction, ambient noise, rainfall

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