

# Dustroid<sup>®</sup>

Real Time Dust Monitor



# About Dustroid®





Dustroid® is an Online Particulate Monitoring system to measure the concentration of dust particles in the ambient air. It is capable of monitoring various particulate size ranging from 1 micron to 100 microns such as Ultrafine Suspended Particulate Matter (UFPM), Suspended Particulate Matter (SPM), Respiratory Suspended Particulate Matter (RSPM) and Total Suspended Particulates (TSP). It works on Active Sampling method to count particulate matters using a highly accurate laser beam.


Dustroid® can be used for dust surveys in areas with dust -laden activities like construction, mining, quarrying, ports, metallurgical processes, and many more. The data gathered from Dustroid® can assist in dust suppression automation, for instance, to activate suppressants at the location once the threshold is breached.





## Product Features

 **Heated Inlet**  
Dehumidifies the sample to nullify the effect of humidity for better accuracy.  
*(only available in Pro variant)*


 **Weather Resistant**  
IP66 Grade (certified) enclosure for endurance against harsh weather conditions.

 **Retrofit Design**  
Plug and play design for ease of implementation.


 **Over-The-Air Update**  
Automatically upgradeable from a central server without any onsite visit.


 **Compact**  
Light-weight and compact system that can be installed at 12-15 feet (4-5 m) height.

 **Real-Time Data**  
Continuous monitoring and real-time data transfer at configurable intervals.

 **Internal Storage**  
Internal data storage capacity of upto 8 GB or 90 days.

 **Network Agnostic**  
Supports a wide range of connectivity options like GSM / GPRS / WiFi / LoRa / NBloT / Ethernet / Modbus.

 **Identity And Configuration**  
Each equipment carries its unique identity with geo-tagging through wireless configuration.

 **On-device Calibration**  
On-site device calibration capability using on-device calibration software.

# Key Benefits



## Robust And Rugged

Robustly built enclosure to sustain extreme climatic conditions.



## Multiparameter Capability

Provision to add gas sensors to existing Dustroid Units.



## Noise-monitoring provision

Critical applications can utilise Dustroid with Noise Sensor to understand decibel trends.



## Easy to install

Effortless installation with versatile mounting arrangements.



## Accurate Data

Gives accurate readings in real-time to detect dust concentrations in ambient air.



## Relay-Based Automation

Dust Suppression systems such as Mist Cannons can be activated based on data thresholds configured.

# Dustroid® Usecases



## Sea Ports

Dust pollution at ports from harbour activities like ship movement, loading-unloading of goods can be reduced by taking timely actions by authorities.



## Construction

Dustroid can be installed at construction sites to alert authorities when dust pollution breaches the threshold limit.



## Mining And Quarrying

Dustroid ensures that effective alerts are deliverable to the authorities and the triggers automate the dust suppression systems on time.



## Public Spaces

Dustroid can help solve various problems of public spaces by generating historical data reports and trends on air pollution levels.

# Dustroid® Variants

Variants	Applications	Parameters
Dustroid® Smart	Urban monitoring and research	PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> , PM <sub>100</sub> (TSP), Temperature, Humidity, Pressure
Dustroid® Pro <i>(with heated inlet)</i>	Mining, construction, industrial monitoring (for high humidity regions)	PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> , PM <sub>100</sub> (TSP), Temperature, Humidity, Pressure
Dustroid® Custom	As per request	Choice of PM type, Light, UV and Noise

## Parameters

Sensor	ID	Range	Resolution	Min. Detection	Working Principle	Expected Sensor Life
Suspended Particulate Matters with size less than 2.5µ (PM <sub>2.5</sub> )	OZPM_1	Upto 5000 µg/m <sup>3</sup>	0.1 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	Optical Particle Counter	5000 hours
Suspended Particulate Matters with size less than 10µ (PM <sub>10</sub> )						
Ultra Fine Particulate Matters with size less than 1µ (PM <sub>1</sub> )						
Total Suspended Particulates (TSP) (PM <sub>100</sub> )		Upto 30 mg/m <sup>3</sup>				
Ambient Noise	OZN_1	Upto 140 dB	1 dB	0.5 dB	Capacitive	2 years
Temperature	OZTEMP_1	-40 to 125°C	0.01°C	-40 °C	Solid State Semiconductor Sensing	
Humidity	OZHUM_1	100% Rh	0.10%	0.10%		
Barometric Pressure	OZPRES_1	300-1100 hPa	0.18 Pa	300 hPa		
Light Intensity	OZUV_1	Up to 1,00,000 Lux	1 Lux	1 Lux	Photoconductivity	3 Years
UV Radiation		0.1-100,000 uW/cm <sup>2</sup>	0.1 uW/cm <sup>2</sup>	0.1 uW/cm <sup>2</sup>		
Visible Light Intensity		Up to 5000 Lux	0.1 Lux	0.1 Lux		

### External Modules



**Anemometer**  
OZWSD\_1  
**Wind Speed:** 0-40 m/s  
**Wind Direction:** 0-359°  
**Working Principle:** Ultrasonic



**Rain Gauge**  
OZRAIN\_1  
**Resolution:** 0.25 mm  
**Working Principle:** Tipping Bucket

# Specifications

## Mechanical

Size	360mm (H) x 328mm (W) x 200mm (D)
Weight	6.5 Kg (instrument weight)
Material	Aluminum Magnesium Alloy, Mild-steel (With Powder Coating), FRP
Certifications	CE, NEMA 4X, IP66, RoHS

## Electrical

Avg. Power Consumption	5 Watt (Actual consumption depends upon the number of parameters)
Power Input Options	AC : External 110-240V AC, 50-60Hz DC : Uninterrupted 24V DC, 2 Ampere 60 Watt 24V Solar Panel
SMPS Specs	24V, 2Amps output UL-62368 & CAN/CSA C22.2 Certified
Battery Backup Time	Upto 12 Hours (Not available in Pro variant)
Battery Specs	Lithium iron phosphate (LiFePO4) battery cell with rated voltage 12.8V Capacity 6Ah

## Technical

Processor	Quad Core ARM Cortex
Memory	2GB RAM / 8GB eMMC ROM
Device Interface	On-device Software / API / Cloud Platform
Internal Data Storage	Upto 8 GB or 90 days

## Environmental

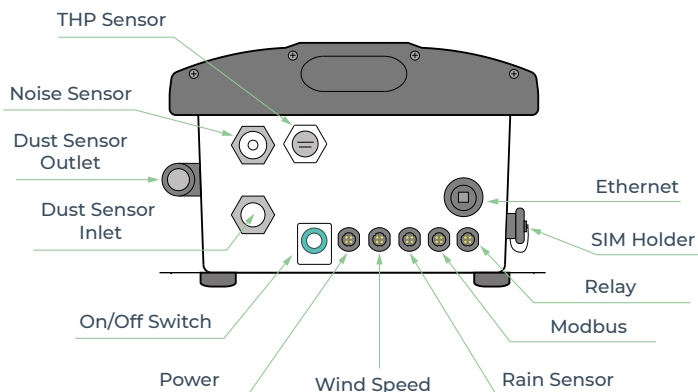
Operating Temperature	-20 °C to 60 °C
Operating Humidity	0-93% RH
Recommended Humidity	15-90% RH
Storage Conditions	10 - 40°C










## Sensing

Dust Measurement Principle	Active Sampling with Sampling rate of 1 L / min
Warm up time	< 2 minutes for data stabilisation

## Communication

Data Interval	2-30 (configurable) minutes
Data-push Protocol	HTTP post request to host server
Data-pull	HTTP request on device IP
Firmware Updates	Over-The-Air Firmware Update
Standby Connectivity	GSM (2G/3G/4G) for remote diagnosis, FOTA updates, and cloud calibration
Certification	PTCRB, CE, FCC, RoHS, ICASA, GCF

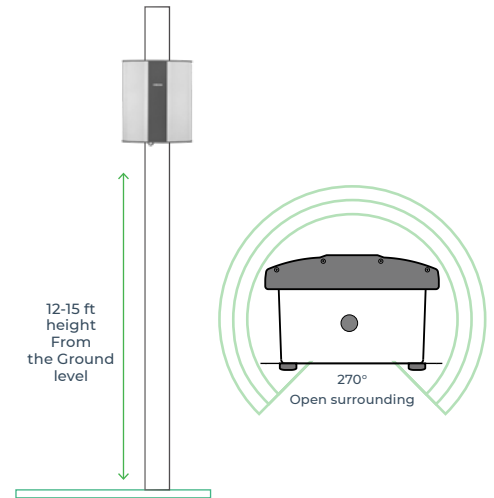


Connectivity Options		Specification
Wireless	 GSM	Global 2G / 3G / 4G
	 LoRa	868 MHz / 915 MHz
	 LTE	CAT-M1
	 NB-IoT	CAT-NB1
	 sigfox	868 to 869 MHz, 902 to 928 MHz
	 WiFi	AP Mode and Station Mode
Wired	 ETHERNET	Static / DHCP Configuration
	 Modbus	RS485 RTU / TCP
	 RELAY	2 Channel Relay

# Functional Specifications

Proper location selection is critical for optimized data collection. It varies as per the purpose of the project. According to USEPA QA handbook (Vol II, Section 6.0 Rev.1), the selection of locations should be based on monitoring purposes.

Preferred Mounting	Pole / Wall (preferably 270° open surrounding)
Installation Height	12-15 feet (4-5 meters)
Direction	As per maximum direct sunlight exposure
Power Availability	Constant AC / DC supply within a 2-meter range from the unit or solar panel
Network Availability	Uninterrupted network connection



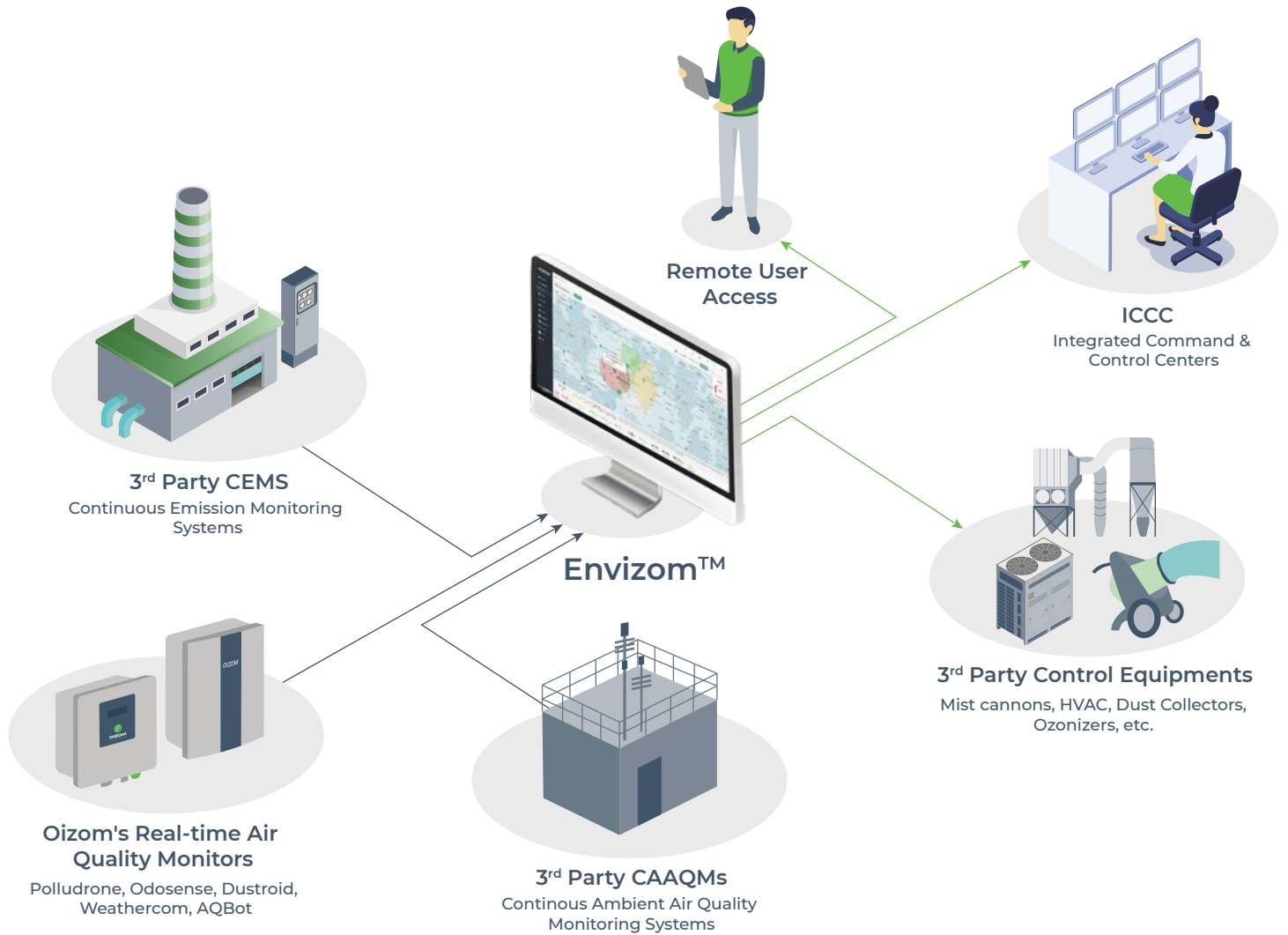
# Data and Calibration

## Collocation Calibration

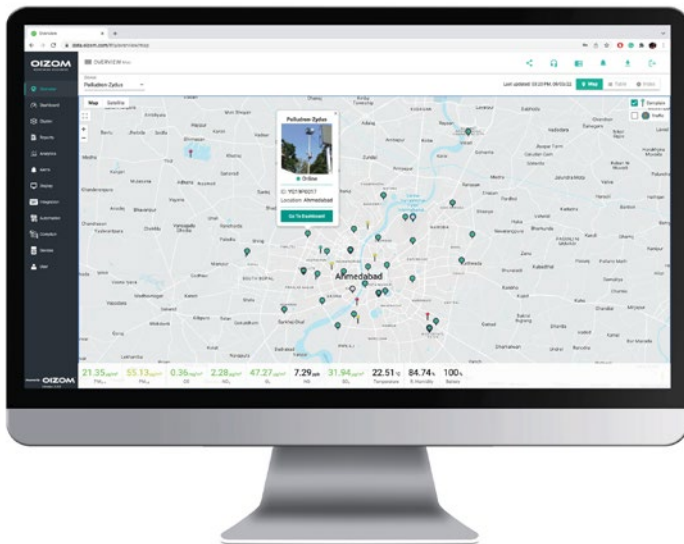
The monitors are operated adjacent to a custom built reference station housing U.S. EPA designated Federal Equivalent Method (FEM) for collocation calibration to ensure optimum data quality.



# Solution Architecture

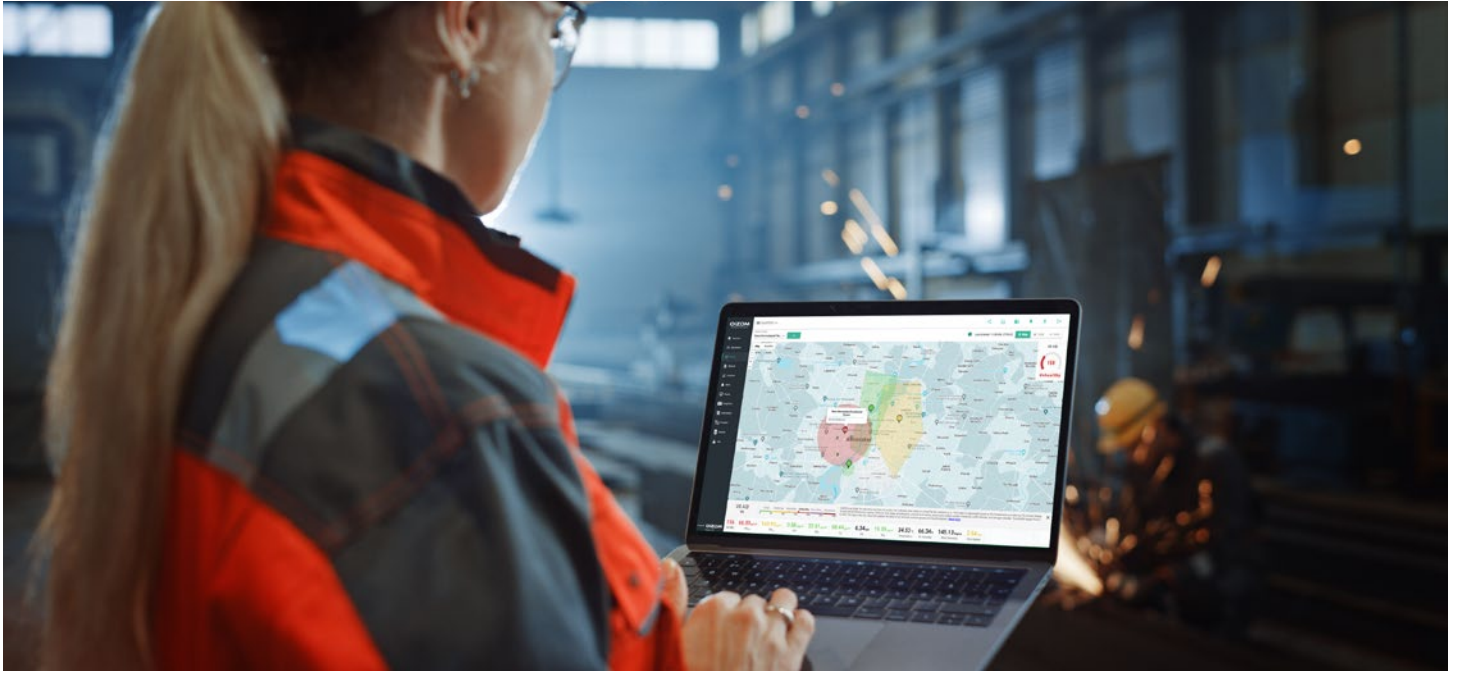


## Envizom™ Air Quality Software



An on-device data software enables users to access the data, configure networks and sensors without any dependency on the internet. Users can also connect their smart devices to Dustroid and view real-time data, perform on-site calibration, change network configuration, and change sensor configuration.

# Envizom™ Features



Real-time data



Smart alerts



User friendly interface



Easy to Set Up



One click share



Data accessibility

## Privacy First Platform



### Data Privacy

The data shared with the client uses an encryption server through HTTPS Secure Socket layers. Envizom™ also uses AES encryption for connection that adds to data safety.



### Data Ownership

Envizom™ creates a secured and encrypted password combination for the user login. Oizom® ensures 100% privacy of the data and doesn't share without relevant permissions.



### Data Transparency

Data collected from Oizom® equipment runs through the Environment Data Interpretation Engine. It processes various algorithms and eliminates environmental impact interferences on the sensors.



# Case Studies



## Ensuring Workers' safety by dust monitoring in the Red Sea Airport

Oizom installed Dustroid to monitor the dust levels and warn the authorities in case of sandstorms in Saudi Arabia's Red Sea Development luxury project.



Saudi Arabia



September 2020



Airports

## City air quality monitoring at Sydney, Australia

Oizom deployed Ambient dust monitors with the help of the local city council in Sydney metropolitan in Australia to monitor the city air quality.



Australia



May 2021



Smart City



## Monitoring dust for one of the largest coal mines in the world

Oizom is monitoring the Dust and other air pollutant emissions from one of the largest Coal mines in the world, in Singrauli, India.



India



March 2021



Mining And Quarrying



# Case Studies



## Construction site monitoring at Singapore

Oizom provided real-time dust monitoring systems for a renovation project of a primary school in Singapore. Meanwhile, Chan & Chan Engineering was the contractor for this project.



Singapore



August 2021



Fenceline

## Dust Monitoring at JCB manufacturing plant

Oizom deployed Particulate Sensor Dustroid to monitor real-time dust generation within the JCB manufacturing plant and activate the air purifiers.



India



January 2019



Industrial  
EHS



## Monitoring air pollution at a Cement Factory in India

High levels of  $PM_{10}$  and  $PM_{2.5}$  were rapidly degrading the air quality of Agra city. Oizom helped in monitoring the air quality by installing Polludrones all across the city.



India



August 2019



Smart City



# About Oizom®



Leaders in sensor based  
air quality monitoring



Plug and play monitors  
for hassle free setup



Low powered solutions  
for multiple applications

Oizom® is an environmental IoT company offering data-driven environmental solutions for better decision-making. With our sensor-based hardware, we monitor various environmental parameters like air quality, noise, odour, radiation, weather conditions, etc. Our data analytics platform derives many actionable insights for authorities, communities, and industries. Oizom® strives to play an essential role in a sustainable future through smart environmental solutions and data science.

Oizom® has years of experience in stimulating innovation by creating groundbreaking technology for environmental monitoring. With an IoT-based development approach, Oizom® has been able to successfully unlock multiple solutions, catering to various industries.

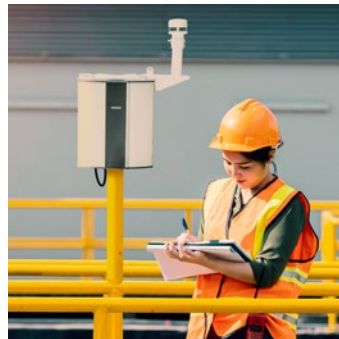
## Other Oizom® Products



### Polludrone®

Ambient Air Quality Monitoring

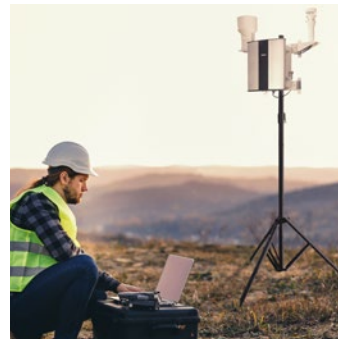
Polludrone® is ideal for real-time ambient air quality monitoring for urban and industrial applications.



### Odosense®

Odour Monitoring System

Odosense® monitors various odourful and toxic gases in the environment and provides insight into odour dispersion.



### Weathercom®

Automatic Weather Station

Weathercom® is an automatic weather station designed to measure various meteorological parameters.



### AQBot™

Single Parameter Air Quality Monitor

AQBot™ is an industrial grade single parameter air quality monitor with automation capabilities.





Trusted by

**60+ Countries**



Solutions Installed in

**65+ Cities**



Total Devices Installed

**1000+**



Total Population Covered

**200 million+**

## Global Presence



**Accurate Air Quality Monitoring And Advanced Data Analytics**



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