

# SCENTROID

## DR1000 FLYING LAB.

Product Brochure



## **Letter from Scentroid's CEO**

Scentroid's mission is to empower our clients with vast in-depth knowledge, state-of-the-art instruments, and the most extensive customer support. To this end, we strive in every aspect of our operation to put our client first and to use our research expertise to develop the most innovative and effective products and services in the sensory industry. We envision a future where environmental impacts will be easily and accurately measured and mitigated.



**Dr. Ardevan Bakhtari**  
CEO, Scentroid

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# INTRODUCING THE DR1000



The Scentroid DR1000 flying laboratory provides continuous monitoring of multiple chemicals. While in flight, five built-in chemical sensors can provide remote monitoring of chemicals selected at the time of ordering. The Scentroid DR1000 can be used to sample and analyze ambient air at heights of up to 150 meters above ground level that was previously impossible to accomplish. Air quality mapping, model ver-

ification, and analysis of potentially dangerous sites are all made possible! While in flight, five built-in chemical sensors can provide remote monitoring of chemicals selected at the time of ordering. It is often necessary to sample stacks, ponds, and other location where human access is difficult and/or dangerous. Furthermore, operator exposure to dangerous chemicals during sampling must be carefully consid-

ered. The Scentroid DR1000 flying laboratory allows the operator to stay safely away from potentially hazardous sources while acquiring the required air sample for laboratory analysis.

Please contact us for any questions or clarifications at [info@scentroid.com](mailto:info@scentroid.com) OR call us at +1.416.479.0078



# DR1000 OVERVIEW



## Intelligent Flying Air Quality Monitoring Laboratory

The DR1000 measures gases using up to 6 sensors selected based on application from a list of more than 40 possible sensors. These sensors can detect pollutants such as H2S, NO2, SO2, VOC, CL2, PM1-10, and many other compounds. The DR1000 analyzes data continuously while in flight at a rate of more than 100 samples per second, and sends it back to the ground station us-

ing long range radio transmission (LORA) and to the dedicated cloud server over 3G wireless network. The data is automatically stamped with GPS position, latitude, time, date, humidity, and temperature. This data can be used for numerous applications using DR1000's GIS software or any other mapping software such as ArcGIS. The Scentroid DR1000 flying laboratory can

also provide continuous monitoring of PM 1, 2.5 and 10 using a laser scattered particulate counter. The particulate monitoring can be installed in addition to the 6 chemical sensors for complete ambient air quality assessment.

## Included With DR1000:

DR 1000 Analyzer  
Ground Station Receiver  
Ground Station (Laptop)  
Carbon Fibre Probe  
GPS, GSM, and LORA antennas  
Charge adapter  
Extra batteries and wall charger (optional)

# Endless Applications

The DR1000 Flying laboratory provides a robust platform to conduct impact assessment and air quality measurement for a wide range of applications including monitoring of: fugitive emissions, flare emissions, leak detection along oil pipe lines, landfill methane, odour emissions and much more!

A thermal imaging camera can also be installed for visual confirmation of fugitive emissions in a variety of applications such as landfills, storage tanks, and oil/gas pipes.

## Recommended Drones

DR1000 is completely self-contained and requires nothing from the attached drone except to operate as a vehicle. DR1000 can be attached to any rotary wing or fixed wing drone with payload capabilities of 3 kg. An example of commonly used drones are DJI S1000 and DJI MATRICE 600.





# Specifications

**Product name** DR1000 Flying Laboratory

**Maximum # of sensors** 6

**Type of sensors** PID, NDIR, EC, Laser Particulate counter, and MOS

**Sampling rate** Adjustable from 1/s to 1/m

**# of sampling ports** 5 Seconds per litre, time based off of sampling bag size

**Weight** 3410g

**Size** 26 cm x 16 cm x 18 cm

**Max. operating time** 2.5 hours with a full battery charge

**Time in flight** Varies per drone type/batter life

**Communication** 3G / 4G (default) WiFi

**On-board data storage** 64GB - SD Card

**Cloud server** Included by Default

**Local server** Optional

**On-Board server** Included by Default

**Software** Free access to DRIMS (Drone Information Management System) for the life of the product

**Temperature range** 0 °C to + 60 °C user will receive warning at 55 °C

**Calibration** Automatic and Optional, using built in calibration gas. User can initiate calibration with ground station

**Warranty** 24 months full warranty to all parts including sensors

**Sensor replacement frequency** Sensor dependent - first 2 years covered by warranty

**Ground station** Specialized laptop with pre-installed Ubuntu and Windows 10 operating system, high gain powerful WiFi antenna, and DRIMS 2.0 software

**Mounting hardware** Customized mounting hardware based off of drone

# Scentroid Sensor List

| #  | Sensor ID | Type | Formula          | Chemical                                      | Max. Detection Limit  | Lowest Detection Threshold | Resolution | Cross sensitivity |                  | Industry  | Expected Life (years) | Warmup Time (Sec) | Response Time (Sec) |
|----|-----------|------|------------------|---|-----------------------|----------------------------|------------|-------------------|------------------|---|-----------------------|-------------------|---------------------|
|    |           |      |                  |   |                       |                            |            | Required          | Recommended      |   |                       |                   |                     |
| 1  | CD1       | NDIR | CO2              | Carbon Dioxide - High Concentration           | 5%                    | 100 ppm                    | 20 ppm     | –                 | –                | Safety/Combustion/process control               | 1                     | 120               | 120                 |
| 2  | CD2       | NDIR | CO2              | Carbon Dioxide - Low Concentration            | 2000 ppm              | 1 ppm                      | 0.6 ppm    | –                 | –                | Urban, Industrial, IAQ                          | 1                     | 120               | 120                 |
| 3  | CM1       | EC   | CO               | Carbon Monoxide (Low Concentration)           | 100 ppm               | 0.03 ppm                   | 0.01 ppm   |                   | H2, C2H4         | Urban, Industrial, IAQ                          | 2                     | 40                | 40                  |
| 4  | CM3       | EC   | CO               | Carbon Monoxide (Medium Concentration)        | 1000 ppm              | 1 ppm                      | 1 ppm      | –                 | –                | Urban, Industrial, IAQ                          | 5                     | 40                | 20                  |
| 5  | CM2       | EC   | CO               | Carbon Monoxide (high concentration)          | 10000 ppm             | 30 ppm                     | 3 ppm      | –                 | –                | Safety/Combustion/process control               | 2                     | 45                | 40                  |
| 6  | CL2       | EC   | CL2              | Chlorine (High Concentration)                 | 2000                  | 1 ppm                      | 1 ppm      | NO2               | BR2              | Safety/Combustion/process control               | 2                     | 45                | 40                  |
| 7  | CL1       | EC   | Cl2              | Chlorine (Low Concentration)                  | 10 ppm                | 0.05 ppm                   | 0.01 ppm   | NO2               | NO2              | Industrial, Safety                              | 2                     | 120               | 60                  |
| 8  | H1        | EC   | H2               | Hydrogen                                      | 10000 ppm             | 100 ppm                    | 10 ppm     |                   | CO               | Industrial, Safety, IAQ                         | 2                     | 120               | 40                  |
| 9  | HCL1      | EC   | HCl              | Hydrogen Chloride                             | 20 ppm                | 0.5 ppm                    | 0.2 ppm    | H2S               | HBr              | Industrial, Safety                              | 2                     | 120               | 60                  |
| 10 | HCY1      | EC   | HCN              | Hydrogen Cyanide                              | 50 ppm                | 0.1 ppm                    | 0.1 ppm    | H2S, NO2, SO2     | –                | Industrial, Safety                              | 2                     | 120               | 30                  |
| 11 | PH1       | EC   | PH3              | Phosphine (low Concentration)                 | 5 ppm                 | 50 ppb                     | 30 ppb     | NO2               | SO2, H2S         | Industrial, safety                              | 2                     | 60                | 20                  |
| 12 | PH2       | EC   | PH3              | Phosphine (high Concentration)                | 2000 ppm              | 5 ppm                      | 2 ppm      | NO2               | SO2, H2S         | Industrial, safety                              | 2                     | 60                | 25                  |
| 13 | HS1       | EC   | H2S              | Hydrogen Sulfide (low Concentration - ppb)    | 3 ppm                 | 7 ppb                      | 1 ppb      | –                 | –                | WWTP, Odour, IAQ, Urban, Industrial             | 1                     | 180               | 35                  |
| 14 | HS2       | EC   | H2S              | Hydrogen Sulfide (high Concentration - ppm)   | 2000 ppm              | 15 ppm                     | 2 ppm      | –                 | –                | Safety, WWTP                                    | 2                     | 180               | 25                  |
| 15 | HS3       | EC   | H2S              | Hydrogen Sulfide (medium Concentration - ppm) | 200 ppm               | 2 ppm                      | 0.2 ppm    | –                 | –                | Safety, WWTP                                    | 2                     | 180               | 60                  |
| 16 | E2        | MOS  | C2H6O, H2, C4H10 | Organic solvents (Ethanol, Iso-Butane, H2)    | 500 ppm               | 25 ppm                     | 1 ppm      | –                 | Benzines <20%    | Industrial, Odour, Compost                      | 1                     | 30                | 10                  |
| 17 | MT1       | NDIR | CH4              | Methane (LEL)                                 | 20,000 ppm            | 10 ppm                     | 10 ppm     | –                 | Propane          | Safety/Combustion/inprocess control, Industrial | >3 years              | 45                | 12                  |
| 18 | NC1       | EC   | NO               | Nitric Oxide (Low Concentration)              | 1 ppm                 | 0.01 ppm                   | 0.001 ppm  | –                 | –                | Urban, IAQ, Industrial                          | 2                     | 120               | 60                  |
| 19 | NC2       | EC   | NO               | Nitric Oxide (Medium Concentration)           | 25 ppm                | 0.2 ppm                    | 0.1 ppm    | –                 | –                | Urban, IAQ, Industrial                          | 2                     | 120               | 60                  |
| 20 | NC3       | EC   | NO               | Nitric Oxide (High Concentration)             | 5000 ppm              | 2 ppm                      | 2 ppm      | –                 | –                | Industrial, safety, Process control             | 3                     | 120               | 10                  |
| 21 | ND1       | EC   | NO2              | Nitrogen Dioxide (Low Concentration)          | 1 ppm                 | 0.01                       | 0.001 ppm  | –                 | –                | Urban, IAQ, Industrial                          | >5 years              | 120               | 60                  |
| 22 | ND2       | EC   | NO2              | Nitrogen Dioxide (Med Concentration)          | 20 ppm                | 0.1 ppm                    | 0.1 ppm    | –                 | –                | Urban, IAQ, Industrial                          | >5 years              | 120               | 60                  |
| 23 | ND3       | EC   | NO2              | Nitrogen Dioxide (high Concentration)         | 1000 ppm              | 2 ppm                      | 1 ppm      | –                 | –                | Industrial, safety, Process control             | 2                     | 120               | 60                  |
| 24 | NS1       | NDIR | N2O              | Nitrous Oxide                                 | 10,000 ppm            | 100 ppm                    | 1 ppm      | –                 | Negligible       | Urban, Industrial, Process control              | 5                     | 30                | 30                  |
| 25 | O2        | EC   | O2               | Oxygen (high Concentration)                   | 250,000 ppm           | 5000 ppm                   | 200 ppm    | –                 | –                | Process control, Safety                         | 1                     | 60                | 15                  |
| 26 | PD3       | PID  | VOCs             | Total VOCs 10.0 eV                            | 100 ppm               | 5 ppb                      | 5 ppb%     | –                 | Aromatic Carbons | WWTP, Odour, IAQ, Urban, Industrial             | 5*                    | 5                 | 3                   |
| 27 | PD1       | PID  | VOCs             | Total VOCs (Low Concentration) - PID 10.7 eV  | 50 ppm (isobutylene)  | 1 ppb                      | 1 ppb      | –                 | All VOCs         | WWTP, Odour, IAQ, Urban, Industrial             | 5*                    | 5                 | 3                   |
| 28 | PD2       | PID  | VOCs             | Total VOCs (High Concentration) - PID 10.7 eV | 300 ppm (isobutylene) | 1 ppm                      | 50 ppb     | –                 | All VOCs         | Safety, Industrial                              | 5*                    | 5                 | 3                   |

| #  | Sensor ID | Type           | Formula        | Chemical  | Max. Detection Limit    | Lowest Detection Threshold | Resolution           | Cross sensitivity |  | Industry                                     | Expected Life (years) | Warmup Time (Sec) | Response Time (Sec) |
|----|-----------|----------------|----------------|---|-------------------------|----------------------------|----------------------|-------------------|--|--|-----------------------|-------------------|---------------------|
|    |           |                |                |   |                         |                            |                      | Required          | Recommended  |  |                       |                   |                     |
| 29 | SD1       | EC             | SO2            | Sulfur Dioxide (high Concentration)               | 2000 ppm                | 2 ppm                      | 1 ppm                | NO2               | -  | Safety, Industrial                           | 2                     | 120               | 25                  |
| 30 | SD2       | EC             | SO2            | Sulfur Dioxide (low Concentration)                | 1 ppm                   | 0.01 ppm                   | 0.001 ppm            | NO2               | -  | Urban, IAQ, Industrial                       | 2                     | 120               | 20                  |
| 31 | SD3       | EC             | SO2            | Sulfur Dioxide (medium Concentration)             | 100 ppm                 | 0.4 ppm                    | 0.2 ppm              | NO2               | -  | Urban, IAQ, Industrial                       | 2                     | 120               | 20                  |
| 32 | FM1       | EC             | CH2O           | Formaldehyde                                      | 5 ppm                   | 10 ppb                     | 10 ppb               | -                 | Ethanol  | IAQ, Safety, Industrial,                     | 2                     | 180               | 60                  |
| 33 | PM 2.5-10 | Laser Scattere | PM             | Particulate PM 2.5, 10 (simultaneous)             | 1000 µg/m3              | 1 µg/m3                    | 1 µg/m3              | -                 | NA   | Urban, IAQ, Industrial                       | >5 years              | NA                | NA                  |
| 34 | TS1       | Laser Scattere | TSP            | TSP - PM Required                                 | 20000 µg/m3             | 1 µg/m3                    | 1 µg/m3              | -                 | NA   | Urban, IAQ, Industrial                       | >5 years              | NA                | NA                  |
| 35 | NMH       | EC             | NMHC           | Non-methane Hydrocarbon                           | 25 ppm                  | 0.1 ppm                    | 0.1 ppm              | -                 | NA   | Industrial, Process, Combustion              | 2                     | 180               | 55                  |
| 36 | MS2       | MOS            | TRS            | TRS and Amines                                    | 10 ppm                  | 10 ppb                     | 2 ppb                | -                 | Trimethyl Amine, Methyl Mercaptans, H2S, other amines and sulfur compounds | Odours, WWTP                                 | 1                     | 30                | 10                  |
| 37 | MS3       | MOS            | NH3-C2H6O-C7H8 | Air Contaminants (Ammonia, Ethanol,               | 30 ppm                  | 1 ppm                      | 4 ppb                | -                 | (ammonia, Ethanol, Toulene)  | Odours, WWTP, Industrial                     | 1                     | 30                | 10                  |
| 38 | AM2       | EC             | NH3            | Ammonia (High concentration)                      | 100 ppm                 | 3 ppm                      | 1 ppm                | CL2               | H2S, NO2   | Agricultural, Industrial                     | 2                     | 30                | 40                  |
| 39 | AM1       | EC             | NH3            | Ammonia (Low Concentration)                       | 10 ppm                  | 0.005 ppm                  | 0.001 ppm            | CL2               | H2S  | Agricultural, Industrial                     | 2                     | 30                | 50                  |
| 40 | OZ1       | EC             | O3             | Ozone (low Concentration)                         | 0.5 ppm                 | 1 ppb                      | 1 ppb                | CL2               | H2S, NO2   | Urban, Industrial                            | >5 years              | 60                | 30                  |
| 41 | OZ2       | EC             | O3             | Ozone (High Concentration)                        | 5 ppm                   | 20 ppb                     | 20 ppb               | CL2               | H2S, NO2   | Urban, Industrial                            | >5 years              | 60                | 30                  |
| 42 | RD1       | Geiger Counter | α-, β-, γ, X   | Radiation Monitor ( α-, β-, γ- and x- radiation ) | 1000 µSv / h            | 0.01 µSv / h               | 0.01 µSv / h         | -                 | -  | Mining, Industrial, Nuclear Energy, Security | >3 years              | 0                 | 0                   |
| 43 | CIO21     | EC             | CIO2           | Chlorine Dioxide                                  | 50 ppm                  | 0.01 ppm                   | 0.05 ppm             | -                 | CL2  | Odour, Industrial                            | 2                     | 180               | 60                  |
| 44 | CH4L      | TDLS           | CH4            | Methane - ppb                                     | 100 ppm                 | 0.4 ppm                    | 0.01 ppm             | -                 | -  | Greenhouse gases, industrial                 | 10+                   | 20                | 1                   |
| 45 | ET1       | EC             | C2H4           | Ethylene - Low Concentartion                      | 10                      | 0.05 ppm                   | 0.01 ppm             | CO                | -  | Greenhouse gases, industrial                 | 2                     | 120               | 30                  |
| 46 | ET2       | EC             | C2H4           | Ethylene - Medium Concentration                   | 200                     | 1 ppm                      | 0.5 ppm              | CO                | --   | Greenhouse gases, industrial                 | 2                     | 120               | 30                  |
| 47 | ET3       | EC             | C2H4           | Ethylene - High Concentration                     | 1500                    | 5 ppm                      | 2 ppm                | CO                | -  | Greenhouse gases, industrial                 | 2                     | 120               | 30                  |
| 48 | MM        | EC             | CH3SH          | Methyl Mercaptan                                  | 10 ppm                  | 0.05 ppm                   | 0.01 ppm             | H2S               |  | Odours, WWTP, Leak Detection, Industrial     | 2                     | 120               | 35                  |
| 49 | EMF       | EMF            | EMF            | Electro Magnetic Field                            | 200 mGauss              | 0.1 mGauss                 | 0.1 mGauss           | -                 | -  | Urban, Industrial, power plants              | 3                     | <1                | <1                  |
| 50 | CS        | EC             | CS2            | Carbon Disulfide                                  | 100 ppm                 | 1 ppm                      | 0.1 ppm              | -                 | -  | Odour, WWTP, Industrial                      | 2                     | 120               | 30                  |
| 51 | TBM       | EC             | C4H10S         | Tert Butylthiol                                   | 14 ppm                  | 0 ppm                      | 0.1 ppm              | -                 | -  | Odour, Leak detection, Industrial            | 2                     | 120               | 30                  |
| 52 | THT       | EC             | C4H8S          | Tetrahydrothiophene                               | 14 ppm                  | 0 ppm                      | 0.1 ppm              | -                 | -  | Odour, Leak detection, Industrial            | 2                     | 120               | 30                  |
| 53 | THT       | EC             | C4H8S          | Tetrahydrothiophene                               | 99.9 pCi/l (3,700Bq/m³) | 0.2 pCi/l (700Bq/m³)       | 0.2 pCi/l (350Bq/m³) | -                 | -  | IAQ, Safety, Industrial,                     | 2                     | 10                | <1                  |

For our most updated sensor list, please email us at [info@scentroid.com](mailto:info@scentroid.com), or visit us online at [www.scentroid.com](http://www.scentroid.com)



# DR1000 FEATURES



## Ground Station

The Ground station that is included with every DR1000 Flying Laboratory consists of a specialized laptop with pre-installed Ubuntu operating system, high gain powerful communication antenna, and DRIMS software. DRIMS (Drone Information Management Software) provides the user with means to control the flying laboratory and log all acquired data. DRIMS will provide

both live data as well as all historical data for all sensors plus GPS position, altitude, temperature, and humidity. The user can also command the drone when to take the sample, select the sampling interval, adjust sampling rate, and perform routine maintenance such as calibration of sensors. If an optional on-board camera is selected the video feed will also be sent to the ground

station for simultaneous viewing. The laptop will be dual boot and can be used for other work including GIS mapping, viewing flight path on Google Earth, data post processing, or any other task.

# DATA SERVER & COMMUNICATION

A photograph of a wooden desk setup. In the center, a person's hands are shown writing in a white notebook with a pen. To the right, a tablet displays a map with a green triangle marker and various data overlays, including a flight log with the number 111601. Above the tablet, a laptop keyboard is visible. To the left, there are stacks of papers and a small white cup of coffee on a saucer.

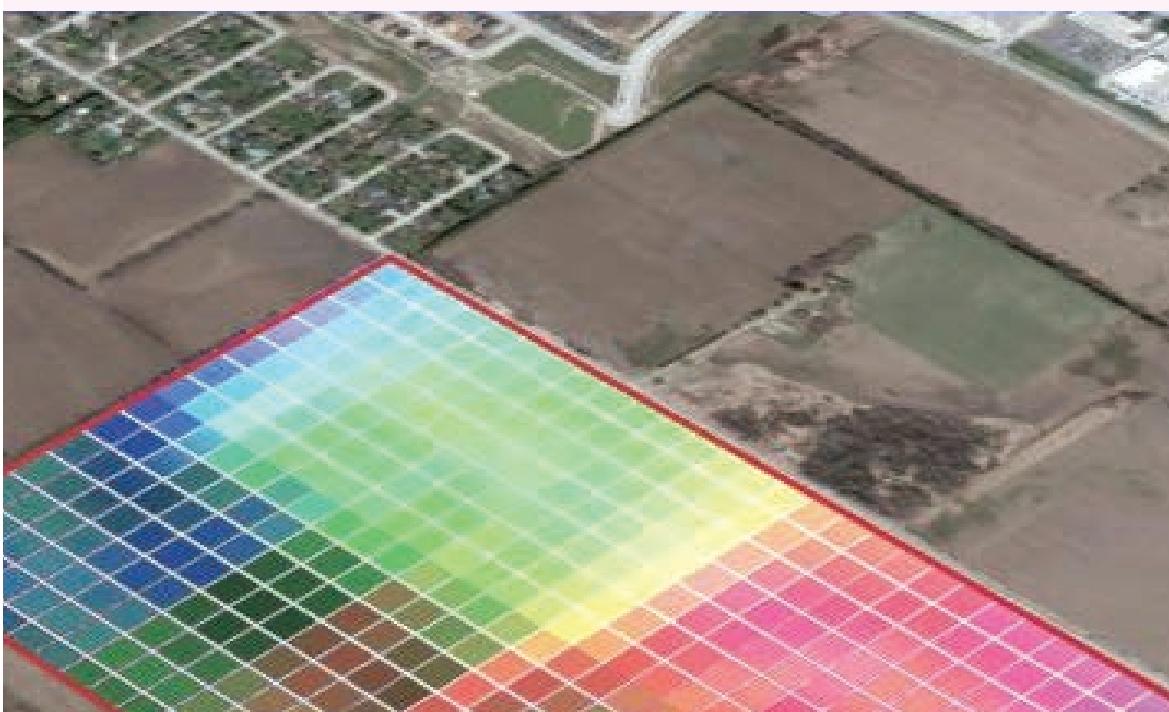
# Reliability

DR1000 provides 3 levels of data storage:

1. Storage of data on pre-installed SD card
2. Transmission and storage of data on the on ground station
3. Transmission and storage of data on the cloud/localized server

# Communication

DR1000 comes with simultaneous GPRS and WIFI communication capabilities. The GPRS is used to send data to Scentroid cloud server called Drone Information Management System (DRIMS). The secure online system will allow you to remotely monitor and even control the flying laboratory as well as store and process the data collected. The Drone also connects to the ground station using WIFI communication protocol. Both Ground station and Cloud based servers run DRIMS software and simultaneously can log data from multiple DR1000 drones.



# Cloud Based Hosting

The central monitoring station is hosted on a secure cloud-based server; allowing remote access with any smart device that is connected to the internet. The access is restricted, and the data is encrypted for maximum security. Users are given an identification and password combination which will define their permission level. For example, a standard user who accesses the platform is only able view and download the results, while a user with administrator access can reconfigure the system and redefine parameters.

The monitoring station is designed to collect all data from the sensors and present the sensor data in an easy to understand graphical interface.

## Local Server (Optional)

DR1000 can be configured so that the DRIMS (Drone Information Management System) software is hosted on a local server, specified by the user. This server must have adequate connection to a secure Wi-Fi or LAN network. Scentroid will provide all necessarily hardware and software to setup a local server. This option includes: Computer hardware, DRIMS software, Ethernet hub.

# Communication Protocols

### GPRS

DR1000, by default, comes with a GPRS module, allowing for wireless communication through existing cell towers. The communication is encrypted and sent to Scentroid's secured DRIMS cloud server. A local SIM card should be obtained by the user to facilitate this data transmission.

Transmitting data of 3G or 4G networks to Scentroid's server or a secured local server allows for a high speed internet connection. Scentroid will cover data charges for one year after purchase of the DR1000.



### RF Communication (LoRa)

Using license-free sub-gigahertz radio frequency bands, LoRa enables long-range transmissions (more than 10 km in rural areas) with low power consumption. The DR1000 uses LoRa communication to send information to the ground station and to receive settings and sampling commands.



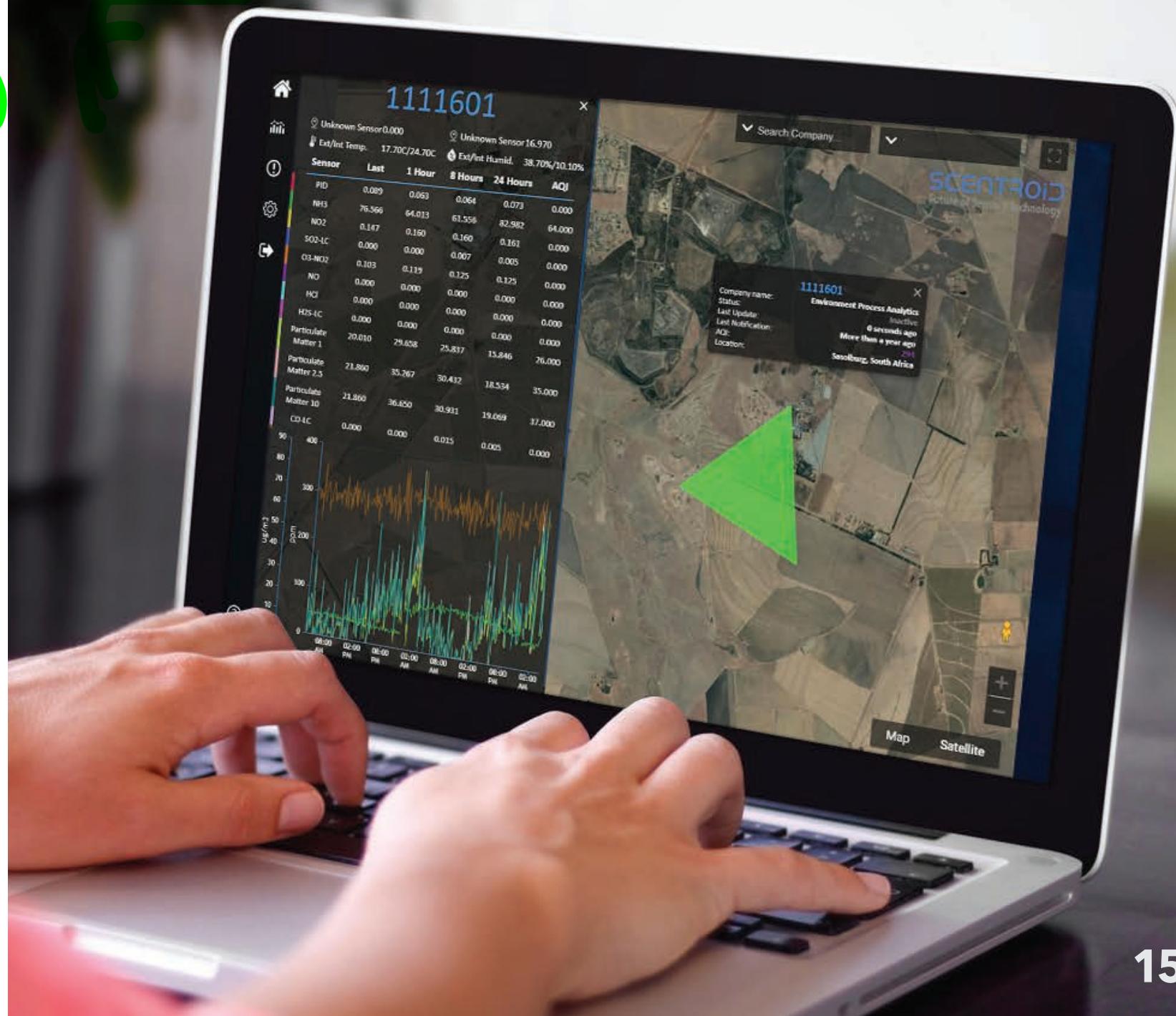
# Drone Information Management System (DRIMS)

Drone Information Management System, DRIMS, is an all-inclusive software, used to view historical data, run diagnostics, configure, and set alarm levels for DR1000. Provided as part of the DR1000 package, the software is installed on:

1. On-board server (default)
2. Scentroid's cloud-based server (default)
3. Client's localized server (optional).

DRIMS provides easy analysis tools for an operator to determine: pollutant hot spots, possible sources, sampled areas, and much more. The easy to use graphical interface makes allows anyone to run complicated data analytics without being a GIS expert.

DRIMS is capable of controlling and displaying data from multiple DR1000s in the same fleet. Users can analyze data and monitor progress of their entire DR1000 fleet remotely from a single platform.





# DR1000 APPLICATIONS

(INDUSTRIES AND RECOMMENDED SENSORS)

# Urban

Urban air pollution is a significant threat to human health and the quality of life of all people around the world. Minimizing urban air pollution not only serves as a healthy buffer for people in their everyday lives but also encourages reducing the emissions of harmful compounds. Scentinal is a perfect fit for air quality monitoring of the cities.

Recommended Sensors:

- Carbon Dioxide - (Low Concentration)
- Carbon Monoxide - (Low Concentration)
- Oxidizing Gases Ozone
- Nitric Oxide - NO (Low Concentration)
- Nitrogen Dioxide - (Low Concentration)
- Oxygen
- Total VOCs (ppb) - PID
- Sulfur Dioxide - (Low Concentration)
- Particulate PM 1, 2.5, 10 (Simultaneous)

# Odour

Environmental odour is among the highest sources of nuisance; festering the largest amount of complaints from residents. Environmental odour can be generated from a variety of industries including food processing, tobacco products manufacturing, chemical plants, paint plants, asphalt plants, pulp and paper, WWTP, and etc. Scentinal can be used to monitor odour emissions in order to help plants optimize processes and reduce odour impact.

Recommended Sensors:

- Ammonia
- Hydrogen Sulfide - (Low Concentration - ppb)
- Organic Solvents (Ethanol, Iso-Butane)
- Total VOCs (ppb) - PID
- General Purpose Odours (VOCs)
- TRS and Amines
- Air Contaminants (Ammonia, Ethanol, Toluene)





## Wastewater

One of the most prominent issues of concern from wastewater treatment plants (also known as sewage treatment plants) is odour. Many chemicals in these facilities generate odour; the majority are sulfur-based. At the start of the process H<sub>2</sub>S, DMS, and other sulfur compounds are abundant, while at the trailing end of the process (sludge processing), VOCs are more predominant. Recommended sensors include:

- Ammonia
- Hydrogen Sulfide - (Low Conc. ppb) (High Conc. ppm)
- Total VOCs (ppb) - PID
- TRS and Amines
- Air Contaminants (Ammonia, Ethanol, Toluene)

## Pipeline Leak Detection

Drones equipped with DR1000 can make offshore oil and gas operations safer and more efficient. For instance, the DR1000 can be used for monitoring of gas emissions from leaks within a pipeline, storage tanks and even stacks. To accomplish this, the DR1000 could be equipped with a fast response PID, H<sub>2</sub>S, NMHC, and SO<sub>2</sub> sensors. Aerial inspection can also result in early detection of leak, damage to structural abnormalities, piping and other external and internal inconsistencies. New technology and innovation for drones is making them more accessible than ever. The oil and natural gas industry has embraced this innovation, to help their efforts as good stewards of the environment. With drone operating costs dropping as technology improves, this tech is rising as the new eye in the sky for oil and natural gas producers.

- Ammonia
- Formaldehyde
- Organic Solvents (Ethanol, Iso-Butane, H<sub>2</sub>)
- Methane (LEL)
- Total VOCs (ppb, ppm) - PID
- Sulfur Dioxide
- Particulate PM 1, 2.5, 10 (Simultaneous)
- Air Contaminants (Ammonia, Ethanol, Toluene)

# Oil & Gas

Pollutant and Odour monitoring in the petrochemical and oil and gas industry is critical due to the number of hazardous air pollutants released in these processes. In-plant stack and ambient air monitoring allows the plant to not only ensure adherence to emission regulations and standards, but also to detect issues within the process such as tank leaks, loading spills, and other unexpected events.

Recommended Sensors:

- Carbon Dioxide - (Low Concentration)
- Carbon Monoxide - (Low Concentration)
- Chlorine
- Ethylene Oxide
- Hydrogen Sulfide
- Hydrogen Chloride
- Hydrogen Cyanide
- Ammonia
- Oxidizing Gases Ozone and Nitrogen Dioxide
- Phosphine - (Low Concentration)
- Phosphine - (High Concentration)
- Hydrogen Sulfide - (Low Concentration - ppb)
- Organic Solvents (Ethanol, Iso-Butane, H<sub>2</sub>)
- Methane (LEL)
- Nitric Oxide - NO (Low Concentration)
- Nitric Oxide - NO (High Concentration)
- Nitrogen Dioxide - (Low Concentration)
- Oxygen
- Total VOCs (ppb) - PID
- Total VOCs (ppm) - PID
- Sulfur Dioxide - (High Concentration)
- Sulfur Dioxide - (Low Concentration)
- Formaldehyde
- Particulate PM 1, 2.5, 10 (Simultaneous)
- Air Contaminants (Ammonia, Ethanol, Toluene)





## Agriculture

Agricultural facilities emit a wide array of pollutants that must be monitored. The majority of these pollutants are not hazardous but are odorous and therefore a source of nuisance. Scentinal can provide monitoring of both odour and pollutants in agricultural facilities. Recommended sensors include:

- Ammonia
- Carbon dioxide
- Methane
- Particulate PM 1, 2.5, 10 (Simultaneous)

## General Safety

Workers from many industries are exposed to multiple harmful gasses every day. These chemicals can lead to fatigue, respiratory decline, illness, and a general decrease in the overall quality of life. Industries need to monitor their air quality and ensure safety for their workers. Recommended sensors include:

- Carbon Dioxide - (High Concentration)
- Carbon Monoxide - (High Concentration)
- Chlorine
- Ethylene Oxide
- Hydrogen
- Hydrogen Chloride
- Hydrogen Cyanide
- Ammonia
- Oxidizing Gases Ozone and Nitrogen Dioxide
- Phosphine - (Low and High Concentration)
- Hydrogen Sulfide - (High Concentration - ppm)
- Methane (LEL)
- Nitric Oxide - NO (High Concentration)
- Nitrogen Dioxide - (High Concentration)
- Total VOCs (ppm) - PID
- Sulfur Dioxide - (High Concentration)
- Formaldehyde

# Compost

Workers in compost facilities are exposed to chemical and biological risks. Additionally, nearby neighborhoods may also be affected by the same contaminants. It is critical to monitor air quality in these type of facilities in order to ensure proper operation and uphold adherence to pertinent regulations. Recommended sensors include:

- Organic solvents (Ethanol, Iso-Butane)
- Hydrogen Sulfide
- Ammonia
- TRS and Amines
- Total VOCs - PID

# First Responders, Disaster Aid

Drones are starting to become a common piece of technology used in emergency situations and this is due to the various benefits they provide. Operators fly drones equipped with a Scentroid DR000 into an active area when they have the go-ahead from the Incident Commander to monitor hazardous gases from catastrophes. This allows first responders to have a complete picture of the entire affected area, a list of possible hazardous gases to be able to make informed decisions on actions to be taken and proper protective equipment to be used. The data can also be used to determine the areas that need to be evacuated and the urgency of the evacuation.

In the event of a wildfire or a controlled burn, information is critical for fire management and suppression. Drone equipped with a Scentroid DR1000 is a powerful tool to collect information both during and after a fire, helping the decision makers direct the firefighting activities. Scentroid's DR1000 has been used by several companies and universities, including University of California, Berkeley to monitor emissions from forest fires. These emissions can help create better models to predict the impact of the fire on air quality both locally and globally. The data can also be used to predict ground level impact up to 48 hours in the future to ensure proper measures such are taken to protect the safety of the public.

Recommended Sensors are:

CO, CO<sub>2</sub>, O<sub>3</sub>, NO<sub>2</sub>, NO, PM2.5, PM10, PM100 SO<sub>2</sub>, VOC, HF, HCl, Radiation, O<sub>3</sub>, NO





# INSTALLATION, MAINTENANCE

# Installation

The small form factor and small mass of the DR1000 makes it easy to transport and install. To install the DR1000, all that is required is to mount it on the specific drone being operated. The DR1000 is self powered and requires no connection to the actual drone being used, therefore any drone with a lift capacity of 3 kg will work with the DR1000. Typically used drones include the DJI Matrice 600 and S1000, however other drones, ground vehicles, and even hot air balloons have been used with the DR1000.

# Sensor Replacement

Sensors are under a comprehensive warranty for 24 months from the date of shipment. Additional warranty can be purchased to cover sensor replacement. Typical sensor life cycle depends on the type of sensor - generally this is between 1 to 5 years.

# Calibration

DR1000 provides a self calibration-check every time it is powered and will adjust zero calibration as required automatically, and requires minimal technical skills.



A photograph of a technical workshop or laboratory. Several people are working on various pieces of equipment. In the foreground, a person is working on a blue machine labeled "SCENTRIVAL". Another person is at a wooden workbench with a laptop, surrounded by mining rig components and tools. A yellow toolbox sits on the bench. In the background, more equipment and boxes are visible.

# AFTER-SALES SUPPORT

## Training

Training is the key of using any instrument, and Scentroid provides worldwide training programs for our clients and distributors. Training can be conducted by Scentroid or your local distributor. Scentroid training tools include: online training, videos, brochure, operation manual and on-site workshops. We also offer a hands-on training program using our high-tech simulation room. Scentroid's state of the art simulation room is located at our headquarters in Toronto, Canada. You are more than welcome to visit us and meet with the people behind these products

## Warranty

We are so confident of the reliability of our products, that we are glad to offer our clients a comprehensive 24 month warranty for every DR1000. Additionally, warranties can be extended for the 3rd, 4th and 5th year. For more information about our extended warranties, speak to us today.

## Technical Support

We are responsible for any products that exit from our manufacturing warehouse! Our support team offers different ways to help you. Choose the one most convenient for you below!



### Local Support

We have developed a vast growing network of distributors and repair facilities. To find your local support please check our distributors map.



### Phone Support

Our highly professional customer services are here to serve you, for any technical issue reach them easily via phone: 416.479.0078 - Ext 210



### SME Support

Connecting you to the Subject Matter Experts! Our customer support is unique in that you can talk directly to the designer or programmer of each product.



### Live Chat

If you feel more convenient to solve your technical issue via chat, No problem! Reach our highly professional customer services through our website-hosted Live Chat.



### Email Support

For any technical issue our engineers are happy to assist via email. For fast and efficient support, simply email our team at [support@scentroid.com](mailto:support@scentroid.com)

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