



APPLICATION ARTICLE

Real-Time VOC Detection at Airports

ION SENSE®



Pioneering Sensing Technology for a Safer Tomorrow.

Real-Time VOC Detection at Airports

Executive Summary

Modern airports are complex operational environments where millions of passengers, thousands of aircraft movements and large quantities of aviation fuel are managed every year. In addition to aircraft operations, airports contain fuel storage facilities, maintenance hangars, cargo terminals and hazardous material storage areas, all of which present potential sources of volatile organic compound (VOC) emissions.

Although many VOC emissions occur at relatively low concentrations, they can present significant safety, health and environmental risks if left undetected. Continuous VOC monitoring provides airport operators with early warning of fuel leaks, solvent emissions and hazardous vapours, allowing rapid intervention before they develop into more serious incidents.

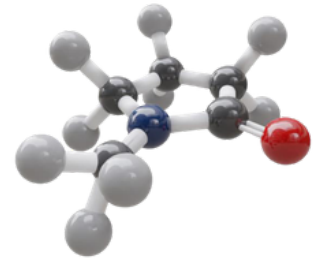
PID technology has become the preferred method for real-time VOC monitoring due to its rapid response, high sensitivity and ability to detect a broad range of volatile organic compounds using a single sensor.

Why VOC Monitoring Matters at Airports

Airports handle thousands of litres of aviation fuel every day while supporting aircraft maintenance, cargo logistics and ground operations. VOC monitoring plays a critical role in protecting personnel, infrastructure and the surrounding environment.

Continuous monitoring helps to:

- Detect fuel leaks before they become hazardous.
- Protect ground crews from exposure to harmful vapours.
- Reduce the risk of fire and explosion.
- Support environmental compliance and emissions reporting.
- Improve predictive maintenance by identifying equipment failures early.
- Minimise operational disruption caused by unexpected leaks.



Key Monitoring Applications

Aircraft Refuelling

Aircraft refuelling operations involve the transfer of Jet A-1 fuel through hydrant systems, bowzers and refuelling vehicles. Small leaks from couplings, hoses or valves may release hydrocarbon vapours that pose both safety and environmental risks.

Why Monitor VOCs?

- Detect fuel leaks before they become hazardous.
- Protect ground crews from exposure to harmful vapours.
- Reduce the risk of fire and explosion.
- Support environmental compliance and emissions reporting.
- Improve predictive maintenance by identifying equipment failures early.
- Minimise operational disruption caused by unexpected leaks.

Fuel Storage Facilities

Large airports often maintain substantial fuel farms with above ground or underground storage tanks connected by extensive pipeline networks.

Potential emission sources include:

- Tank breathing vents
- Loading pumps
- Transfer pipelines
- Valve assemblies
- Pump seals
- Flanges and pipe connections

Continuous monitoring enables maintenance teams to identify abnormal emissions before significant product losses occur.

Aircraft Maintenance Hangars

Maintenance facilities use numerous VOC-containing products, including cleaning solvents, adhesives, paints, coatings and degreasers.

Monitoring helps identify emissions from:

- Engine maintenance
- Composite repairs
- Fuel system servicing
- Paint booths
- Solvent cleaning stations
- Safety for wing tank entry

Maintaining good indoor air quality improves worker safety while supporting occupational exposure requirements.

Cargo and Dangerous Goods Handling

Air cargo terminals routinely process chemicals, pharmaceuticals, industrial products and hazardous materials. Damaged containers or accidental spills can release VOCs into enclosed workspaces.

Real-time monitoring provides an additional layer of protection by enabling early detection before personnel are exposed.

Airport Perimeter Monitoring

Many international airports operate continuous environmental monitoring stations around the airport boundary to assess air quality and fugitive VOC emissions from airport operations.

High-sensitivity PID sensors allow operators to monitor background VOC concentrations and identify emission trends over time, helping to protect people in surrounding communities by identifying changes in air quality and VOC emissions and supporting early action to minimise potential exposure.



Why Use PID Technology?

ION SENSE® PID sensors are designed for OEM integration into fixed and portable gas detection systems, combining a compact design, low power consumption and proven performance for demanding applications.

Unlike sensors designed to detect a single target gas, PID technology can detect hundreds of VOCs with rapid response times, making it particularly well suited to airport environments where multiple compounds may be present.

Key advantages include:

- Real-time measurements
- Detection from sub-ppb to thousands of ppm
- Fast response and recovery
- High sensitivity to aromatic and hydrocarbon VOCs
- Low power consumption
- Compact OEM integration
- Continuous monitoring capability



Application	Sensor	Benefits
Perimeter air quality monitoring	MiniPID 2 PPB XF & HS	Detects trace VOC emissions at ppb & ppm levels for environmental monitoring.
Aircraft refuelling	MiniPID 2 PPM	Wide measurement range suitable for higher hydrocarbon concentrations.
Fuel farms and storage tanks	MiniPID 2 PPM	Continuous monitoring of storage and transfer infrastructure.
Maintenance hangars	MiniPID 2 PPB XF & HS	High sensitivity for solvent and cleaning chemical monitoring.
Cargo inspection	MiniPID 2 PPB XF & HS	Early detection of VOCs released from damaged hazardous goods.

Conclusion

VOC monitoring is becoming an increasingly important element of airport safety and environmental management. From aircraft refuelling and fuel storage to maintenance facilities and perimeter monitoring, continuous PID-based VOC detection provides early warning of leaks, improves worker safety and supports compliance with environmental regulations.

By selecting the appropriate ION SENSE® PID sensor for each application, OEM manufacturers and system integrators can develop reliable monitoring systems that deliver accurate, real-time VOC measurements across the diverse operating environments found within modern airports.

Disclaimer

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