

Ambient Air Quality Monitoring



Photo by the courtesy of Mr. Werner Loosli, Zürich Airport Authority



Measurements of Aircraft Emissions

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For control of emissions in airports Opsis provides a fast system performing simultaneous monitoring of compounds emitted by the aircraft engines. Thus, the impact of aircraft take-offs and landings can easily be followed on-line. In addition Opsis lends itself to monitoring fugitive emissions, coming from the numerous activities within the airport.

A single system will simultaneously monitor all the compounds that cause concern. Continuously generated data is stored by the system's analyser, allowing information to be presented as averages for any user-defined interval – minutes, hours or days – either in real time or retrospectively.

Opsis will monitor any compound characterized in its software. In aircraft applications, this allows it to monitor for example nitric oxide (NO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), formaldehyde, benzene and toluene, 1,2,4-trimethylbenzene and other hydrocarbons. Several user-specified compounds may be monitored by one system.

The Opsis Technique

A basic Opsis system includes an analyser connected by a fibre optic cable to a light path created by a light emitter and a receiver. Several light paths may be run from a single analyser. Opsis may be permanently installed or operated from a mobile facility such as a specially equipped vehicle.

In either case the analyser will accept data from other devices producing a continuous 4–20 mA or a digital output. This allows information from meteorological sensors (wind strength and direction, temperature etc.) to be presented with air quality data to give a more detailed picture of environmental conditions.

Please refer to separate data sheets on the AR 500 series analyser, on the ER 110 and ER 150 light emitter and receiver sets for fixed systems and on the ER 130 for mobile systems.

Tests and Approvals

Opsis has been tested and approved by a number of internationally recognized institutes and authorities. The system meets the requirements of the U.S. EPA and the German authorities. Full details are available on request.

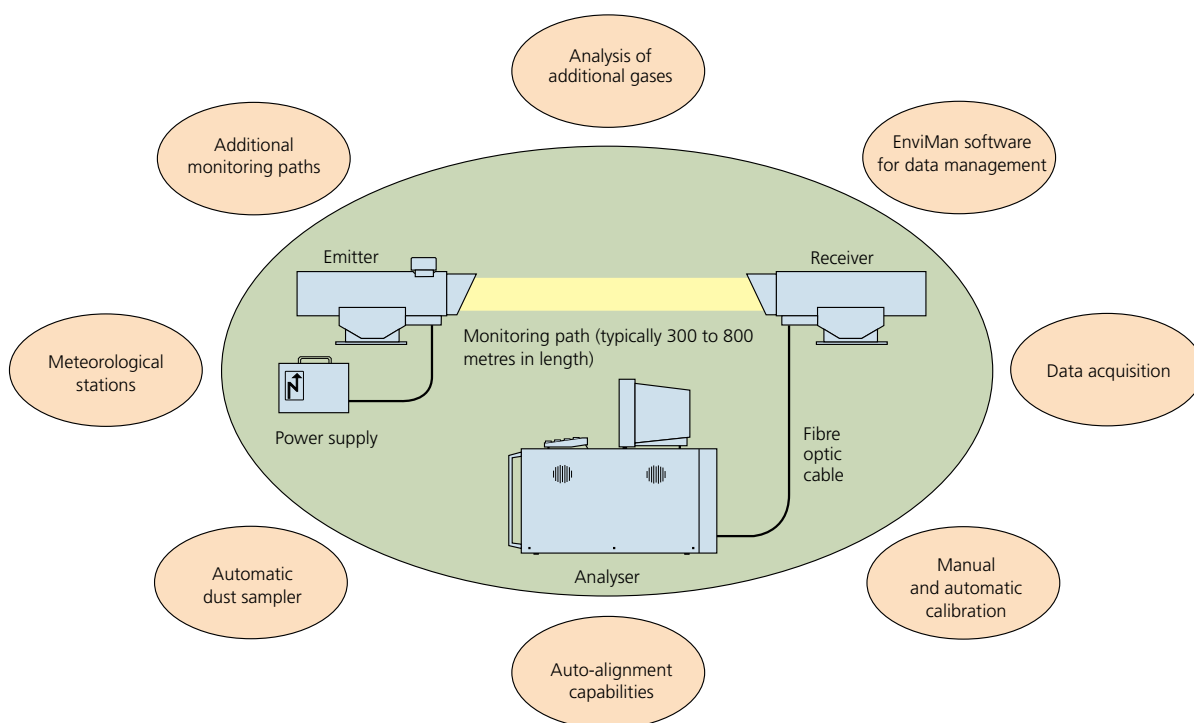
Opsis – the Total Monitoring Solution

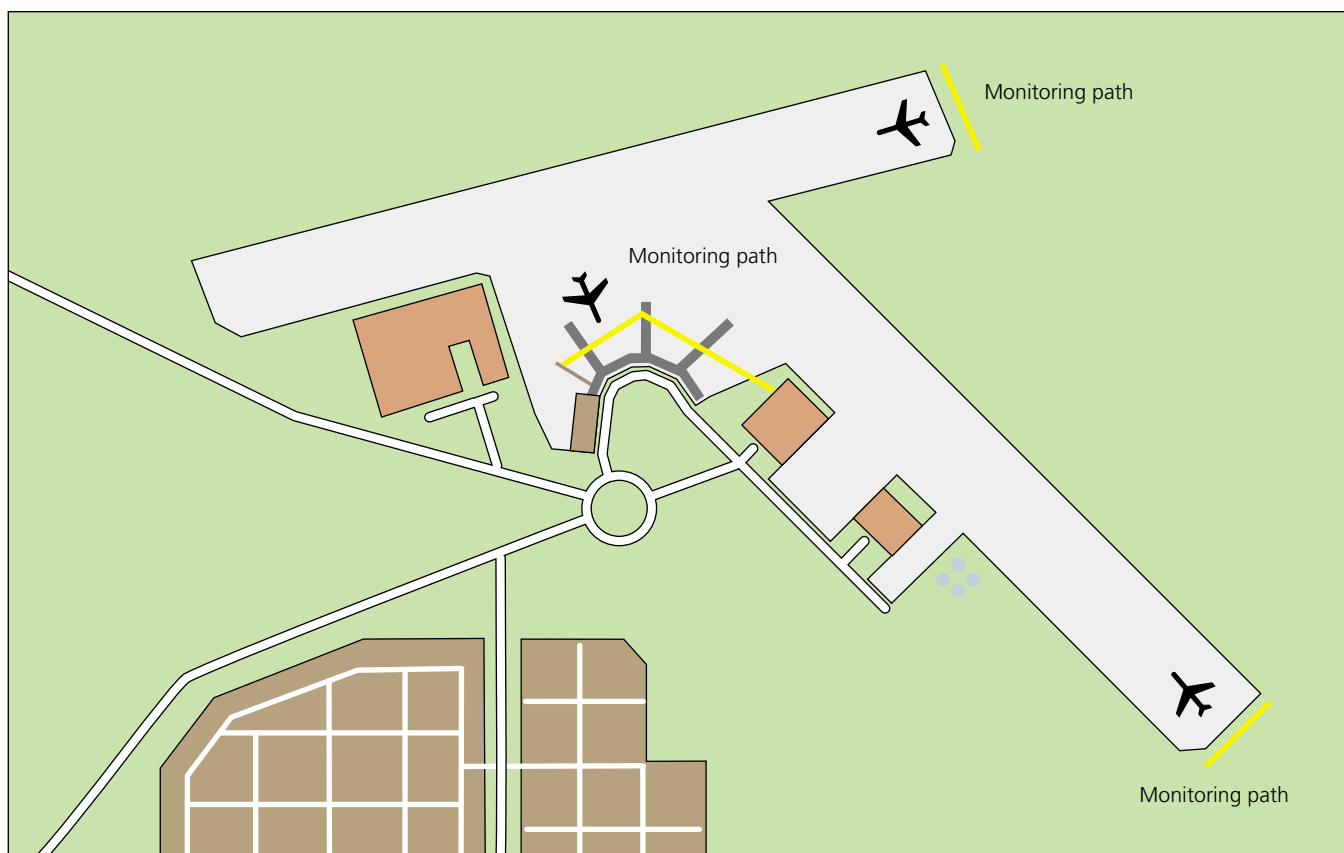
The Opsis long-path air quality monitoring system brings new standards of accuracy and data quality to environmental monitoring. Every minute, several thousand cubic metres of air interact with the light between the light source – the emitter – and the receiver. When captured by the receiver, this light contains information on gases in the air it has penetrated.

This information is extracted by spectrographic analysis. Results are logged as data that can be collected for further analysis by modem – from anywhere in the world.

Opsis offers the total monitoring solution including software for data management. In addition, Opsis offers dust monitors and conventional gas analysers.

Opsis technology is subject to a continual process of development. This, with the modular construction of Opsis systems, means that it is always possible to expand or update an installation without redundancy of viable equipment.





An Opolis system layout for monitoring airport environment

Performance Data (additional compounds can be monitored)

Compound	Max. measurement range (500 m path) ¹⁾	Min. detectable quantities (monitoring path 500 m, measurement time 1 min.)	Zero drift (500 m path, max. per month)	Span drift (per month, better than)	Span drift (per year, better than)	Linearity error (of measurement range, better than)	Max. length of fibre optic cable (when measuring several compounds) ¹⁾	Hardware requirement
AR 500 / AR 520 Analyser								
NO ₂	0–1000 µg/m ³	1 µg/m ³	±2 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
SO ₂	0–1000 µg/m ³	1 µg/m ³	±2 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
O ₃	0–1000 µg/m ³	2 µg/m ³	±4 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
NO ₂ ²⁾	0–2000 µg/m ³	2 µg/m ³	±4 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
NH ₃ ²⁾	0–500 µg/m ³	2 µg/m ³	±4 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
NO ₃	0–500 µg/m ³	0.1 µg/m ³	±0.2 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
HNO ₂	0–500 µg/m ³	1 µg/m ³	±2 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
Formaldehyde	0–500 µg/m ³	1 µg/m ³	±2 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
Benzene ³⁾	0–500 µg/m ³	1 µg/m ³	±2 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
Toluene ³⁾	0–500 µg/m ³	1 µg/m ³	±2 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
p-, m-Xylene ³⁾	0–500 µg/m ³	1 µg/m ³	±2 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
1,2,4-Trimethylbenzene ³⁾	0–500 µg/m ³	5 µg/m ³	±10 µg/m ³	±2%	±4%	±1%	10 m	AR 500/520
AR 550 Analyser								
CO ²⁾	0–100 g/m ³	100 µg/m ³	±200 µg/m ³	±2%	±4%	±1%	10 m	AR 550
CO ₂ ²⁾	0–100 g/m ³	1 mg/m ³	±2 mg/m ³	±2%	±4%	±1%	10 m	AR 550
CH ₄ ²⁾	0–100 g/m ³	50 µg/m ³	±100 µg/m ³	±2%	±4%	±1%	10 m	AR 550
H ₂ O ²⁾	0–100 g/m ³	0.1% vol	±0.2% vol	±2%	±4%	±1%	10 m	AR 550

¹⁾ When monitoring individual compounds, fibre optic cables of extended lengths are available.

²⁾ Based on 200 m path. Recommended monitoring path length: 100 to 200 metres.

³⁾ Max. O₃ concentration at 500 m path: 250 µg/m³.

⁴⁾ Recommended monitoring path length: 300 to 800 metres.

Please contact your Opolis supplier to discuss your particular system requirements, including the compounds you wish to monitor. Separate product sheets are available describing individual items of Opolis system hardware.

Specifications subject to change without notice

Why Opsis?

Total monitoring solution

Cost-effective, open-path technology

High-performance monitoring of criteria pollutants

High-performance monitoring of BTX

Representative path-integrated data

Easily calibrated

Operates with a minimum of maintenance

U.S. EPA approved

TÜV approved



Opsis AB, Box 244
SE-244 02 Furulund Sweden
Telephone Int +46 46 72 25 00
Telefax Int +46 46 72 25 01
E-mail info@opsis.se
URL <http://www.opsis.se>

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