



Ambient Air Quality Monitoring

# Remote Sensing of Ship Emissions

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## Ambient Air Quality Monitoring

# Remote Sensing of Ship Emissions

New regulation forces ships to lower the emissions of SO<sub>2</sub>. Ships travelling in SECA areas has to either run on low sulphur fuel, or install SO<sub>2</sub> scrubbers.

To measure the SO<sub>2</sub> emissions from a ship is not an easy task. OPSIS provides the Port Authorities with a unique measurement principle where the emissions from the ship is measured remotely.

Light is passing the emissions and by analyzing the light, concentrations of SO<sub>2</sub> can be measured.

If the SO<sub>2</sub> concentration is too high, the ship does not meet the regulations and further investigation can be made.

### RETURN OF INVESTMENT

An easy and reliable control of the emissions from ships will lower the sulphur emission. Ships not following the regulation will be found.

The cost of an OPSIS system is small compared to alternative methods of controlling the emissions from ships.

### TEST AND APPROVALS

The OPSIS system has been tested and approved by a number of internationally recognized institutes and authorities. The system meets the European directives and is approved by DNV and Germanischer Lloyd. Full details are available on request.

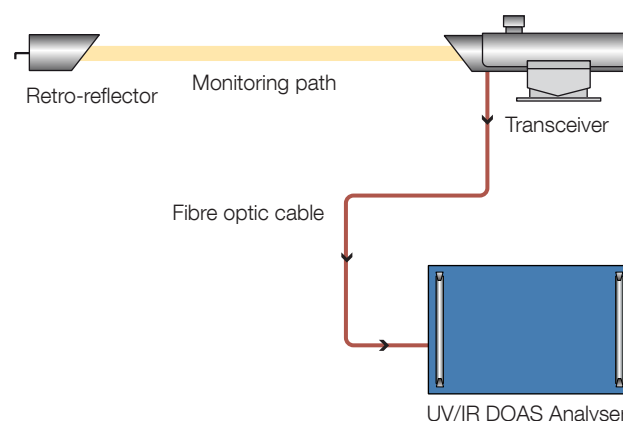
### OPSIS PRODUCT PORTFOLIO

OPSIS has a full product portfolio for measurements of gases. It includes air quality systems designed to meet the marine directives. It also includes monitoring systems for monitoring emissions from ship engines.

For further information, please contact us or visit [www.opsis.se](http://www.opsis.se).

## SYSTEM OVERVIEW

An OPSIS system layout for monitoring emissions in the ambient air quality in harbours.





# REMOTE MONITORING OF SHIP EMISSIONS

OP SIS provides a unique measurement principle for the Port Authorities, where the emissions from ships are continuously measured remotely.



## PERFORMANCE DATA (TYPICAL DATA WHICH MAY VARY DEPENDING ON APPLICATION)

Compound	Max. measurement range <sup>(1)</sup> (500 m path) <sup>(2)</sup>	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 monitoring individual compounds) <sup>(3)</sup>	Hardware requirement
<b>AR500/AR520 UV/IR DOAS Analyser</b>								
SO <sub>2</sub>	0-5000 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	±2 µg/m <sup>3</sup>	±2%	±4%	±1%	10 m	AR500/520

<sup>(1)</sup> Higher measurement ranges are possible depending on application and compound.

<sup>(2)</sup> Recommended monitoring path length: 300 to 800 m.

<sup>(3)</sup> When monitoring individual compounds, fibre optic cables of extended lengths are available.

- Besides the compounds above, the Opsis system can monitor the following compounds: NO, NO<sub>2</sub>, O<sub>3</sub>, CO, CO<sub>2</sub>, NH<sub>3</sub>, NO<sub>3</sub>, HNO<sub>2</sub>, HCl, HF, Hg, H<sub>2</sub>O, CS<sub>2</sub>, CH<sub>4</sub>, HCN, HBr, HCl, Formaldehyde, Acetaldehyde, Phenol, Benzene, Toluene, Xylenes, Cresol, ClO<sub>2</sub>, COCl<sub>2</sub>, C<sub>6</sub>H<sub>5</sub>C<sub>2</sub>H<sub>5</sub>, C<sub>2</sub>H<sub>6</sub>, C<sub>2</sub>H<sub>4</sub>, CH<sub>2</sub>=CHCN, Trimethylbenzenes, and others.

## Ambient Air Quality Monitoring in Ports by OPSIS

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Cost-effective, open-path technology

Easily calibrated

Operates with a minimum of maintenance

Low energy consumption

Internationally approved

Thousands of systems installed worldwide

Experienced and skilled service network

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Please contact your OPSIS supplier to discuss your particular system requirements, including the compounds you wish to monitor. Separate product and other industrial application sheets are available. Specifications subject to change without notice

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