EnviroTechnology
services plc

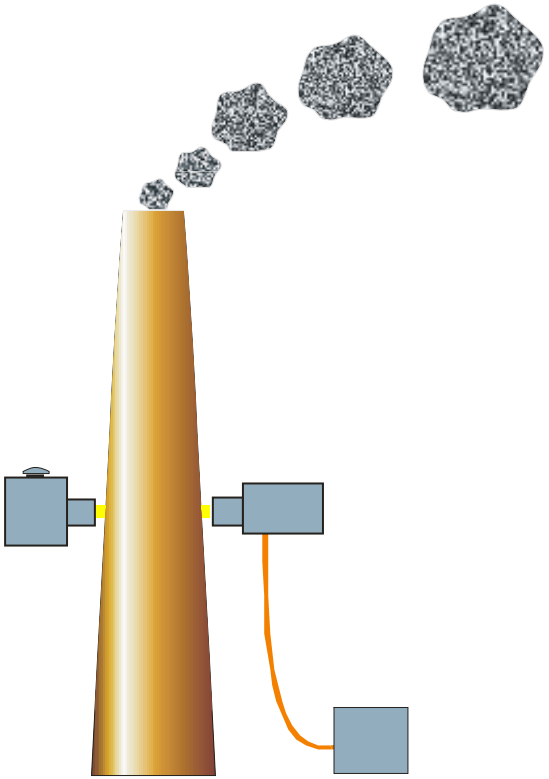
EnviroTechnology
services plc

Measurement of Fenceline / Fugitive Emissions using MCERTS Approved Opsis Open-Path System

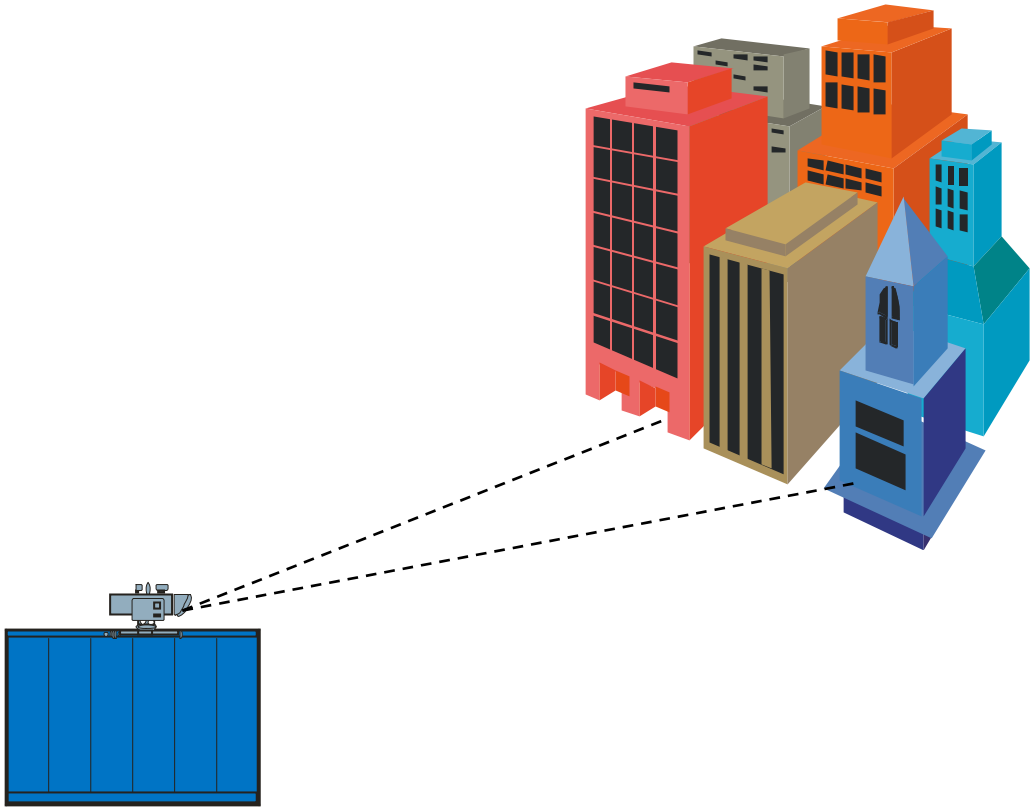
www.et.co.uk

EnviroTechnology services plc

Gas Monitoring Systems



CEMS



CAMS

EnviroTechnology services plc

ENVIRO TECHNOLOGY SERVICES PLC

- Air Quality Monitoring Systems using Open Path technology
- Air Quality Management Software Tools
- Continuous Emission Monitoring Systems

EnviroTechnology services plc

ENVIRO TECHNOLOGY SERVICES PLC

- Founded in 1985.
- Located in Stroud, Gloucestershire.
- 50 employees.
- Represented worldwide.

TÜV Rheinland

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

EPA United States Environmental Protection Agency

"...to protect human health and to safeguard the natural environment..."

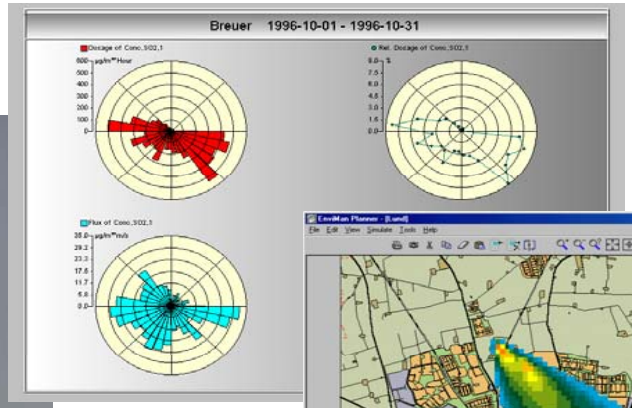
CERTIFIED ISO 9001 ISO 14001 SEMKO-DEKRA

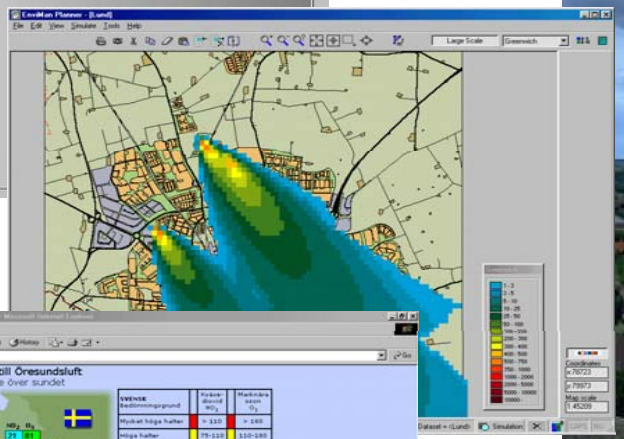
EnviroTechnology services plc

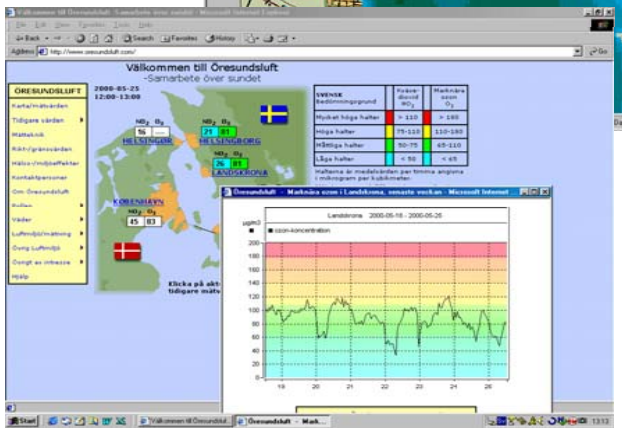
Major Application Areas

Software for data management and modelling

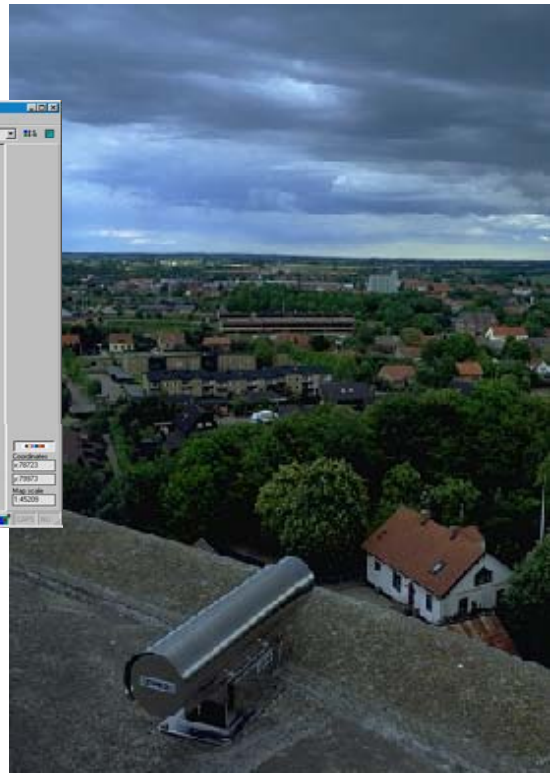
CEM







CAMS



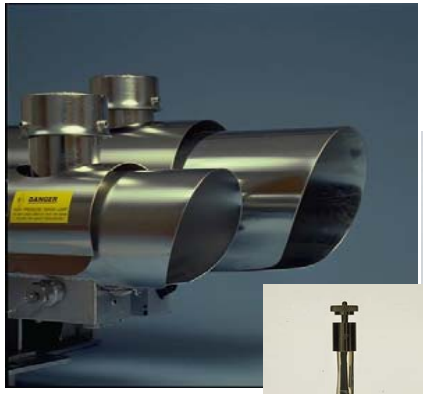
EnviroTechnology services plc

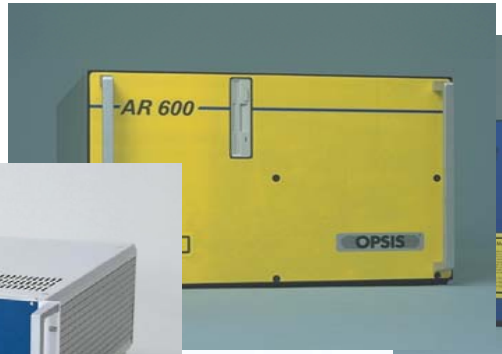
CAMS Applications

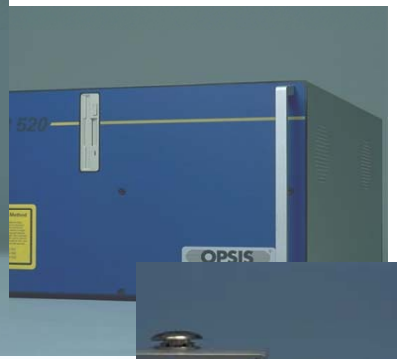
- Urban trend monitoring (“roof top”)
- Fence-line monitoring of fugitive emissions
- Street-level monitoring
- Airport monitoring
- Background monitoring

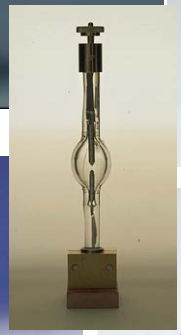
EnviroTechnology
services plc

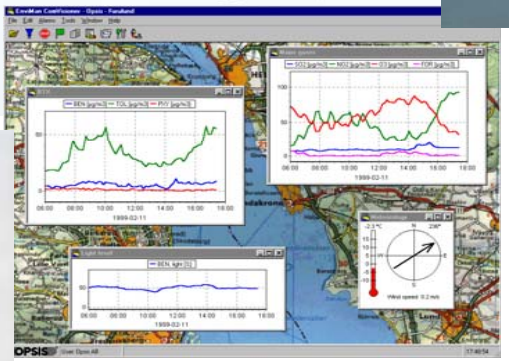
ETS Products





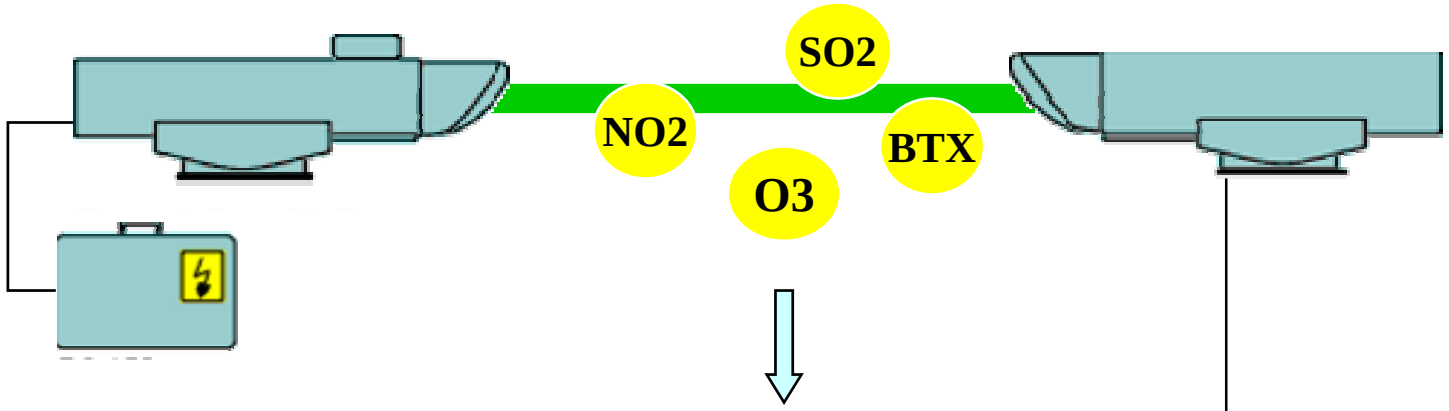


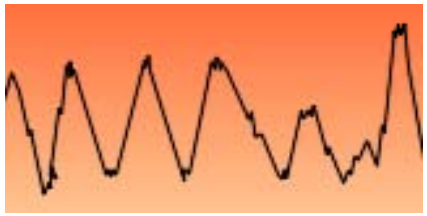


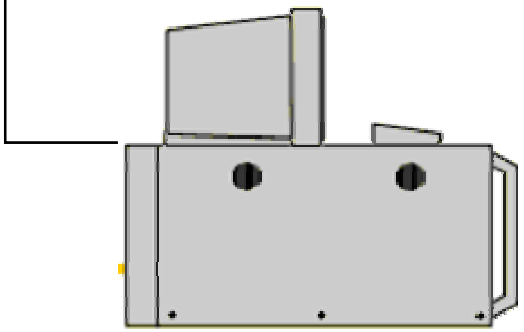


EnviroTechnology services plc

DOAS ”Open path”







Differential
Optical
Absorption
Spectroscopy

EnviroTechnology
services plc

DOAS Analyser

EnviroTechnology
services plc

DOAS Emitter/Receiver

EnviroTechnology services plc

What can be measured by DOAS?

Criteria pollutants

SO_2
NO_2
NO
O_3

Aromatic HC

Benzene
Toluene
Styrene
Ethylbenzene
Xylenes
Cresols
Trimethylbenzenes
Monochlorbenzene
Dichlorbenzene

Smelling compounds

NH_3
CS_2
Trimethylamine
Formaldehyde
Acetaldehyde
Phenol

EnviroTechnology services plc

Special DOAS compounds

Mercury (Hg^0)
Phosgene ($COCl_2$)
Chlorine (Cl_2)
Sulfur Trioxide (SO_3)
Hydrogene Fluoride (HF)
Hydrogen Chloride (HCl)
Hydrogene Cyanide (HCN)
Methylisocyanate (MIC)
Etc.

EnviroTechnology services plc

DOAS BENEFITS

- No sampling system, pumps, filters or scrubbers
- Low maintenance and operational costs
- Multiple gas capability
- Multiple path capability
- Superior Area Coverage
- High performance
- Integrated signal handling system
- Long life time durability
- Internationally approved

Approvals AQM

U.S. EPA,

The system is designated equivalent to 40 CFR.

- SO_2, NO_2, O_3

C.N.R., Italy

- Benzene
- SO_2
- NO_2
- O_3
- PM10

MCERTS, UK

- SO_2
- NO_2
- O_3
- Benzene

TÜV, Germany

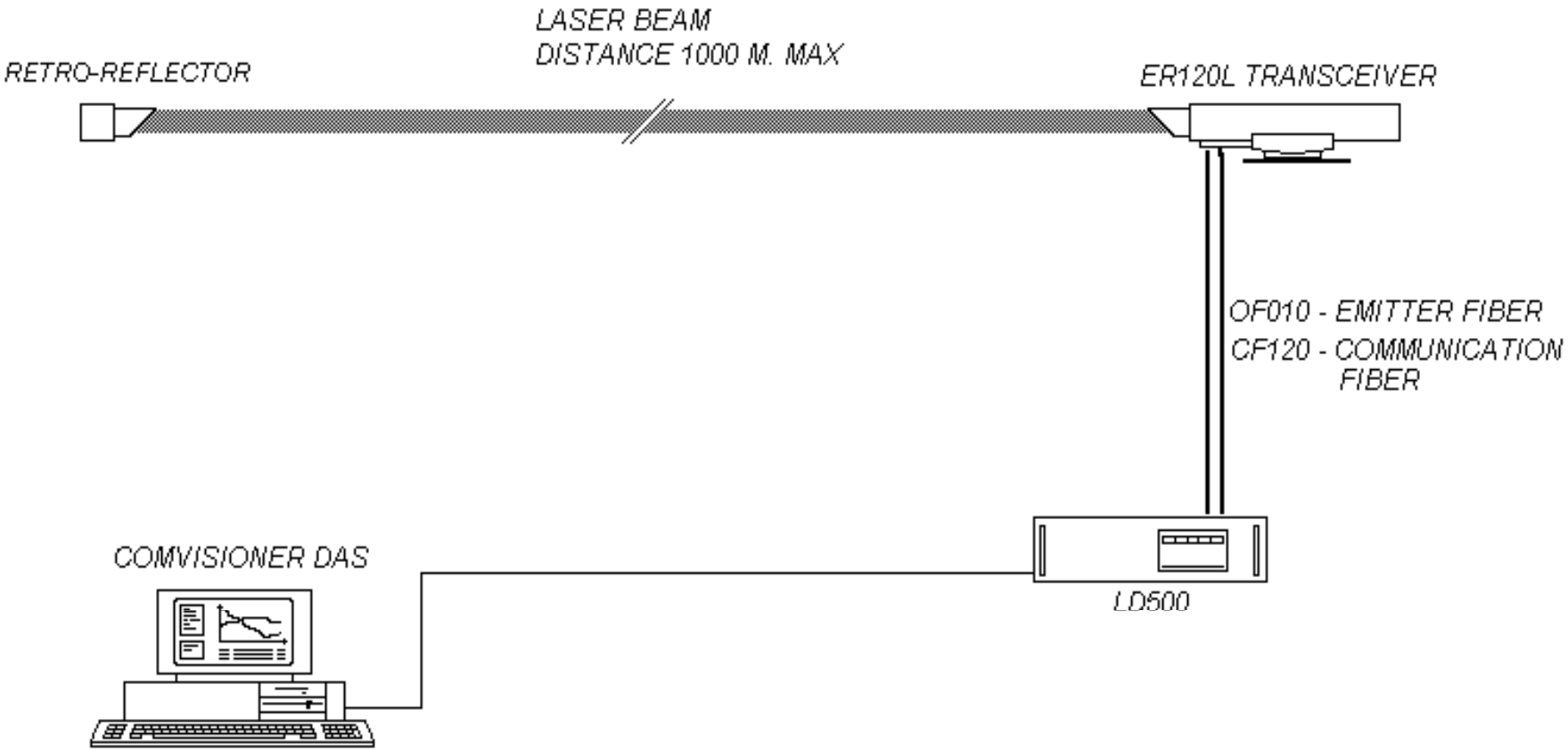
- SO_2
- NO_2
- O_3
- Benzene
- PM10

Gosstandard, Russia

- SO_2
- NO
- NO_2
- O_3
- H_2S
- NH_3
- CO
- Cl_2
- HCl
- Styrene
- Benzene
- Toluene
- Phenol
- Formaldehyde
- HF
- CH_4

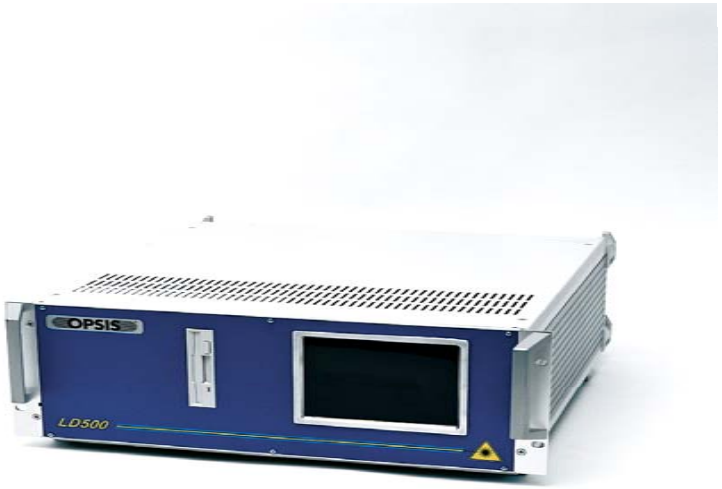
EnviroTechnology services plc

Diode Laser



EnviroTechnology services plc

Diode Laser



EnviroTechnology services plc

Features - Diode Laser

- Fast response time (~ 1 sec)
- Multiple paths (1-8)
- Multiple gases (NH_3, HF, HCl, O_2, CO_2, H_2S, CH_4, H_2O…)
- Long fibre lengths (< 1 km)
- Low detection limits
- Operates with a minimum of maintenance
- Semiconductor laser = reliable, long life time
- Automatic optical alignement

Same facilities as DOAS :

- Calibration equipment
- I/O signals with IO256 and IoMan modules
- Built in serial communication and modem

EnviroTechnology services plc

Particulate monitor

EnviroTechnology services plc

Features – BAM1020

- Automatic particulate monitor and sampler
- TSP, PM10, PM2.5 and PM1.0
- Tested and approved within European Union
- Samples on 47 mm filters for further lab analysis (such as led, cadmium etc.)
- Several hundreds of installations

EnviroTechnology
services plc

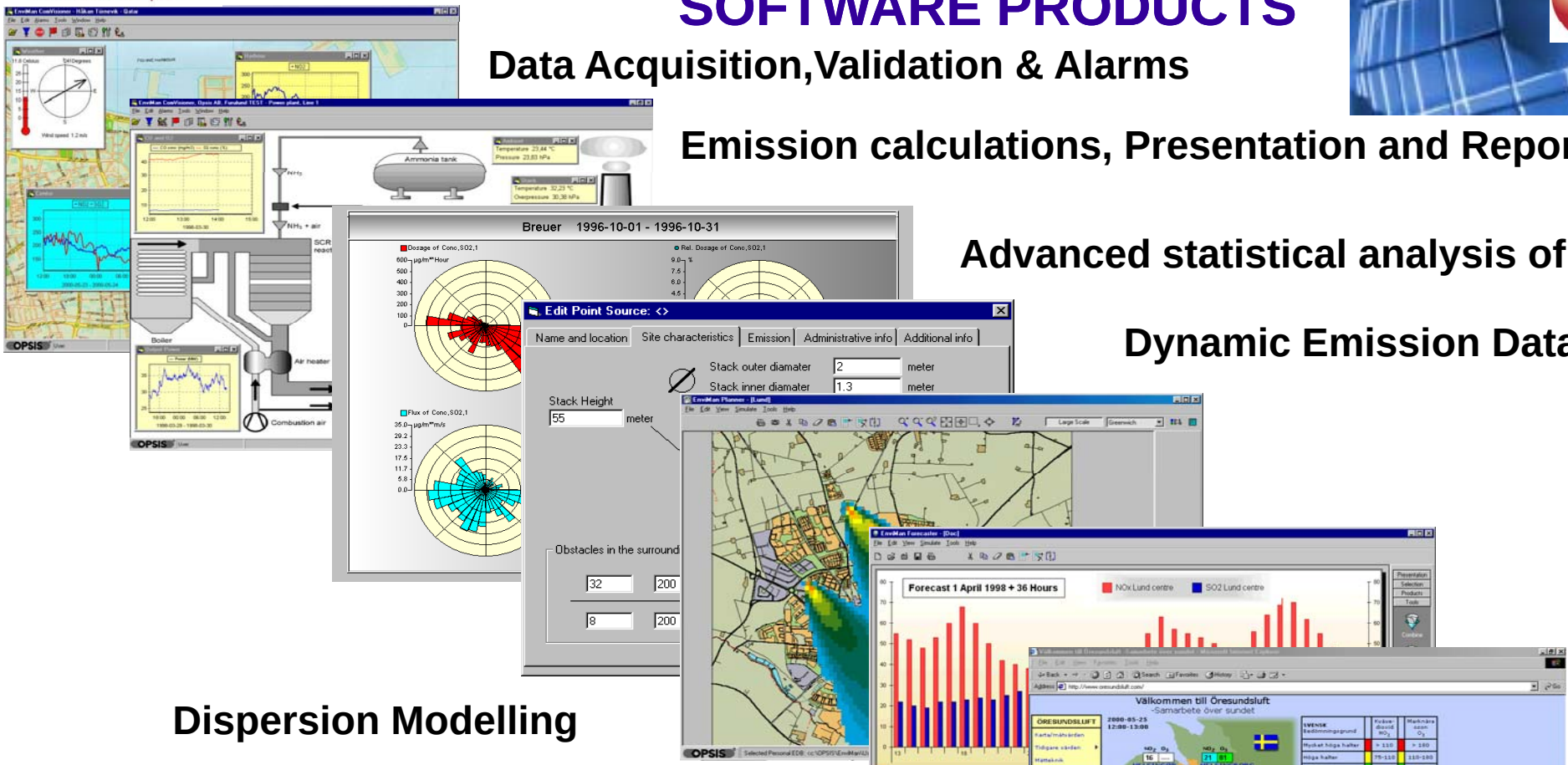
SOFTWARE PRODUCTS

Data Acquisition,Validation & Alarms

Emission calculations, Presentation and Reporting

Advanced statistical analysis of data

Dynamic Emission Database



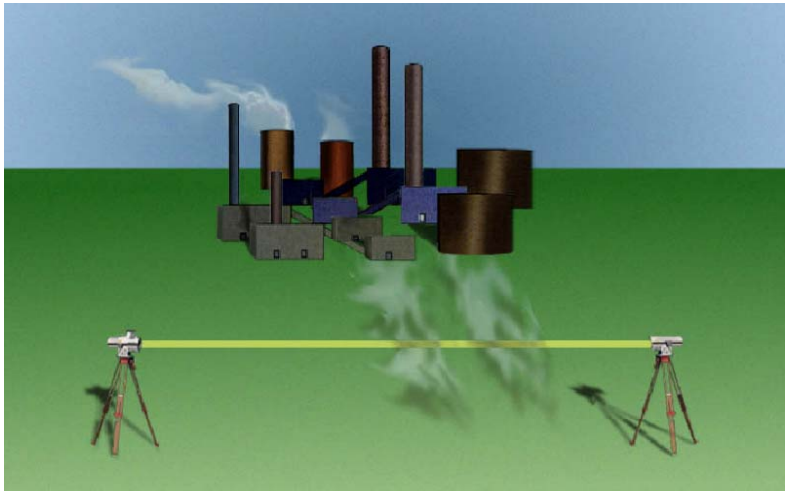
Dispersion Modelling

Air Quality Forecasts

Export to Intranet/ Internet

EnviroTechnology services plc

The Fence-Line Monitoring Concept



Three functions in one Package:

- Monitoring Air Quality for compliance with standards/guidelines
- Monitoring fugitive industrial emissions
- Providing a fast and sensitive gas alarm system

EnviroTechnology services plc

Configuration Example

EnviroTechnology services plc

Features – Fence line

•Provides useful information on general air quality, but also on specific industrial fugitive emissions.

•Provides useful information for Air Quality Management and ISO 14000 compliance.

•Will give extensive information on export and import of gaseous compunds to and from neighbouring areas.

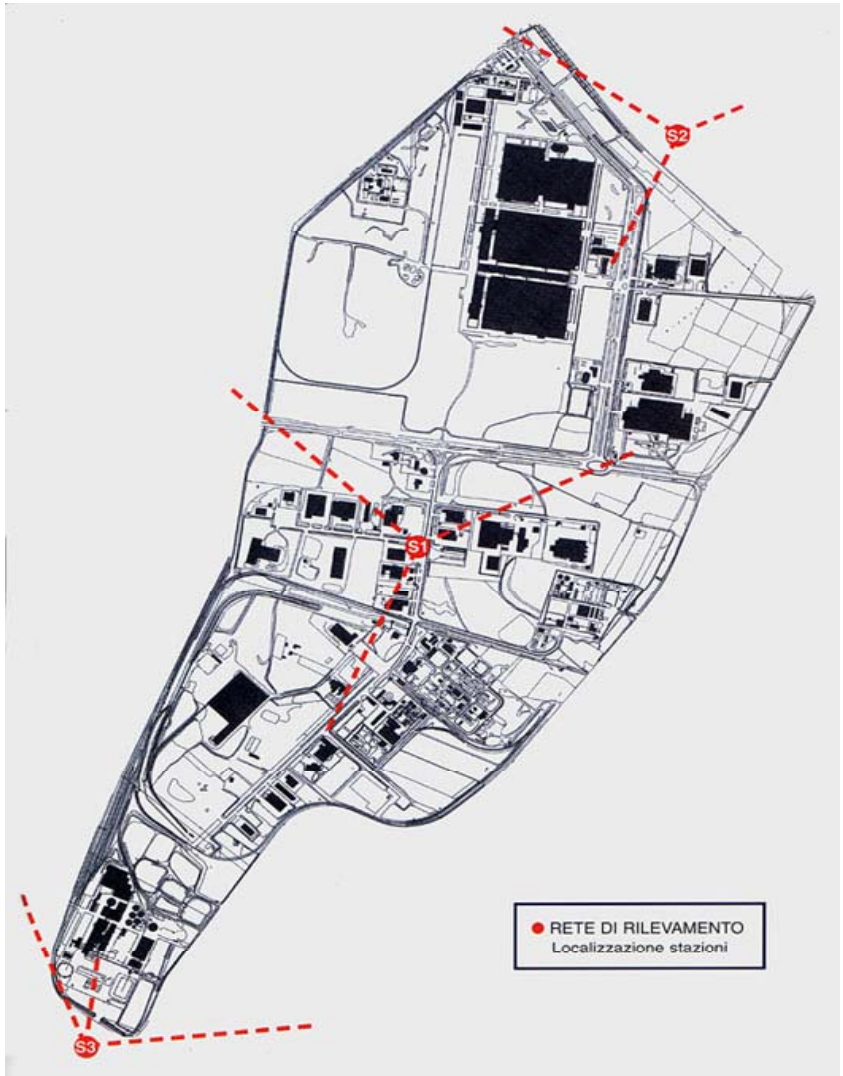
•Provides alarms in case of gas leaks or accidential releases.

•Detection and actions against gas leaks and fugitive emissions saves costs.

EnviroTechnology services plc

Case Study - Biferno, Italy

Fence-line Monitoring using 3 x 3 DOAS paths



EnviroTechnology services plc

- The problem: Several industries in a valley creating high pollution levels.

- The objectives: Finding efficient monitoring techniques that can be used for monitoring multiple paths and a large number of gas compounds, and a software tool for managing obtained data.

- The solution: Advanced monitoring stations in fence –line configuration using DOAS open-path monitors in combination with EnviMan software .

Industries and Emissions

Type of Industries and Fugitive Emissions:

Automotive – Formaldehyde, HC

Sugar factory and refinery – NOx, SO_2, H_2S

Various chemical industries – Phenols, CS_2, NH_3

Food industry – Various HC

EnviroTechnology services plc

Parameters monitored

DOAS:
SO_2, NO_2, NO, O_3, NH_3, Benzene, Toluene, P-xylene, Styrene, CS_2, Formaldehyde, Acetaldehyde, Phenol, HCl, HF, Hg^0, O, M and P- Cresol

Met:
Wind speed , wind direction, temperature, pressure, humidity and global radiation

Others:
CO, GC (PAH), PM10

EnviroTechnology services plc

Equipment

The open path stations are using motorized receivers (RE130) to monitor 3 light paths at each station.

The emitters are the EM150 model, designed for maximum 2000 metre path length.

The AR520 analysers can handle both UV and IR absorption.

EnviroTechnology
services plc

Station with shelter and RE130 receiver

EnviroTechnology services plc

Conclusions

Modern technologies such as the open path DOAS monitoring system can provide important information on the pollution situation in and around industrial estates, such as :

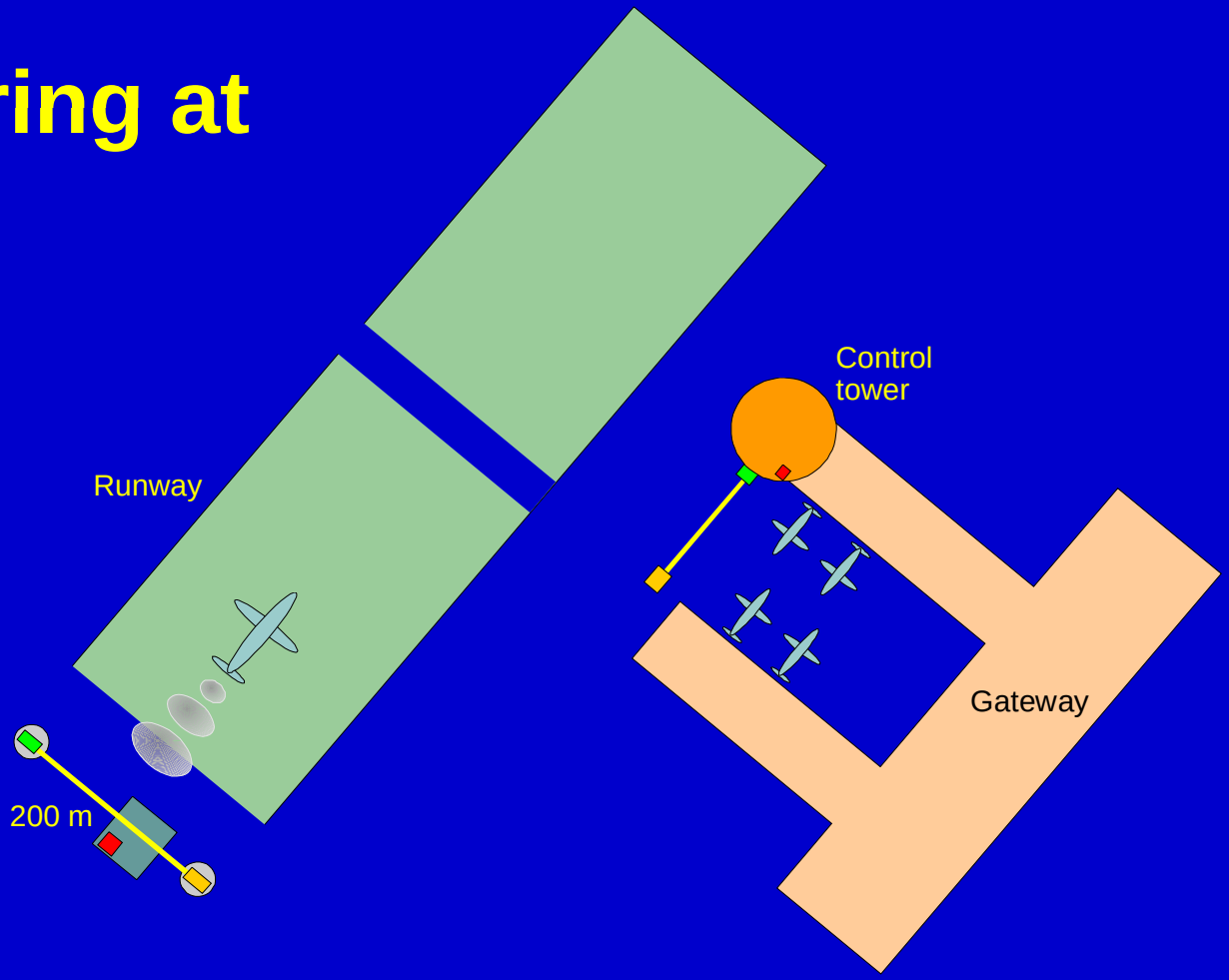
- How residential areas are affected by specific industrial emissions
- Import and export of pollution in the area
- Locations of the most significant sources of pollution
- Concentrations of gases to be compared with guidelines and health limits
- A database for future planning and decision-making

EnviroTechnology services plc®

TOTAL MONITORING SOLUTION

Monitoring at Airports

Cologne, Germany
Copenhagen, Denmark
Düsseldorf, Germany
Greece
Toronto, Canada
Zürich, Switzerland



Gases monitored
Benzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, NO, NO_2, SO_2,

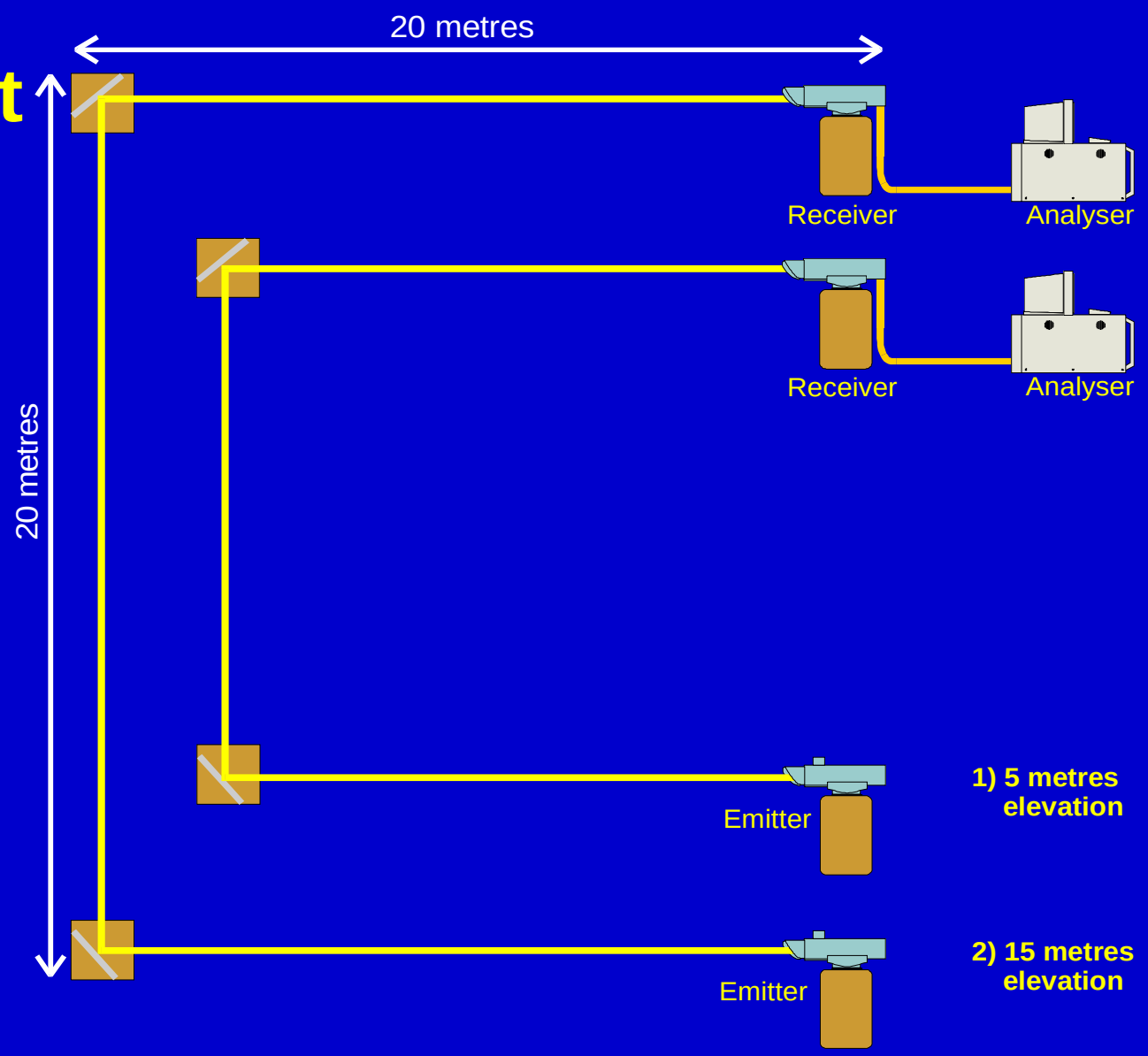
EnviroTechnology services plc

TOTAL MONITORING SOLUTION

Chemical Plant

Location: China

Parameter: Methylisocyanate



EnviroTechnology services plc

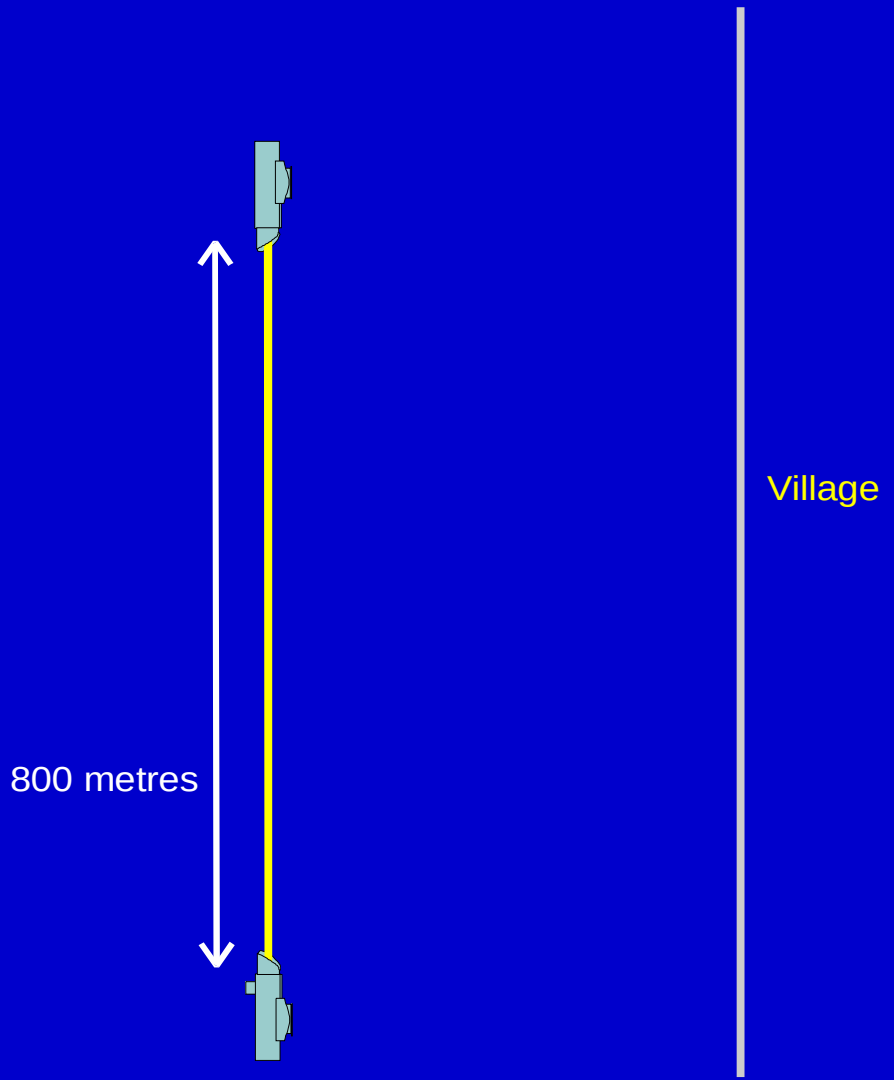
TOTAL MONITORING SOLUTION

CS_2 Monitoring

Location: Valkeakoski, Finland

Parameter: CS_2

Plant Area



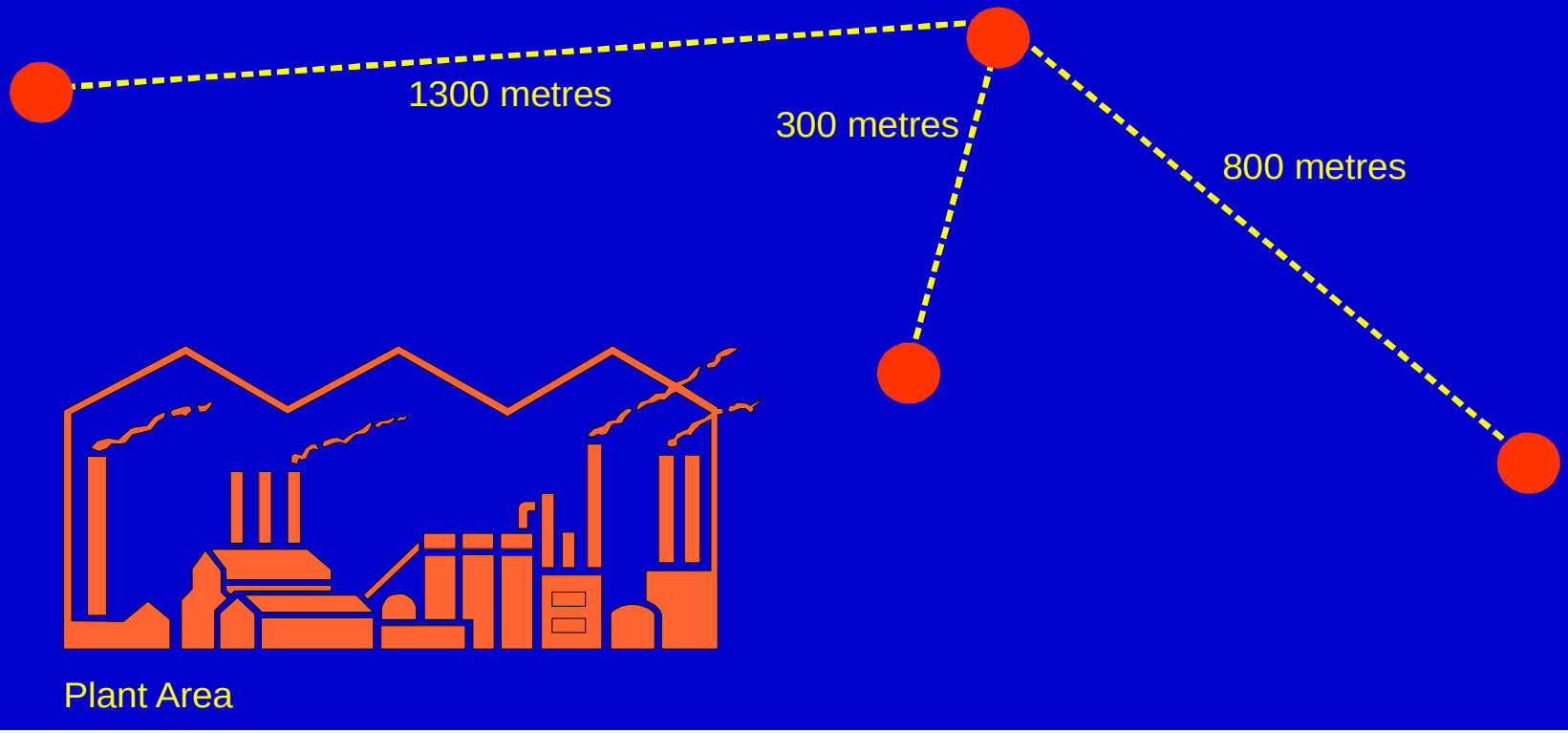
EnviroTechnology services plc®

TOTAL MONITORING SOLUTION

Fertilizer Plant
Chemical Plant

Location: Norway

Parameter: Hg, Cl_2, NH_3, NO, O_3, NO_2, SO_2



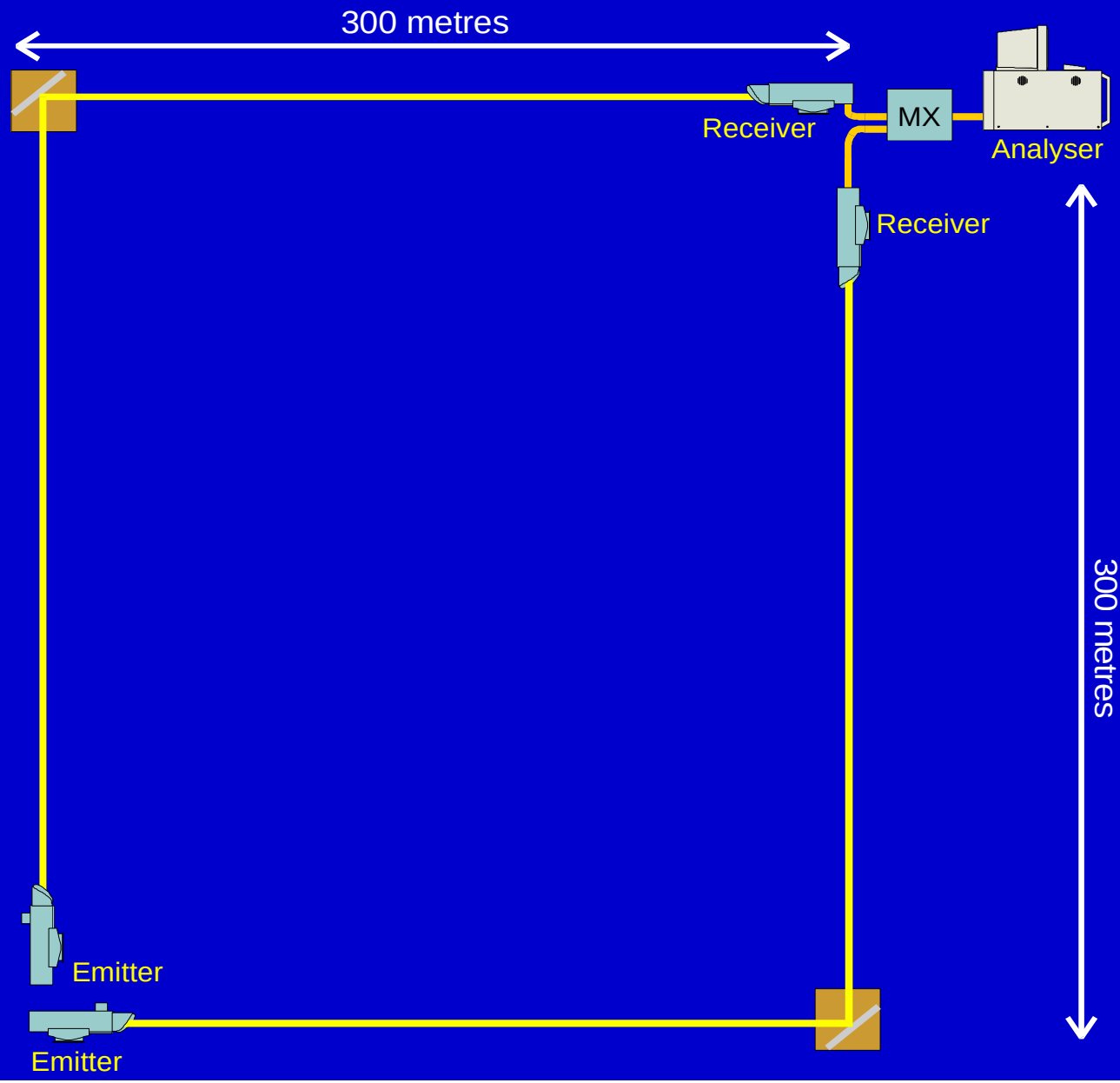
EnviroTechnology services plc

TOTAL MONITORING SOLUTION

Refinery

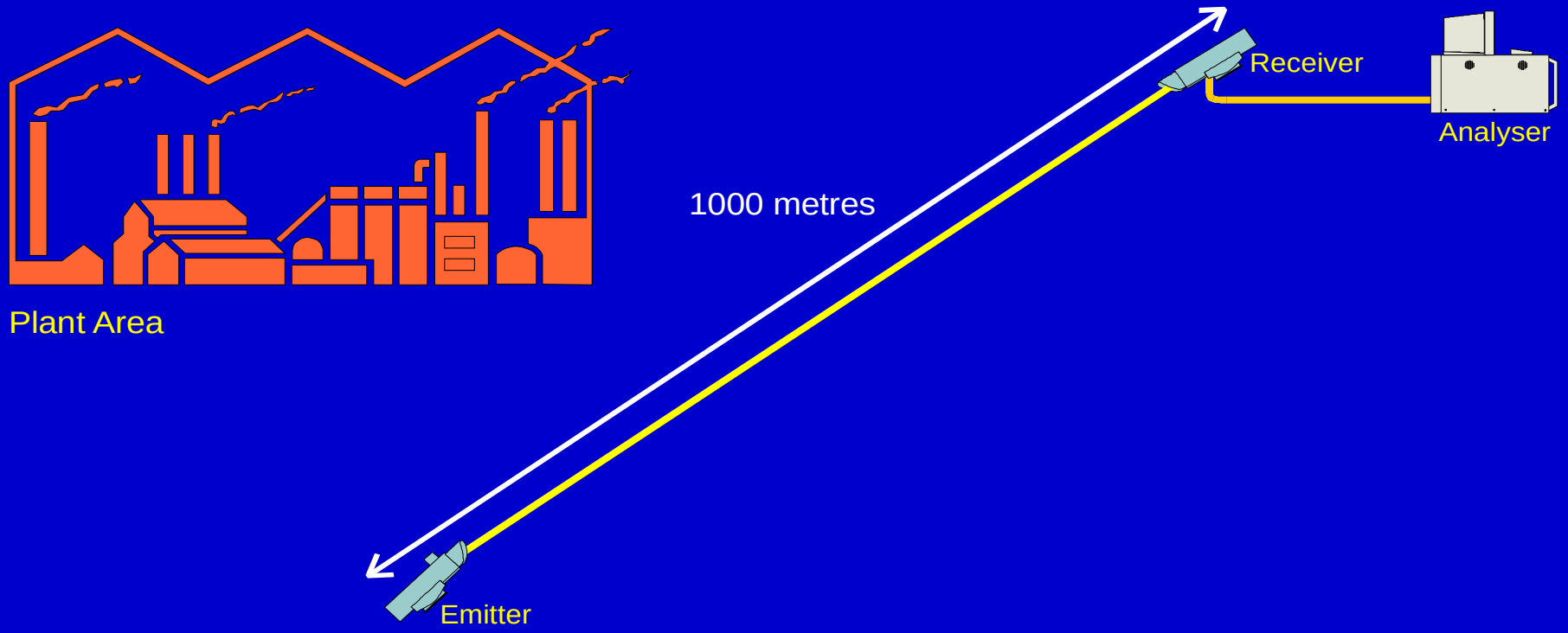
Location: Belgium

Parameter: Benzene



Waste Incinerator

Location: Florida, the U.S.
Parameter: Hg



EnviroTechnology
services plc

EnviroTechnology
services plc

Total Solutions for CEMS and CAMS

www.et.co.uk