

Air Quality Monitoring System

The economic and political stability of the industrially developed countries is highly depending on the continuous growth of the economy. The two main factors of economic growth are technological development and the productivity enhancement of existing technologies. In result of the economic growth the population consumes more and more causing more and more pollution around their living areas. The environment load caused by both the industry and the people themselves cause a considerable health risk for the population of cities.

One of the most effective mitigation techniques is to implement an electronic environment control integrated with an early warning system in polluted town and cities.



The essence of the **electronic control** is round the clock gas emission measurement installed in the settlements. Meteorological information may also be continuously collected. Knowing the gas concentration and the meteorological environment, the supervising personnel of the system is able to implement preventive measures like traffic and industry limitations.

Monitoring System

The most important component of the system – the monitoring device measuring the gas concentration – is installed with an electro-chemical sensor. The analogous measurements of the sensor are digitized and averaged by the system, then compared to the set warning and alarm thresholds. The incidental warnings and alarms are transported to control room application.

To reach a complete monitoring of the environment of a settlement, it is essential to measure the air pollution caused by vehicles, heating etc. which are low concentration gases and dust particles, the high concentration dangerous or explosive gases used in factories in or near the settlement which are high concentration gases.

Measurement frequency:	Customizable, by default: 10 min.		
Measured meteorological parameters:	Temperature (0.5m & 2m) Humidity Wind direction Wind speed Calculated vertical stability		
High concentration gases:	NH ₃ H ₂ S Cl ₂ COCl ₂ CH ₃ CH ₂ CH ₃ NO ₂	C ₃ H ₃ N C ₂ H ₇ N HF CO AsH ₃ H ₂	HCN HCl SO ₂ CNCl NO O ₃
Low concentration gases:	CO O ₃	NO SO ₂	NO ₂ H ₂ S
Other measurable:	Dust particle concentration (VOC) Rain		
Configurations:	Gas only – Gas&Meteo Normal with battery – Without battery Redundant – Non redundant Standard – Explosion proof		
Communication options:	Fiber – Ethernet – Microwave – GSM – TETRA		

Control Room Application

The meteorological and gas concentration measurement data is transported to a computing center – formed by highly reliable servers and network devices – serving the control room clients. The computer center has professional physical protection formed by access control system, video surveillance, flooding protection, electromagnetic shielding, highly reliable air conditioning, redundant power with multiple inline and manned security.

The control room client application provides an integrated interface to the supervisor personnel to control the whole system or several instances of the system deployed in different locations:

Displays the measurement data and the alarms	
Supports the personnel with	action plans dispersion modeling
Provides a possibility to operate the public alarm system	
Provides graphical map overlay to visualize pollution	



Alarm system

The remote control of the public alarm system enables issuing alarms and providing information by speech instructions.

Sound sources	Pre-defined signal-alarms Pre-defined speech stored in the siren Speech pre-defined by the supervisor personnel Live speech
Variations	Standalone pole Flat roof Individual design (e.g. tent roof)
Communication options	Microwave – TETRA

Reliability

All parts of the system are designed to allow a full-extent in-depth system monitoring via standard system management tools from application memory usage through server fans to even the membrane of the sirens pressure chamber.

This high extent of monitoring allows defect repairs before actual outage would happen, resulting very high system availability.

The system design allows all system components to be implemented redundantly increasing the reliability even more.

Potentials

The system – thanks to its flexible design – optionally equipped with other sensors (water or soil contamination, water level etc.) or other controlled devices (e.g. energetic or traffic control) is ready to be adopted to several other telemetric and remote control applications.