European Network on New Sensing Technologies for Air Pollution Control and Environmental Sustainability - *EuNetAir*
COST Action TD1105

1st EuNetAir Air Quality Joint-Exercise Intercomparison

Sensors versus Analyzers for Air-Pollution Monitoring in Aveiro City

Institute for Environment and Development - IDAD
Aveiro, Portugal, 13 - 27 October 2014

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MOX Sensor based Outdoor Platform for Air Quality Measurements

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Context and objectives

- **Can temperature cycled MOX sensors be used for immission monitoring?**

- Immission / odour nuisance reported by residents

- Sensor network for objective monitoring with sufficient time and location resolution

- Immission means:
  - Small concentrations
  - Climate parameters influence transport from emission site to immission location
 - Strong local disturbance
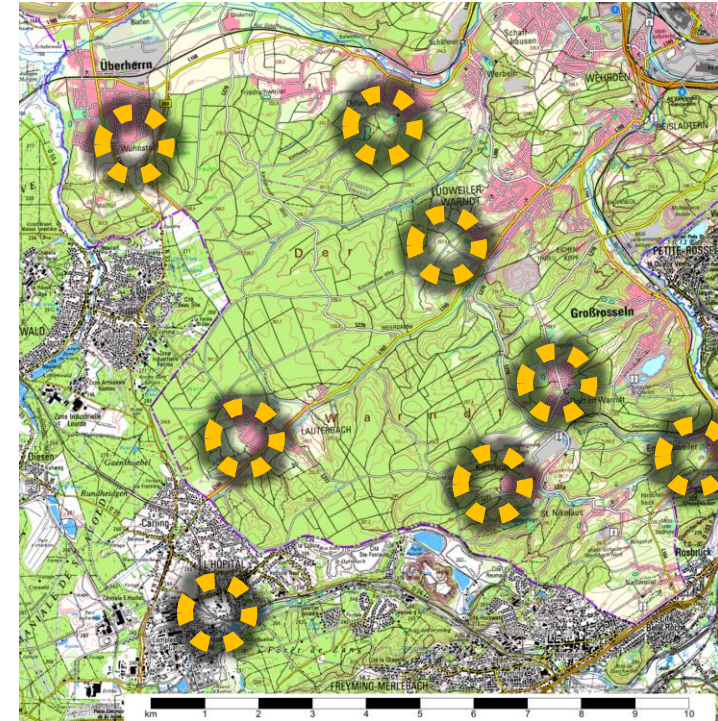
Sensor-System to be Used in Exercise

- Outdoor device with rugged housing and off-grid power options

- Based on electronics platform from mnt-era.net VOC-IDS IAQ device

- Current specifications

  - 2 independent MOX sensors

  - r.H. / T sensor as reference

  - Pneumatic path with pump

  - Stand-alone acquisition and logging

- Modular set-up expandable through

  - Wind sensor, communication module

  - Sampling unit, other sensors and sensor types

sensor block

r.H. / T sensor

tissue filter

pump
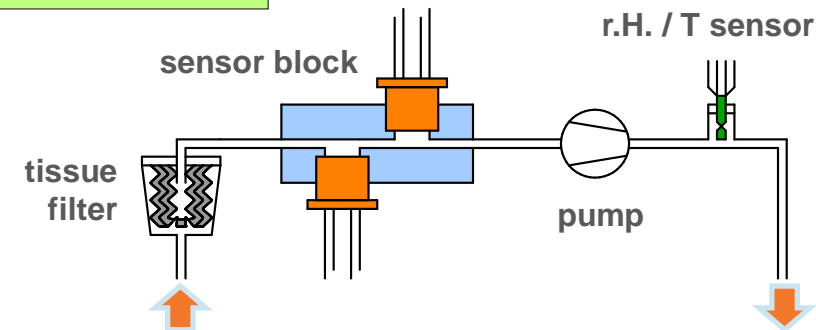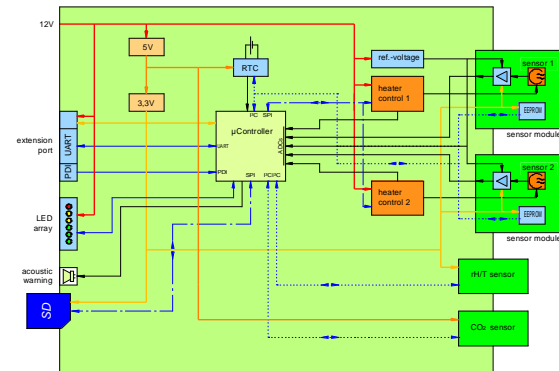
Temperature cycled MOX sensors

- Metal oxide gas sensors: working principle redox reactions with surface adhesed oxygen

- Temperature dependency can be used for "thermal spectroscopy"
  → selectivity

- Transient behaviour most interesting, current research shows vast increase in sensitivity

- Temperature cycle results in response pattern
  → pattern recognition correlates reaction with substances / odours
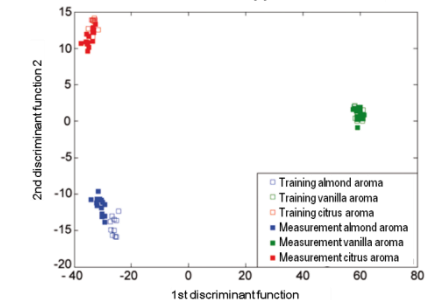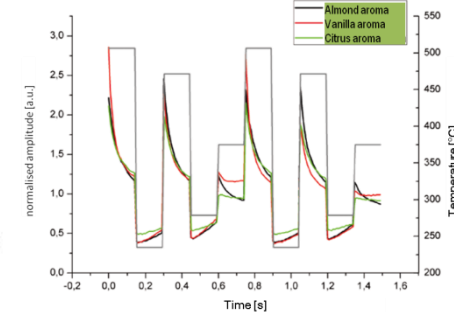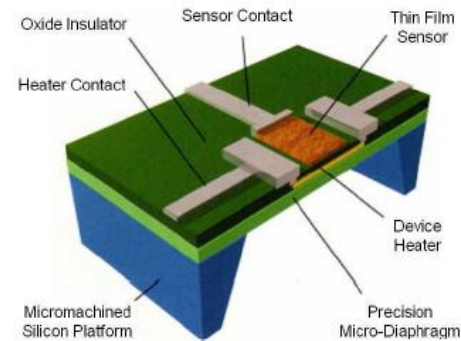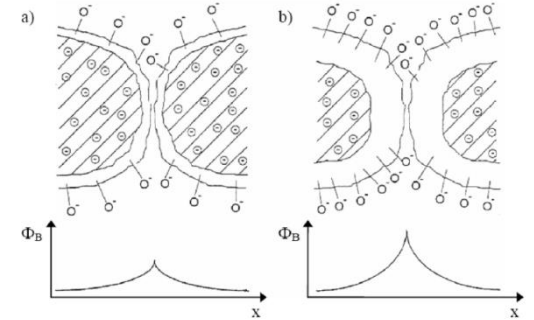
CONCLUSIONS

- Goals of taking part in the intercomparison exercise

  - Comparison of sensitivity with analyzer data as a reference

  - Algorithm evaluation for selectivity concerning known pollutants

- Expected problems

  - Lack of sensitivity → improvements on temperature cycle, sensor type and sampling method

  - Lack of selectivity → improvements on temperature cycle, adaptation of data processing

- Overall system evaluation over exercise duration

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3S° Gas sensing solutions