

**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**

Action Start date: 01/07/2012 - Action End date: 30/06/2016 - Year 3: 2014-15 (*Ongoing Action*)

**SNAQ Sensor Boxes for Air Quality Measurements
Come and see their poster!**



**Paul Smith on behalf of Olalekan Popoola and Vivien Bright
Function in the Action: (WG Members?)
University of Cambridge, UK**

Scientific context and objectives

Air Quality Problem:

- Spatial heterogeneity
- High variability (many trace species)
- Non-linear chemistry
- Complex & uncertain sources
- Micro-meteorology complicated
- **Measurements need to be conducted at the appropriate spatial & temporal scale!**

- Many types of low-cost miniature sensors are now available - We are working with the manufacturers, developing platforms to exploit these technologies
- We want to perform real-time monitoring in scalable networks & get useful data
- We can use platforms and data for AQ studies, source attribution, exposure studies, EIA, also public information – ‘citizen science’

Monitoring Problem:

- Sparse expensive networks or dense & temporally poor
- Spatial & temporal variability not reliably captured (e.g. ‘hot spots’)
- Derived parameters (e.g. personal exposure) can be unreliable
- Urban AQ not well-constrained
- **Alternative methods needed!**

Description of Sensor-System to be used in Exercise



SNAQ (Sensor Networks for Air Quality)

Species:

- NO₂, O₃, NO, CO, SO₂ (Electrochemical)
- CO₂ (NDIR)
- Total VOC's (PID)
- Size-specified particulate 0.38 – 17.4 μm (Optical Particle Counter, OPC)

Sampling resolution:

- Electrochemical (EC) @ 2 s + 20 s point
- CO₂ and total VOC's @ 20 s
- Particulate @ 20 s

Meteorology etc (2-D sonic not shown)

- Wind speed & direction (2-D sonic)
- Temperature and RH (capacitive sensors)
- GPS, GPRS*, USB (position & RTD)
- 490 x 220 x 160 mm, 2.8 kg, 12 V (500 mA)

CONCLUSIONS

Expected achievements:

- First intercomparison of our SNAQ units with existing/new designs of sensor platforms – great!
- Sharing of data and knowledge – performance issues, advice, tips..
- Feedback for Alphasense & SenseAir – improvement of designs

Open problems:

- **A plethora of new sensor networks will generate lots of data both ratified (us now) & un-ratified...(citizen science!)**
- **How do we ensure comparable protocols with regards the design, operation, calibration & post-processing etc?**