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

- COST Action TD1105

WGs and MC Meeting at Rome, 4-6 December 2012

Action Start date: 01/07/2012 - Action End date: 30/06/2016

- Year: 2013

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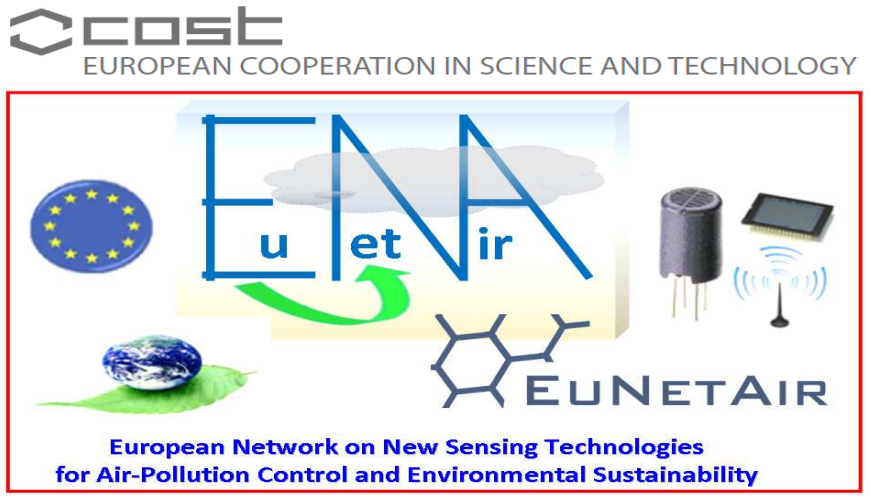

Scientific context and objectives in the Action

- Protocols and Standardisation Methods / WG4 in EuNetAir
- We will try to establish common general standards for modern European sensor / analyzers based on different measurement techniques; focusing on gases, odors and particle detection
- We will choose some common analytes every action year and concentrate on them
- Certified test laboratories or wellknown universities / institutes will investigate method accuracy and performance according a general test guideline

Current research activities of SenseAir

- **Current research topics at the partner organization / Problem statement:** SenseAir can investigate and compare commercially available CO2 sensor / analyzer performance in our Analysis & Test laboratories parallel to the ongoing testing of our prototypes and products
- **Brief list of ongoing research topics:** SenseAir is summarizing the main CO2 applications focusing on impact from environmental, safety or economical point of view from an European perspective

Research Facilities available at SenseAir

- Computer controlled climate chambers with large span in gas concentration, temperature and humidity
- Stable temperature monitoring room
- Gas regulating systems and automatized calibration routines
- Signal / noise analysis equipment

WG4 pre-meeting at SenseAir 29 Oct 2012

From left: Donatella Puglisi, Jens Eriksson, John Saffell, Gunnar Forsgren, Nicolas Moser and Ingrid Bryntse

Scope of WG4 and EuNetAir

- We discussed the general scope of EuNetAir and decided that we´are aiming at low-cost sensors and in this case the price for the user is below **€100 for small sensor with simple pcb** (OEM manufacturer price to a customer which use in their system) and **€300 for sensor modules**. This is something to further discuss and decide in EuNetAir!
- We selected some species to start with. We chose the analytes that are believed to either causing severe harm for living beings (eg carcinogenic benzene) or being of great importance from an energy saving point of view (CO_2).

Proposal of WG4 Target analytes

Odorants

- We will limit our focus on sulphur based compounds such as H_2S and organic thiols of various lengths (also called mercaptans).
- **Action:** A state-of-the-art summary of sensors / analyzers will be written by John Saffell. Goal: First draft May 2013 Referees: John Cristoph AlphaMOS, Thorsten Conrad, A-C Romain & M Brattoli.
- General odour scope: olfactometry, head-space GC and MS will perhaps be adressed next year, 2014

PM

- PM_{10}, $PM_{2.5}$, ultrafine PM and BC will be included.
- **Action:** A state-of-the-art summary of PM sensors / analyzers will be written by Anita Lloyd Spetz. Grisa Mosnik Aerosol doo will referee it Goal: First draft May 2013.

Proposal of WG4 Target analytes

VOC, Indoor air

- CH_2O methanal (often called formaldehyde)
- C_6H_6 benzene
- Both of the above species are harmful in very low concentrations - sub-ppm measurements are highly desired.
- **Action:** A first draft state-of-the-art summary of sensors / analyzers will be written by John Saffell & Nicolas Moser, focusing on metal oxide and electrochemical sensors. Goal: First draft May 2013. Andreas Schuetze and Thorsten Conrad, who are in this field, will referee it.

Proposal of WG4 Target analytes

Inorganic gases

- NO_2 nitrogen dioxide & O_3 trioxygen / ozone.
- Both must be analysed simultaneously due to the common dynamic reaction: $NO_2 + O_2 \Rightarrow NO + O_3$
- **Action:** A state-of-the-art summary of sensors / analyzers will be written by Nicolas Moser at SGX. Goal: First draft May 2013. Members of the EuroMet project MacPoll (which is working with ozone), Rod Jones and Michel Gerboles could referee it.
- CO_2 carbon dioxide is important both as a ventilation marker and a greenhouse gas
- **Action:** Ingrid Bryntse at SenseAir will write a summary of main applications. Goal: First draft Feb 2013. Referees: Nicolas Moser and John Saffell. Also, commercial European CO_2 sensors could be tested at SenseAir´s Analysis & Test Laboratory.

Road map for WG4 within EuNetAir

WG4 will:

- Summarise the "state of the art" of commercially available low cost gas sensors / analyzers
- Summarise possible and most common applications for a certain gas sensor
- Produce lists of tests “test protocol” that should be used in order to validate sensor specifications. These protocols and test results could later be used for creation of modern standards
- Identify test sites which could be used for field testing of sensors and sensor networks, if EuNetAir partners and other companies (in Europe or elsewhere) would like to provide sensors
- Initiate laboratory and field testing at nationally accredited test laboratories. Other labs could be used: Alphasense / Rod Jones at Cambridge for lab / field validation and SenseAir for CO_2 testing. Time plan and costs for testing are unknown

Standards?

- We are not certain that WG4 has the resources (time / money) to write *new* standards. Also we do not know if we should produce a general standard for a specific analyte, advise on improving current standards or write a standard directed to a certain application.
- If we choose specific applications, who should direct which applications to focus on? Input from other EuNetAir members are highly appreciated.
- **For SME:s in EuNetAir it is impossible to add a lot of work to write standards – we must focus on surviving in economically tough times……**