



# COST

## 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: 2012-2013 (*Starting Action*)



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WG 4 member, Sub-WG 4.2 Leader

ULg / Belgium



# Scientific context and objectives in the Action

- **Background / Problem statement:**

Monitoring of environmental odours and indoor air quality with new/improved/ standardized low-cost sensing technologies

- in real-world environmental conditions (outdoor and indoor; harsh conditions);  
On line; low LOD; selectivity (but not necessarily specificity); wireless-sensors  
network-real time mapping; citizen sensors,...

- **MoU objectives *matching* the partner activities:**

- Applications: (page 12) enhanced cost-effective handled-sensors for odour monitoring in sensitive sites; indoor air quality to reduce cost and health effects (“sick building syndrome”) simultaneously
- Objectives (page 17) : assess degradation rates and lifetime of low cost sensors in defined environment...; monitor real-world environment conditions..., standardization of methods; dissemination;
- WG 4-2 (standards for AQC by sensors) and SIG 1 (network of spin-offs)

# ULg Current research activities

- electronic nose to monitor odors in the environment and inside buildings



- testing of chemical gas sensors for real life use (in particular in field)
- measurement and modeling the impact of the environmental odour (compost, landfills, waste water, industrial sites,...)
- indoor air quality : Diagnosis of pollution inside buildings



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+material emissions monitoring



- Industrial process monitoring : eg biogas facilities





# Research Facilities ULg(1/2)

- Various e-noses
- Characterization of gas sensors arrays (resistive gas chemical sensors) in real life conditions and in laboratory
- Odour and VOC's sampling (outdoor-indoor) : flow chamber, emission chamber (to test indoor material emissions – ie a test room of 50 m<sup>3</sup> in controlled ambient conditions), special pumping systems, adsorbent cartridges, bags, bubblers, ....
- Odour and VOC's measurements : gas chromatography, mass spectrometry, sniffing port GC, FID, electrochemical cells, dynamic olfactometer (according to EN 13725), odour intensity measurement lab-made device (for indoor), standard forms of surveys in the neighbourhood
- Air dispersion modelling (with adapted weather stations)
- Statistical software development environments (Statisitica, MATLAB, LabWindows, GIS,...)
- Benches test for gas/vapour exposure under controlled conditions (T, Hr, Flow rate)



# Research Facilities ULg(2/2)

Some pictures :

- Emission chambers : FLEC and 50m<sup>3</sup> chamber
- Dynamic dilution olfactometer

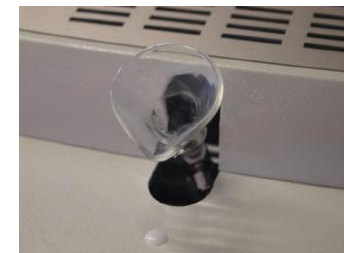
(according EN13725, Odile) :



- TD-GC-MS + sniffing port



- Lab-made e-noses (eg. biogas process control; FIDOR landfill odour monitoring)



- Odour sampling equipment (flow chamber, dilution unit,
  - meteorological stations, ...)





# Suggested **Priorities** for future research

- PRIORITIES for research to be carried out in the Action for future activities :
  - for outdoor and indoor applications (odours and VOC measurements)
  - Testing new gas sensors for labmade e-noses (sensors array)
  - Development of gas sensor devices as e-noses and data treatment for odour monitoring and AQC
  - Exchanging information and practices for standardisation and protocols methods
- INNOVATIONS :
  - implementation of new chemical sensors for real life application, in complex matrix for odour annoyance-indoor air pollution (eg: nanosensors)
  - development of devices for low concentration gas mixtures (eg: in the vicinity of residents of odorous sources; emissions of building product) with low LOD and more selective chemical sensors
  - harmonisation of sensorial measurements methods