

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

COST Action TD1105

SECOND SCIENTIFIC MEETING

Working Groups and Management Committee

at University of Cambridge

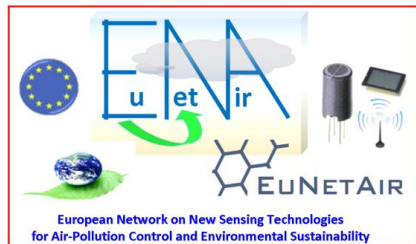
Queens' College, Cambridge, 18 - 20 December 2013

Welcome Address and Plenary Session

Action Start date: 01/07/2012 - Action End date: 30/06/2016 Year 2: 2013 - 2014

OVERVIEW of COST Action TD1105 *EuNetAir*

 **cost**
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY



Michele Penza

Function in the Action: Action Chair

ENEA - Brindisi, Italy



Outline



- **Background / Problem Statement:**
 - ✓ *Scientific context*
 - ✓ *Challenges addressed by the Action*
- **MoU Action's Objectives: Main and Secondary**
- **Action Research Directions:**
 - ✓ *Methodology and Innovation*
- **Working Groups**
- **Future Plans and Challenges: Expected Impact**
- **Concluding Remarks**

Air-pollution: An International problem



Chernobyl, Ukraine



Yamuna-River, New-Delhi, India



Wastes in the Pacific Ocean are Equivalent to Texas-Area



Linfen, China

Polluted Cities, Europe



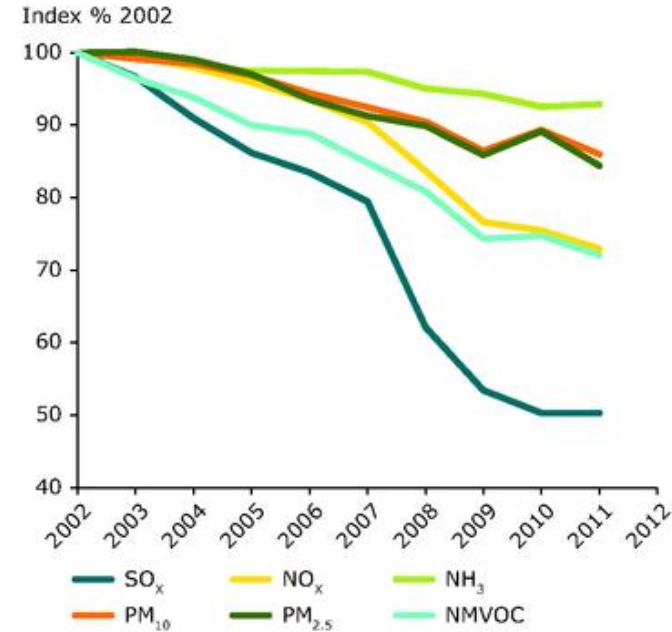
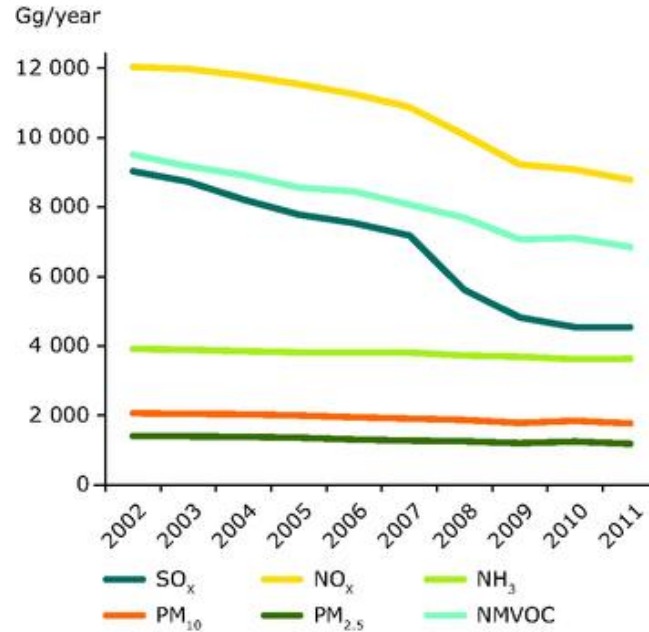
ATIIOI

River-Riachuelo, Buenos-Aires, Argentina



Scientific context: Air Quality Control (1/2)

European Environment Agency, EEA Report 9/2013

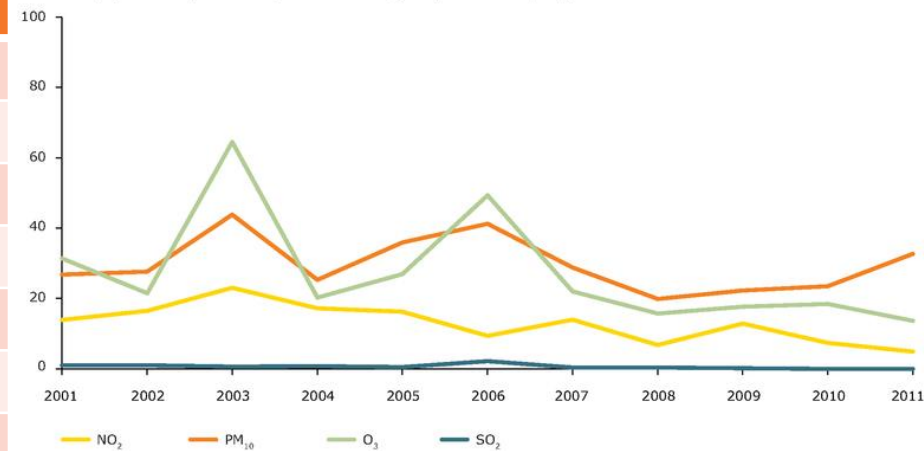


Some Environmental Emergencies:

- 1930 - Meuse Valley (Belgium)
- 1952 - Great London Smog (UK)
- 1954 - Los Angeles (USA)
- 1984 - Bhopal (India)
- 2005 - Teheran (Iran)
- 2006 - Hong Kong (China)
- 2008 - Shanghai, Peking (China)
- 2012 - Taranto (Italy)

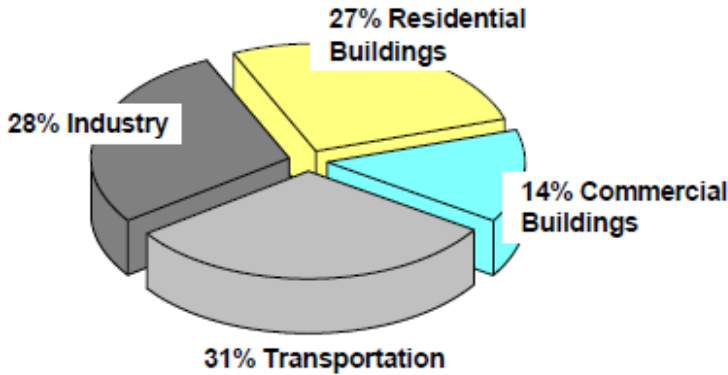
Pollutant	Limit Level
NO _x	100, 200 ppb
CO	8 ppm
SO ₂	130, 190 ppb
O ₃	120 µg/m ³
PM ₁₀	50 µg/m ³
BTEX	6 µg/m ³
PAH (BaP)	1 ng/m ³
PM _{2.5}	-

% of urban population exposed to air pollution exceeding acceptable EU air quality standard



AMBIENT AIR QUALITY EU DIRECTIVE 2008/50/EC and Daughters

Scientific context: Indoor/Outdoor Energy Efficiency (2/2)



Primary energy consumption in the EU¹

¹ O. Seppanen,

11th Conference on Indoor Air Quality
2008, Copenhagen, Denmark

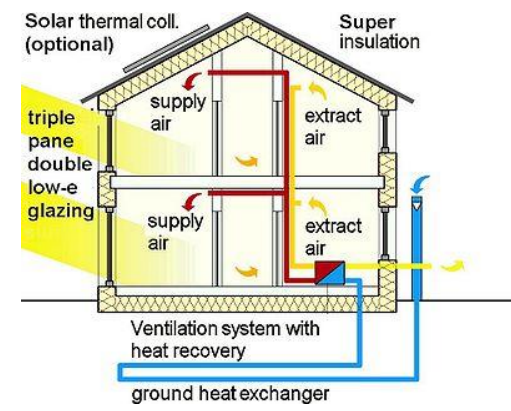
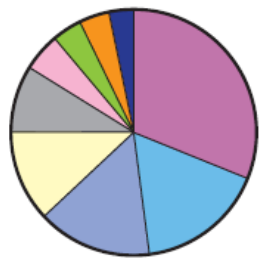
41% Primary Energy consumed in Buildings:

- 2/3 in Residential Buildings
- 1/3 in Commercial Buildings

Energy Performance of Buildings EU Directive
EPBD 2010/31/EC

Figure 2 – Total Energy Consumption by End Use
Adapted from E Source, 2006

- Ventilation 4%
- Refrigeration 3%
- Space Heating 31%
- Water Heating 17%
- Cooling 15%
- Lighting 12%
- Other 9%
- Cooking 5%
- Office Equipment 4%



Source: Environmental Protection Agency's National Action Plan for Energy Efficiency Sector Collaborative on Energy Efficiency Hotel Energy Use Profile

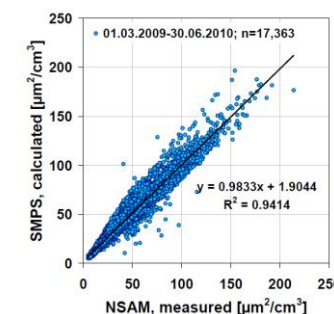
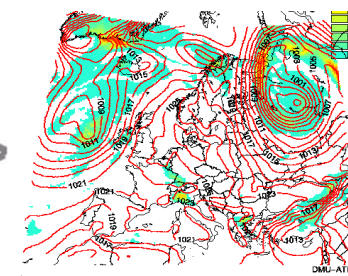
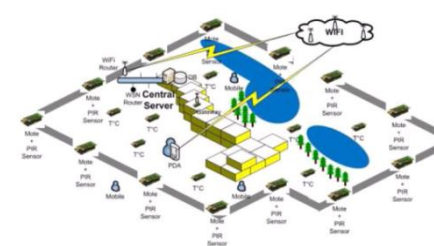
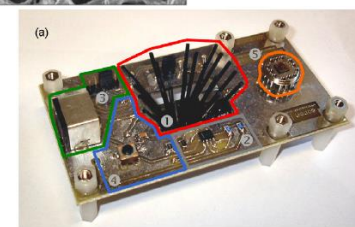
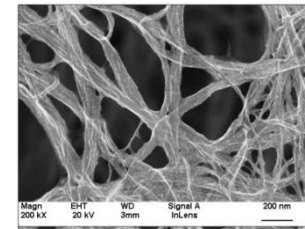
IAQ by WORLD HEALTH ORGANIZATION

Indoor Air		Typical Substances		Cure	
Contamination Source	Emission Source	VOCs	Others		
• Human Being	• Breath	Acetone, Ethanol, Isoprene		demand controlled ventilation	
		CO ₂			
	• Skin Respiration & Transpiration	Humidity			
		Nonanal, Decanal, α-Pinene			
	• Flatus	Methane, Hydrogen			
	• Cosmetics	Limonene, Eucalyptol			
	• Household Supplies	• Combustion (Engines, Appliances, Tobacco Smoke)	Alcohols, Esters, Limonene		
			Unburnt Hydrocarbons		
CO					
CO ₂					
		Humidity			
• Building Material • Furniture • Office Equipment • Consumer Products	• Paints, Adhesives, Solvents, Carpets	Formaldehyde, Alkanes, Alcohols, Aldehydes, Ketones, Siloxanes		permanent 5-10% ventilation	
		• PVC	Toluene, Xylene, Decane		
	• Printers, Copiers, Computers	Benzene, Styrene, Phenole			

Table 1 – Typical Indoor Air Contaminants (VOCs and others)

Challenges addressed by Action TD1105 (1/1)

- **Nanomaterials for AQC sensors**
- **Low-cost Gas Sensors**
- **Low-power Sensor-Systems**
- **Wireless Technology (*Environmental Sensors Network*)**
- **Air Quality Modelling**
- **Environmental Measurements**
- **Standards and Protocols**



Action's Objectives (1/3)

MoU Main Objectives of COST Action TD1105:

- To establish a *Pan-European multidisciplinary R&D platform* on new sensing paradigm for Air Quality Control (AQC) contributing to sustainable development, green-economy and social welfare.
- To create *collaborative research teams* in the ERA on the new sensing technologies for AQC in an integrated approach to avoid fragmentation of the research efforts.
- To train *Early Stage Researchers (ESRs)* and new young scientists in the field for supporting competitiveness of European industry by qualified human potential.
- To promote *gender balance* and involvement of ESRs in AQC.
- To disseminate *R&D results on AQC* towards *industry community* and policy makers as well as general public and high schools.

Action's Objectives (2/3)

MoU Secondary Objectives of COST Action TD1105:

- To provide a *platform between scientists* in the field of materials, nanotechnology and sensor-systems and other scientists such as environmental protection engineers, public agencies managers, stakeholders, decision-makers, aiming to improve best practices in AQC and explore the potential role of new generation of low-cost sensing devices.
- To investigate *sensing mechanisms* of functional nano-materials for gas measurement and identification of the best available nano-materials, providing concepts and harmonising pre-standardised methods; based on available datasets from partners.
- To assess *degradation rates and lifetime* of sensor elements in defined environmental conditions and evaluate interactions of sensitive materials with outdoor/indoor pollutants; based on datasets from ongoing and historical field deployments of low-cost sensors.
- To investigate *the best available technology* for sensor deployment, communication, power supply and data storage, analysis and display.

Action's Objectives (3/3)

MoU Secondary Objectives of COST Action TD1105:

- To monitor real-world environmental conditions with *experimental campaigns* to assess composition of *indoor air* (buildings: house and office) and *outdoor air* (urban areas and industrial sites) and to investigate how such data can be utilised in air pollution modelling.
- To approach *standardisation of methods* for air quality measurements, e.g. harmonisation of test procedures, chemical analysers, post processing, protocols, etc..
- To disseminate *knowledge* on functional materials and sensor-systems for AQC; to aid better focusing of Europe's resources by coordinated efforts in AQC and environmental sustainability to strengthen Europe's competitiveness and scientific excellence improving capacity building and networking to tackle global challenges in a big market in the mid-long term.

COST Action EuNetAir: Some National Research Projects

Nat. Res. Project:
NDIR-GAS SENSORS
Sector: ENV TECH, ICT
Lead Partner: CCMOS Ltd
Country: UK

Nat. Res. Project: SMART-GAS
Sector: ENV TECH
Lead Partner: SenseAir
Country: Sweden

Nat. Res. Projects: SMS-Nase, DFG
Sector: MATERIALS, AOC SENSORS
Lead Partner: ...

Nat. Res. Project: NANOSENSORS
Sector: MATERIALS, GAS SENSORS
Lead Partner: C - CN Academy of Science
Country: China

Nat. Res. Project: SNAQ-Health
Sector: ...
Lead Partner: ... Cambridge
Country: UK

Nat. Res. Project: ... EFFICY
Sector: ...
Lead Partner: ...
Country: Germany

Nat. Res. Projects: RF-SENS, INTEGROSENS
Sector: ENV, GAS SENSORS, CONTROL
Lead Partner: University of Bayreuth
Country: Germany

Nat. Res. Project: SMART SENSOR
Sector: MATERIALS, GAS SENSOR
Lead Partner: NRC - Kurchatov Institute
Country: Russian Federation

Nat. Res. Project: HTS&M
Sector: Materials, NanoDev
Lead Partner: IMEC
Country: Netherlands

Nat. Res. Projects: VOC-IDS (EraNet), IGFL
Sector: ENV, SECURITY, ICT
Lead Partner: LMT-Saarland University
Country: Germany

Nat. Res. Project: CAPBTX
Sector: GAS SENSORS, ENV
Lead Partner: ...
Country: ...

Nat. Res. Project: CABTURES
Sector: NANO, SENSORS
Lead Partner: EPFL
Country: Switzerland

Nat. Res. Projects: IDEA, MOBILE SENSING
Sector: ENV, ICT
Lead Partner: VITO
Country: Belgium

Nat. Res. Project: SMART NANOSENSORS
Sectors: CNT NANOSENSORS FOR SPACE, COMMERCIAL/INDUSTRIAL APPLICATIONS
Lead Partner: NASA Ames Research Center
Country: USA

Nat. Res. Project: NAVACS, N...
Sector: NANO, GAS SENSORS
Lead Partner: IREC
Country: Spain

Nat. Res. Project: VALTEC, TEC
Sector: NANO, GAS SENSORS
Lead Partner: UB, IREC
Country: ...

Nat. Res. Projects: FC Aeth, Air Pollution
Sector: ENV TECHNOL
Lead Partner: Aerosol 2.0
Country: Slovenia

Nat. Res. Project: InTechFun
Sector: MATERIALS, SENSORS
Lead Partner: SUT
Country: Poland

Nat. Res. Projects: VAMOS, CARIATI
Sector: ENV
Lead Partner: CSIC
Country: Spain

Nat. Res. Projects: VOC&ODOR, SIMPA
Sector: ENV
Lead Partner: UNIBA
Country: Italy

Nat. Res. Projects: SIMS, RES...
Sector: ICT, Materials, Env
Lead Partner: ENEA
Country: Italy

Nat. Res. Projects: ...
Sector: ...
Lead Partner: ...
Country: Italy

Nat. Res. Projects: NOVANA, ARCTIC
Sector: ...
Lead Partner: Aarhus University
Country: Denmark

Nat. Res. Projects: FIRB, NANOTHER, CARIPLO
Sector: NANOMATERIALS, GAS SENSORS, ENERGY
Lead Partner: UNIBS; ...
Country: Italy

Nat. Res. Projects: EXOTHERMO
Sector: MATERIALS, GAS SENSORS, ENERGY
Lead Partner: FORTH; ...
Country: Greece

Nat. Res. Projects: CWFIS, SFO
Sector: ENV, AQ Modelling
Lead Partner: NIMH
Country: Bulgaria

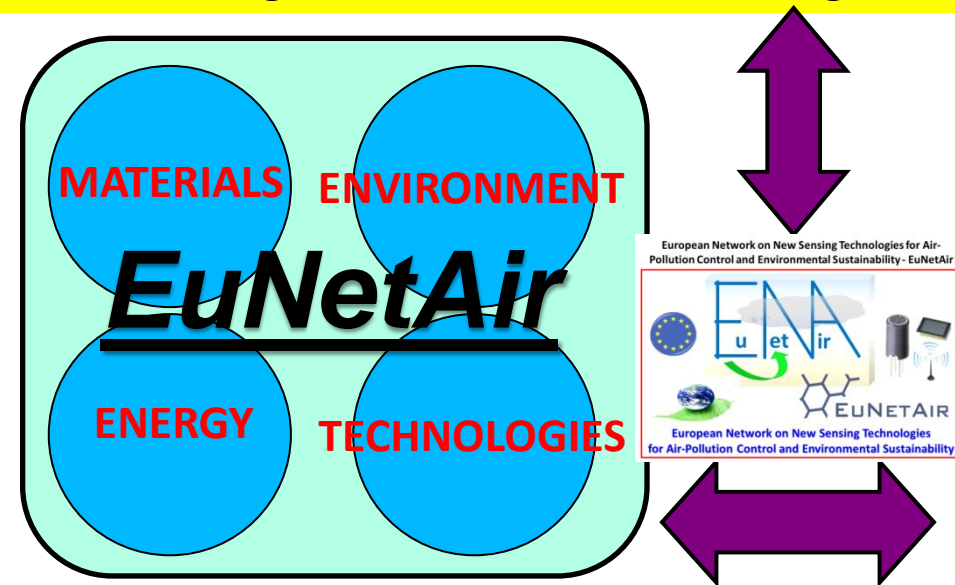
COST Action EuNetAir

COST Action EuNetAir

COST Action EuNetAir: **INNOVATION** (1/2)

Complementarity with other COST Actions:

- ES0602 Chemical Weather Forecasting and Information Systems
- ES1004 European Framework for Online Integrated Air Quality and Meteorology Modelling
- MP0701 Composites with Novel Functional and Structural Properties by Nanoscale Materials
- MP0901 Designing Novel Materials for Nanodevices: From Theory to Practice
- TU0902 Integrated Assessment Technologies to Support the Sustainable Development of Urban Areas



RELATED FP6-FP7 PROJECTS:

- NANOS4, NMP
- S3, EU-RUSSIA COOPERATION
- ORAMA, NMP
- NANO2HYBRIDS, NMP
- AIRMONTECH, ENV
- AQUILA, ENV
- OFFICAIR, ENV
- CITI-SENSE, ENV
- GOSPEL, Network of Excellence in Artificial Olfaction
- FLEXSMELL, PEOPLE Marie-Curie Action

INNOVATION of ACTION:

Integrated approach on AQC for environmental sustainability by cooperative networking of multidisciplinary research on nanomaterials, gas sensing technologies, wireless sensor technologies and networks, environmental measurements, ambient intelligence, air quality modelling, chemical weather forecasting, harmonisation of measurements, protocols, methods, standards and procedures for commercialisation of low-cost AQC sensors.

Innovation Highlights of COST Action TD1105 *EuNetAir*:

The Working Program includes multidisciplinary Research at integrated approach and trans-domain multi-scale level:

- Nanomaterials for low-cost AQC sensors
- Improved gas sensor systems and low-power sensing microdevices
- Wireless sensor networks and distributed intelligence
- Air-quality modelling and chemical weather forecasting
- New protocols, standards and methods for AQC sensors
- Harmonisation of environmental measurements
- Guidelines for AQC systems and transducers
- Environmental sustainability and energy efficiency



EuNetAir SOLUTIONS: NANOMATERIALS AND NANOTECHNOLOGIES

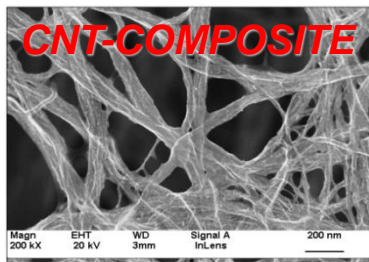
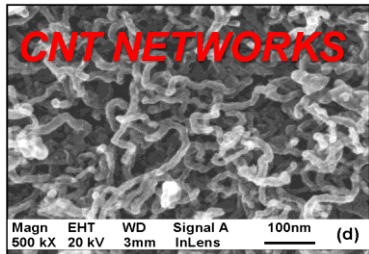
Metal Oxides Nanostructures by University of Brescia,



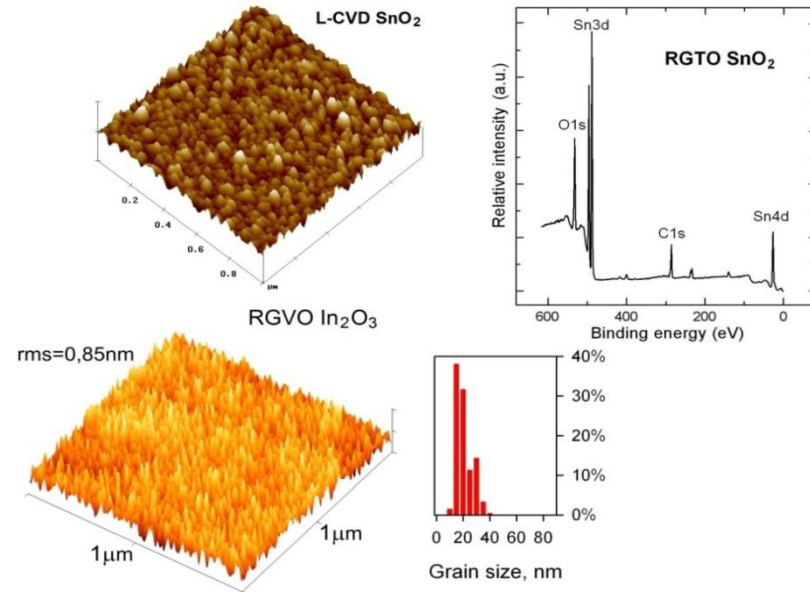
*The increasing scientific interest in **1-D systems** (nanowires, nanobelts, nanorods, nanotubes) and single-crystalline 1-D nanostructures (SnO_2 , ZnO , WO_3 , In_2O_3 , MoO_3 , TiO_2 , etc.) are nowadays emerging as building blocks for a new generation of electronic, and optoelectronic nanometer-scaled devices with superior performances for gas sensing and energy applications.*



Carbon nanotubes (CNT) in the form of networks and composite as filler in an organic matrix by ENEA, Italy



RGTO (RGVO) SnO_2 and In_2O_3 nanolayers by Silesian University of Technology, Poland



PROPERTY OF CNTs	VALUE
High surface area	100 - 1800 m^2/g
Hollow structure	1 - 5 nm diameter
Nanosized morphology	10 - 1000 Aspect ratio
High electron mobility	up to 10000 $\text{cm}^2\text{Vs}^{-1}$, at 300K
High structural/chemical reactivity	Bending at high angle ($< 40^\circ$)
High thermal stability	1800 - 6000 $\text{Wm}^{-1}\text{K}^{-1}$ therm. cond.
Electrical Resistivity	1 - 100 $\text{k}\Omega$ (p-type Semiconductor)

EuNetAir SOLUTIONS: WIRELESS TECHNOLOGY

Production version of the mote technology from EPSRC MESSAGE.

3 electrochemical gas sensors, temperature, humidity & noise.

IEEE 802.15.4 wireless mesh networking of up to 100 motes (up to 100 m between motes).

Custom network protocols for routing and power management.

Solar rechargeable battery + Lithium D cell backup.

Designed for easy deployment on lighting columns etc.

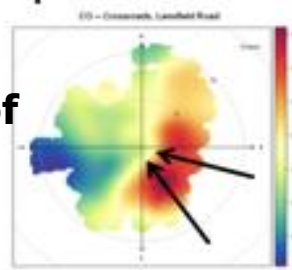
Low cost, rapid deployment and high spatial resolution.



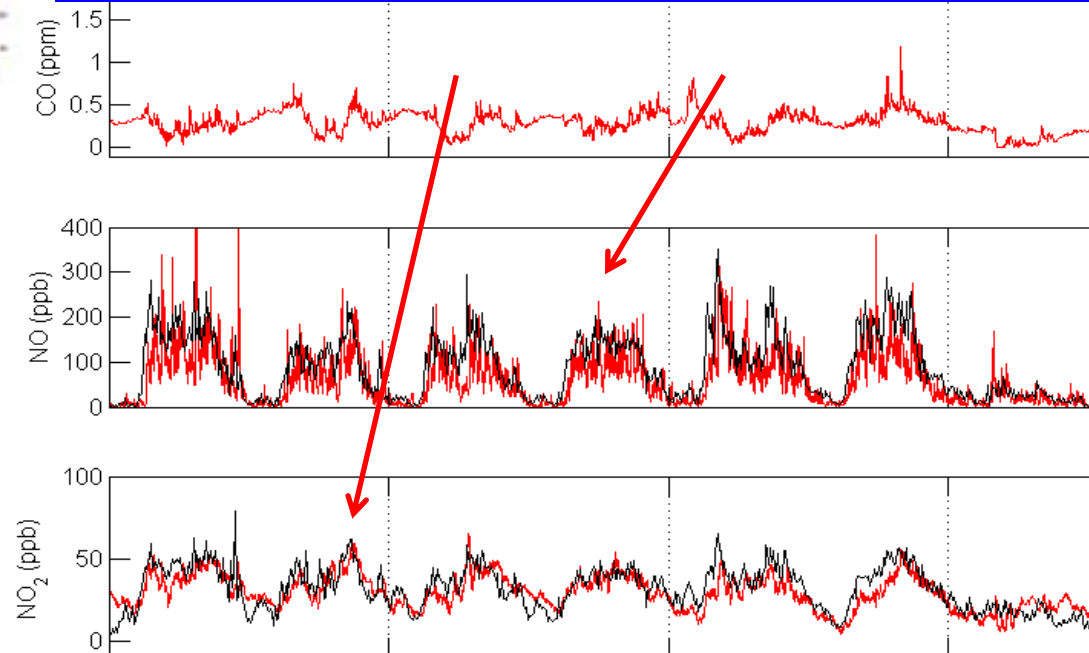
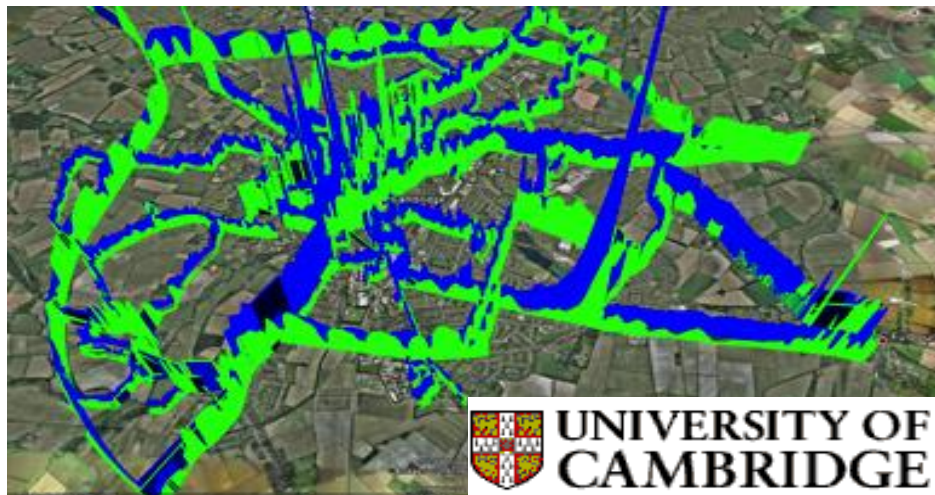
The Envirowatch mote

Automatically corrects mote electrochemical sensor data for temp and humidity (red) to achieve excellent agreement with precision instruments (black)

High granularity evaluation of air quality (e.g. NO_x , below), source attribution (right).

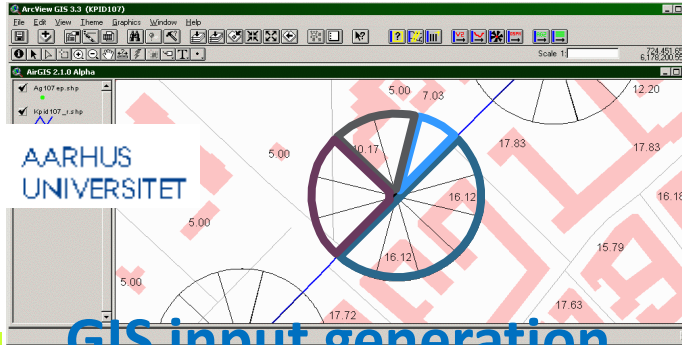
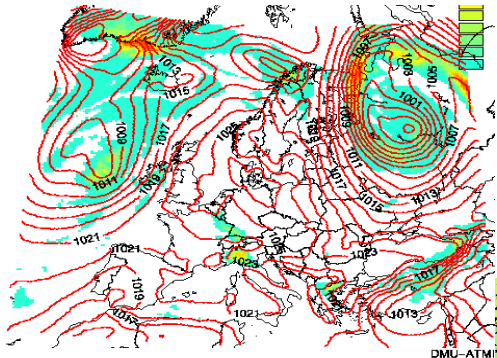


WIRELESS SENSORS NETWORK for AQC



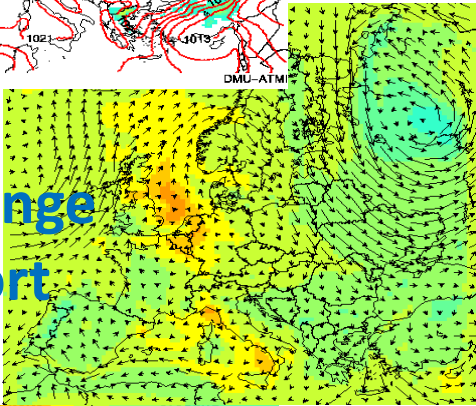
EuNetAir SOLUTIONS: AIR QUALITY MODELLING

Chemical weather

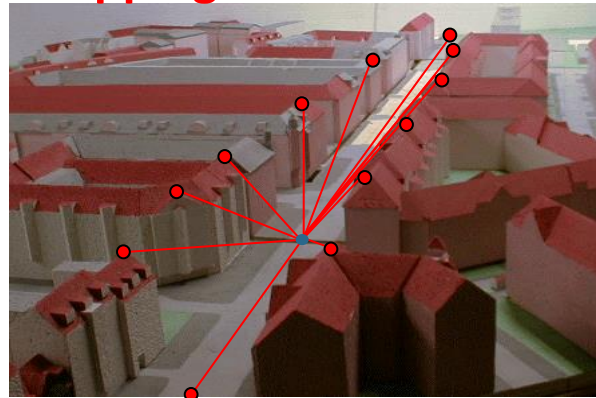


GIS input generation

Long-range transport



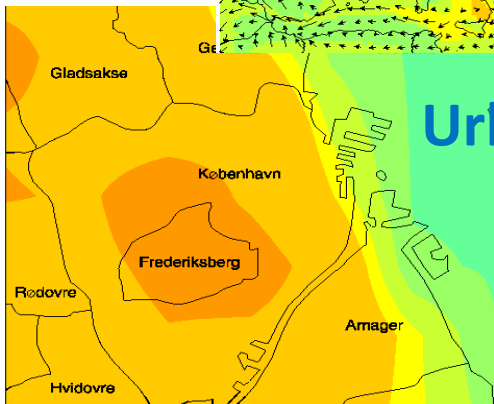
Mapping addresses



AirTHESS: operational AQ management and information system for Thessaloniki, Greece, employing Computational Intelligence for AQ forecasting and mobile phone technology for early warning messages.

By Aristotle University, Greece.

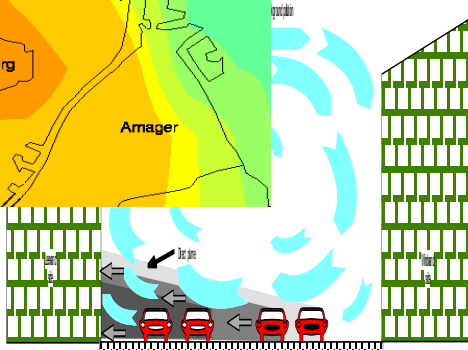
Urban scale



Tracking routes

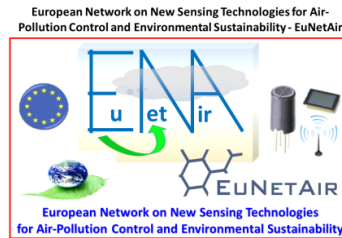


Street scale



ArcView script for visualisation

Action TD1105 *EuNetAir*: Working Groups (1/5)



WG1:
**Sensor Materials
&
Nanotechnologies**

WG2:
**Sensors, Devices
& Systems for AQC**

WG4:
**Protocols &
Standardisation
Methods**

WG3:
**Env. Measurements
&
Air Pollution Modelling**

**INTERDISCIPLINARY
SPECIAL INTEREST GROUPS**

MANAGEMENT COMMITTEE:

CORE-GROUP & STEERING COMMITTEE

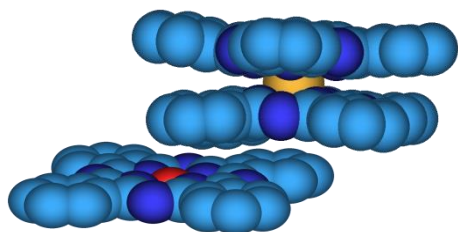
- *Editorial Board*
- *Dissemination*
- *Training Schools*
- *Gender Balance*
- *Early Stage Researchers (ESR)*
- *Short-Term Scientific Mission (STSM)*
- *Intellectual Property Rights (IPR)*
- *Local Organizing Committee (LOC)*

- **SIG 1: Network of Spin-offs**
- **SIG 2: Smart Sensors for Urban Air Monitoring in Cities**
- **SIG 3: Guidelines for Best Coupling Air Pollutant-Transducer**
- **SIG 4: Expert comments for the Revision of the Air Quality EU Directive**

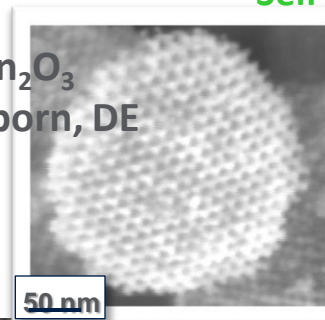
- Sub-Working Group 1.1:**
Metal oxides nanostructures for AQC gas sensors.

- Sub-Working Group 1.2:**
Carbon nanomaterials for AQC gas sensors.

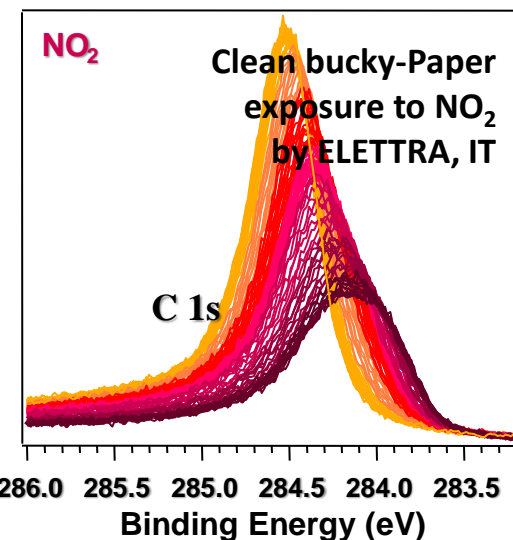
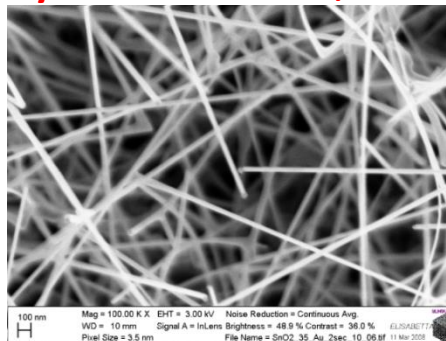
- Sub-Working Group 1.3:**
Emerging sensor materials (organic/inorganic, hybrid, nanocomposites, polymers, functional, etc.).



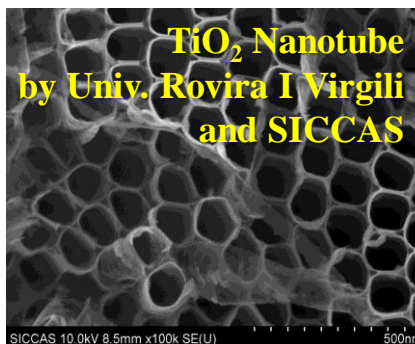
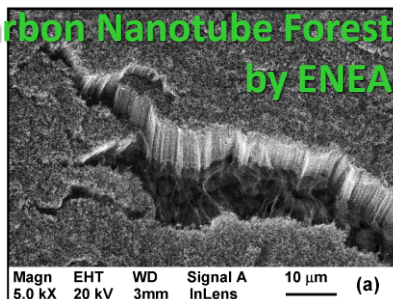
Mesoporous In₂O₃
by Univ. of Paderborn, DE



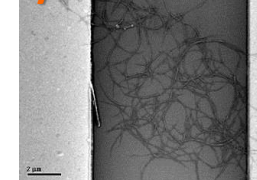
Metal oxide (SnO₂)
Nanowires nets
by Univ. of Brescia, IT



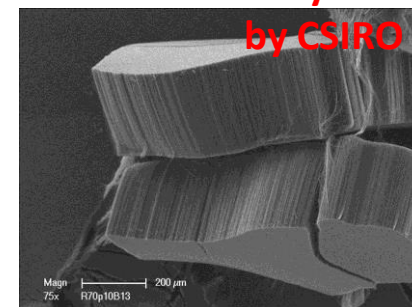
Carbon Nanotube Forest
by ENEA



Carbon Nanotube ropes
by Ames NASA



Carbon Nanotube yarns
by CSIRO



New molecular materials of polymer-macrocycles as transducers for polluting gas sensing by University of Bourgogne

TD1105 *EuNetAir* **WG2**: Sensors, Devices and Systems for AQC (3/5)

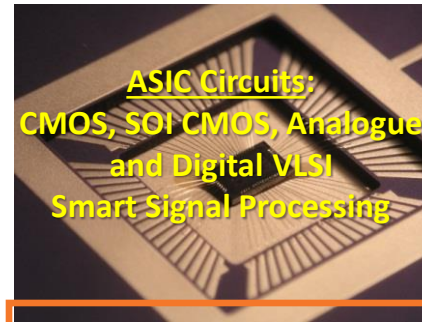
WG2 Chair: Prof. Andreas Schuetze, Saarland University, Germany

IT PATENT ENEA

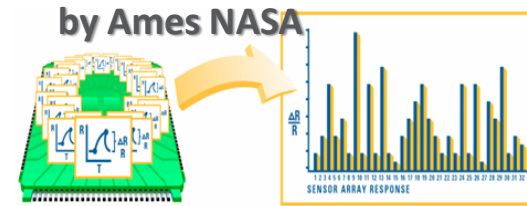
Carbon Nanotube Gas Sensors



EnviroWatch mote by Newcastle University



Warwick University in collaboration with Cambridge University, EPFL, PennState.

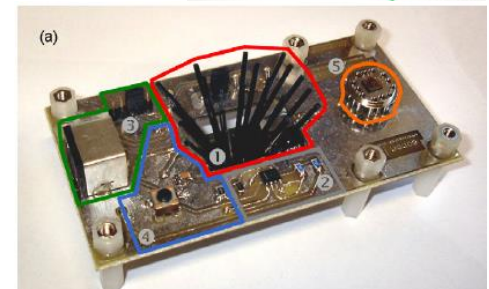


Using pattern matching algorithms, the data is converted into a unique response pattern

A versatile platform for the efficient development of gas detection systems based on automatic device adaptation by University of Saarland.

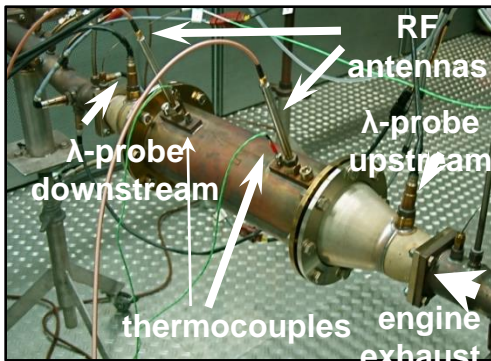


Low-ppb sensitivity for NO₂ GaN-based sensor concept



Autonomous Gas Sensor System by IREC and Univ. of Barcelona

- Sub-Working Group 2.1: Gas sensors and new transducers.
- Sub-Working Group 2.2: Portable gas sensor-systems.
- Sub-Working Group 2.3: Wireless technology and AQC sensors network.
- Sub-Working Group 2.4: Intelligence algorithms and distributed computing for networked AQC gas sensors.



Direct status measurement of automotive catalysts by radio-frequency technique by University of Bayreuth, DE.

ERATION IN SCIENCE AND TECHNOLOGY

Sub-Working Group 3.1:

Environmental measurements at laboratory and in field air-quality stations.

Sub-Working Group 3.2:

Air-quality modelling and chemical weather forecasting.

Sub-Working Group 3.3:

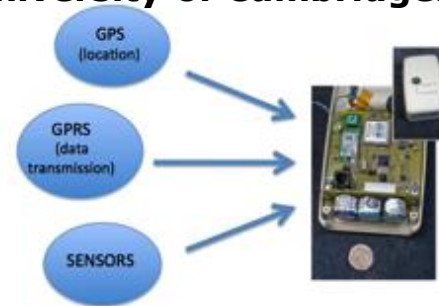
Harmonisation of environmental measurements.

by Aristotle University, EL

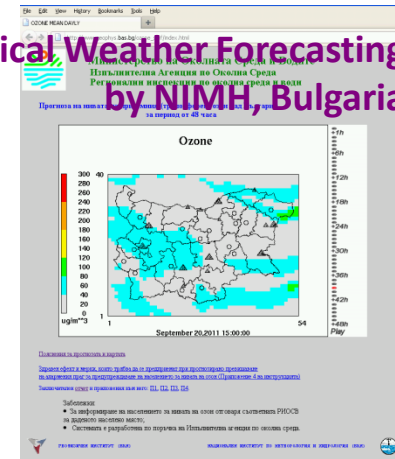


AirMerge system for Chemical Weather Models

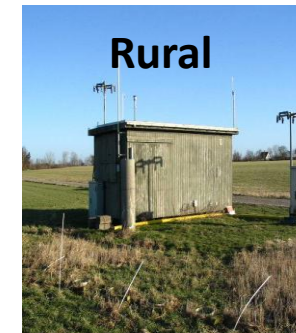
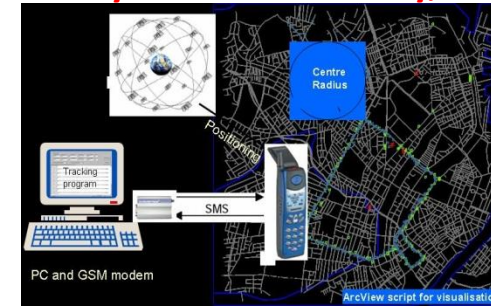
Mobile and static sensor network configurations by University of Cambridge.



Chemical Weather Forecasting by NIMH, Bulgaria



AQ Modeling: Tracking routes by Aarhus University, DK



Environmental measurements of PM and air pollution by CSIC, ES

AQ monitoring station by ARPA-PUGLIA, IT

AQ monitoring station by Aarhus University, DK

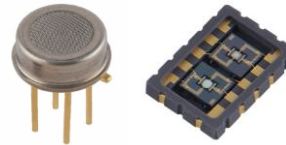
AQ monitoring station by Lithuanian EPA

- **Sub-Working Group 4.1:** Protocols, standards and methods for AQC by analyzers/instruments (no-sensors) technologies.
- **Sub-Working Group 4.2:** Protocols, standards and methods for AQC by sensors (no-analyzers) technologies.
- **Sub-Working Group 4.3:** Benchmarking of new products and market of commercial AQC sensors.

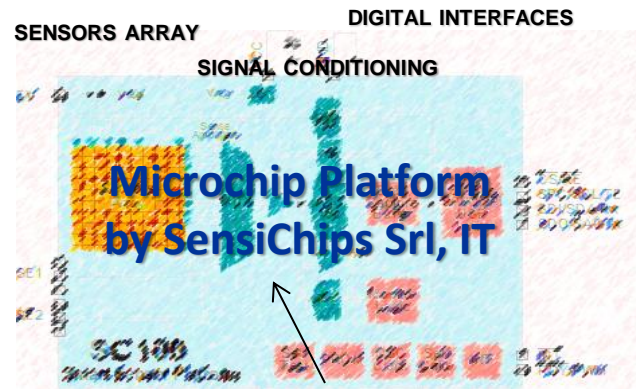
European Directive 2008/50/EC: Ambient Air Quality
EU standard EN 13725/2003: Dynamic Olfactometry

Protocols and Standardised Methods for Gas Sensors
Guidelines of Best Transducers applied to specific gases

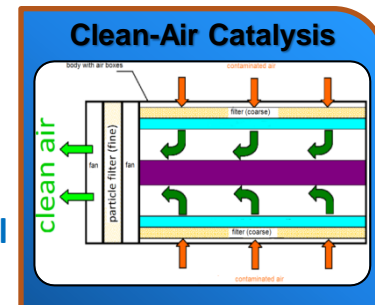
Dynamic olfactometry EN13725
by Univ. of Liege, Odometric SA,
Univ. of Bari, Lenviros srl.



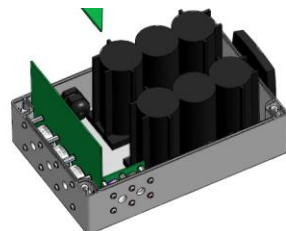
Packaged Sensors
by **SGX-Sensortech, CH**



New precision multi-parametric analytical tool



Becker Gruppe, DE

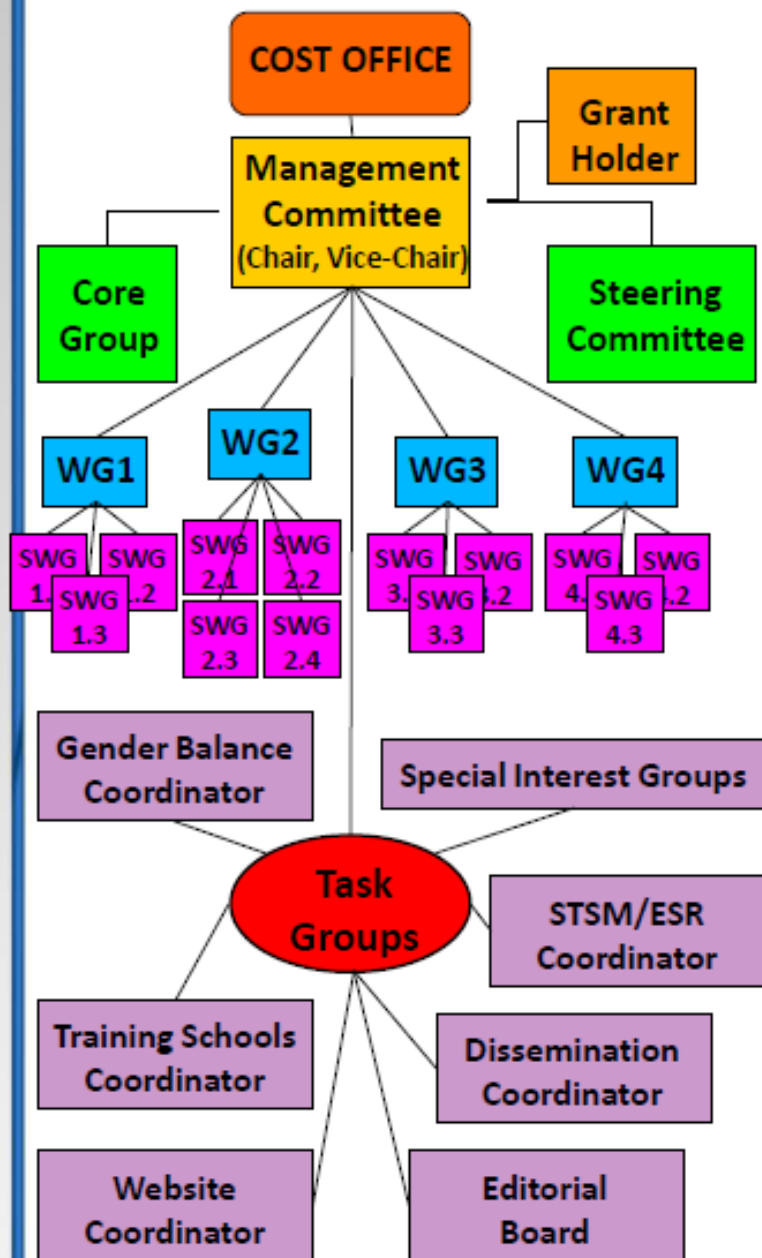


Battery-Powered Sensors by Alphasense Ltd, UK



CO₂ IR sensor for alarm
System by SenseAir AB, Sweden

COST Action EuNetAir: COORDINATION AND ORGANIZATION



MANAGEMENT COMMITTEE

2 Representatives of participating Countries

Steering Committee:

- ✓ Action Monitoring
- ✓ Milestones settings
- ✓ Prepare MC meetings
- ✓ Management of IPR issues

Core Group:

- ✓ Prepare Documents for MC
- ✓ Prepare MC meetings
- ✓ Executive tasks in Action

- Meet every 6 months
- S&T exchange
- Cooperation
- Researcher mobility (STSM)
- Budget management
- Report to COST Office
- Organize Workshops/Conferences
- Organize Training Schools
- Promote Gender Balance
- Action Results Dissemination
- Evaluation plans

CORE GROUP

Action Chair
Action Vice Chair
Secretary

WGs Coordinator

- Organize WG meetings
- Coordination
- Monitoring
- Promote joint-activities
- Report to MC and SG

STSM/ESR Coordinator

- STSM/ESR agenda
- Training agenda

Gender Coordinator

- Gender agenda
- Care for gender balance

Dissemination Coordinator

- Dissemination activities
- Action Website
- Local Organizing Committee

NETWORKING

- Special Interest Groups (SIGs)
- Network of spin-offs
- International Experts
- Keynote Speakers

COST Action TD1105 ROADMAP (2012-2016)

YEAR	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1	<p><u>M</u>: Kick-Off Meeting. MC Meeting 1.</p> <p><u>D</u>: MC setup and Action Workplan established</p>	<p><u>M</u>: Editorial Board for Leaflet, Brochure, Newsletter. Action website setup.</p> <p><u>D</u>: Definition of WGs and WGs Workplans</p>	<p><u>M</u>: MC Meeting 2.</p> <p>WGs Meeting 1.</p> <p><u>D</u>: Scientific activities, ESR/STSM program, Dissemination</p>	<p><u>M</u>: Workshop 1. Training School 1.</p> <p>State-of-Art on AQC.</p> <p><u>D</u>: Evaluation and Activity Report. Scientific strategies</p>
2	<p><u>M</u>: MC Meeting 3. WGs Meeting 2. Update Action website.</p> <p><u>D</u>: Scientific activities. Liason with EU Programs</p>	<p><u>M</u>: Editorial Board meeting. ESR/STSM.</p> <p><u>D</u>: Dissemination. Newsletter. Reporting</p>	<p><u>M</u>: MC Meeting 4.</p> <p>WGs Meeting 3.</p> <p>Workshop 2. Training School 2.</p> <p><u>D</u>: S&T strategies</p>	<p><u>M</u>: International Conference 1. Edit. Board. ESR/STSM.</p> <p><u>D</u>: Dissemination. Reporting</p>
3	<p><u>M</u>: MC Meeting 5. WGs Meeting 4.</p> <p><u>D</u>: Dissemination. Strategies & Activities</p>	<p><u>M</u>: Edit. Board: State-of-art AQC. ESR/STSM</p> <p><u>D</u>: Dissemination. Strategies. Reporting</p>	<p><u>M</u>: MC Meeting 6.</p> <p>WGs Meeting 5.</p> <p>Workshop 3. Training School 3.</p> <p><u>D</u>: S&T strategies</p>	<p><u>M</u>: Edit. Board: Newsletter. ESR/STSM</p> <p><u>D</u>: Dissemination. Reporting</p>
4	<p><u>M</u>: . MC Meeting 7. WGs Meeting 6.</p> <p><u>D</u>: S&T strategies. Link to EU programs, Industry</p>	<p><u>M</u>: Workshop 4. Training School 4.</p> <p><u>D</u>: Dissemination. ESR/STSM. S&T strategic activity.</p>	<p><u>M</u>: WGs Meeting 7.</p> <p><u>D</u>: S&T strategies and activities. ESR/STSM. Dissemination</p>	<p><u>M</u>: International Conference 2. MC Meeting 8.</p> <p><u>D</u>: Final Evaluation. Reporting</p>

M: Milestones **D: Deliverables**

COST Action TD1105 *EuNetAir*: Dimension

PARTIES

Already accepted MoU: 28 Countries

Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Former Yugoslav Republic of Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom.

Non-COST Countries: 5

Australia, Canada, China, Russia, USA

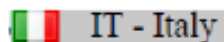
New Candidates NNC: Morocco, Ukraine

Number of Participants: > 150


N.r of Research Teams including Academia, Research, Industry, Agencies: > 80

 AT - Austria	Materials Center Leoben Forschung GmbH	
 BE - Belgium	VITO, Université de Liège, Odometric S.A.	
 BG - Bulgaria	National Institute of Meteorology and Hydrology - BAS; Institute of Electronics - BAS	
 CH - Switzerland	Ecole Polytechnique Fédérale de Lausanne; e2v Microsensors S.A.; EnvEve S.A.; EMPA	
 CZ - Czech Republic	Academy of Sciences of the Czech Republic	
 DE - Germany	Institute of Energy and Environmental Technology; Saarland University; MPI for Biogeochemistry Univ. of Bayreuth; Univ. of Paderborn; Univ. Applied Sci. Ostwestfalen-Lippe; UST; Alfred Becker; 3S	
 DK - Denmark	Aarhus University; Technical University of Denmark - DTU	
 EL - Greece	Aristotle University; FORTH; Athena/ISI; University of Piraeus	
 ES - Spain	Catalonia Institute for Energy Research - IREC; Spanish National Research Council - CSIC; University Rovira i Virgili; University of Barcelona, Worldsensing S.L.	
 FI - Finland	University of Oulu; University of Helsinki; Tampere University of Technology	
 FR - France	University of Bourgogne; University Blaise Pascal; Ecole des Mines de Douai; CEA-CNRS; ETHERA	
 HU - Hungary	Hungarian Meteorological Service	
 IS - Iceland	Agricultural University of Iceland	 MK - Republic of Macedonia Ministry of Environment and Physical Planning
 IE - Ireland	Trinity College Dublin; University College Cork	
 IL - Israel	AirBase Systems; TECHNION	 RS- Serbia Institute of Public Health of Belgrade; VINCA
 IT - Italy	ENEA; ELETTRA; Univ. of Bari; Univ. of Brescia; Univ. of Trieste; Lenviros; Sensichips, ARPA-Puglia	
 LV - Latvia	University of Latvia	
 NL - Netherlands	IMEC - Holst Centre; ECN	
 NO - Norway	NILU - Norwegian Institute for Air Research	
 PL - Poland	Silesian University of Technology; Warsaw University of Life Science	
 PT - Portugal	Univ of Coimbra; Instit. of Environment & Development; National Health Institute; Univ of Lisbon	
 RO - Romania	National R&D Institute for Nonferrous and Rare Metals; SC IPA SA - Research & Development	
 SE - Sweden	Linköping University; Chalmers University of Technology; SenSiC AB; SenseAir AB	
 SI - Slovenia	University of Ljubljana; Aerosol d.o.o.	
 UK - United Kingdom	Imperial College London; Newcastle University; University of Manchester; Cambridge; University of Warwick; University of Edinburgh; Cambridge CMOS Sensors; Alphasense	
 TR - Turkey	GEBZE Institute of Technology; Middle East Technical University of Ankara	


EuNetAir: List of Experts

 IT - Italy


170 EXPERTS from **28** COST Countries
and **7** Non-COST Countries

 AT - Austria


Dr. Anton KOCK
Dr. Stefan DEFREGGER

 BE - Belgium


Prof. Anne-Claude ROMAIN
Dr. Jan THEUNIS
Dr. Julien DELVA

 BG - Bulgaria


Dr. Dimiter SYRAKOV
Dr. Ivan NEDKOV

 CH - Switzerland


Dr. Danick BRIAND
Dr. Marco BRINI
Dr. Christine ALEPEE
Dr. Nicolas MOSER
Dr. Christoph HUEGLIN

 CZ - Czech Republic


Dr. Vera KURKOVA
Dr. Roman NERUDA
Dr. Zdenek ZELINGER

 DE - Germany


Dr. Thomas A. J. KULHUSCH
Dr. Ulrich QUASS
Prof. Andreas SCHUETZE
Dr. Tilman SAUERWALD
Prof. Ralf MOOS
Dr. Daniela SCHONAUER-KAMIN
Dr. Thorsten WAGNER
Dr. Olaf KIESEWETTER
Dr. Thorsten CONRAD
Dr. Thomas BECKER
Prof. Wrenger Burkhard
Dr. Jost Valentin Lavric
Dr. Corinna HAHN

 DK - Denmark


Prof. Ole HERTEL
Dr. Lise Lotte SORENSEN
Prof. Anja BOISEN
Dr. Silvan SCHMID

 EL - Greece


Prof. Kostas KARATZAS
Prof. George KIRIAKIDIS
Dr. Christos KOULAMAS
Prof. George PAPAPOPOULOS
Prof. Tatiana TAMBOURATZIS

 ES - Spain


Prof. Juan Ramon MORANTE
Dr. Francisco HERNANDEZ
Dr. Xavier QUEROL
Dr. Mar VIANA
Prof. Eduard LLOBET
Dr. Radu IONESCU
Prof. Albert ROMANO
Dr. Juan Daniel PRADES
Dr. Jordi LLOSA

 FI - Finland


Prof. Heli JANTUNEN
Prof. Jyrki LAPPALAINEN
Dr. Jari JUUTI
Prof. Kaarle HAMERI
Prof. Jorma KESKINEN

 FR - France


Prof. Marcel BOUVET
Prof. Jerome BRUNET
Prof. Alain PAULY
Dr. Jean SUISSE
Dr. Amadou NDYAE
Dr. Thu-Hoa THRAN-THI
Dr. Philippe KARPE
Prof. Jerome ROSSIGNOL
Prof. Nadine LOCOGE

 HU - Hungary


Dr. Zita FERENCZI
Dr. Krisztina LABANCZ

 IS - Iceland


Dr. Arngrimir THORLACIUS

 IE - Ireland


Dr. Francesco PILLA
Prof. John WENGER

 MK - Rep. of Macedonia


Dr. Igor ATANASOV
Dr. Ljupcho GROZDANOSVKI

 NL - Netherlands


Dr. Sywert BRONGERSMA
Dr. Ernie WEIJERS
Dr. Rene OTJES

 PL - Poland


Dr. Monika KWOKA
Prof. Stanislaw GAWRONSKI
Prof. Jacek SZUBER

 PT - Portugal


Prof. Bernadete RIBEIRO
Prof. Carlos BORREGO
Dr. Joao Paulo TEIXEIRA
Prof. Cristina MAGUAS
Dr. Miguel COUTINHO
Dr. Ana Margarida COSTA

 SE - Sweden


Prof. Anita LLOYD SPETZ
Dr. Marina VOINOVA
Dr. Mike ANDERSSON
Dr. Donatella PUGLISI
Dr. Ulf THOLE
Prof. Ingrid BRYNTSE

 IL - Israel


Dr. Liad ORTAR
Prof. Hossam HAICK

 UK - United Kingdom


Prof. Julian GARDNER
Prof. Roderic JONES
Prof. Krishna PERSAUD
Prof. John POLAK
Dr. Robin NORTH
Dr. Jeff NEASHAM
Dr. Fabio GALATIOTO
Prof. Florin UDREA
Dr. John SAFFELL
Prof. John LEE

 NO - Norway


Dr. Nuria Castell-BALAGUER
Dr. Philippe SCHNEIDER

 RO - Romania


Dr. Roxana Mioara PITICESCU
Dr. Marcel IONICA
Dr. Cristina RUSTI
Dr. Radu Adrian IONICA

 TR - Turkey


Prof. Zafer Ziya OZTURK
Prof. Mehmet Fatih DANISMAN

 RS - Serbia

Anka CVETKOVIC
Milena JOVASEVIC-STOJANOVIC

 SI - Slovenia

Rahela ZABKAR
Grisa MOCNIK
Branko STER

 LV - Latvia

Prof. Iveta STEINBERGA

COST Action TD1105 *EuNetAir*: 28 COST Countries (Parties) have already signed Memorandum of Understanding (MoU)

PARTIES

already accepted
MoU: 28 Countries

Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, The Former Yugoslav Republic of Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom.

COST Action *EuNetAir* PARTICIPANTS

The following logos are displayed around the map:

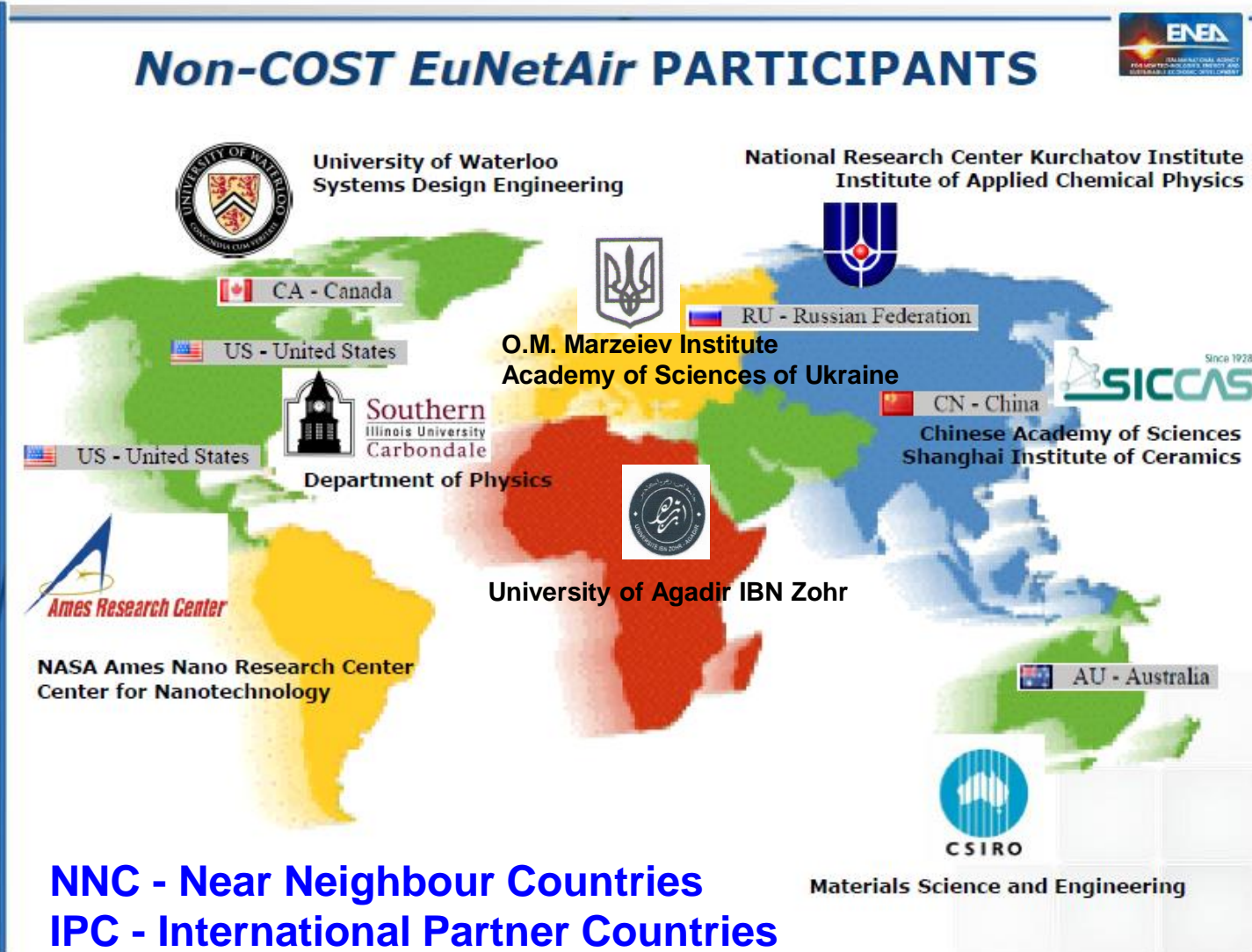
- vito
- UNIVERSITÄT DE LIÈGE
- Arion campus
- ODOMETRIC
- ICICJR
- CAMBRIDGE CMOS SENSORS
- TRINITY COLLEGE DUBLIN
- MPI-BCC
- UNIVERSITY OF LIJING
- ENEA
- UNIVERSITÄT PADERBORN
- e2v
- ENVEVE
- EMPA
- ECN
- NILU
- UNIVERSITÄT DES SAARLANDES
- FM FUNCTIONAL MATERIALS
- ETHERA
- idat
- AIRBASE
- LATVIJAS UNIVERSITÄTE
- UNIVERSITÄT PADERBORN
- BECKER GRUPPE
- 3S Gas sensing solutions
- UST
- UMWELT SENSOR TECHNIK
- IMNR
- UNIVERSITÄT AARHUS
- DTU
- Aristotle University Thessaloniki
- UNIVERSITÄT DE BARCELONA
- FORTH
- I.S.I. Industrial Systems Institute
- IREC
- MINISTERIO DE CIENCIA E INNOVACION
- CSIC
- UNIVERSITÄT DE BARCELONA
- UNIVERSITÄT ROMA TOR VERGATA
- world sensing
- UNIVERSITY OF OULU
- UB
- UNIVERSITÄT BLAISE PASCAL
- HMS
- imec
- ENEA
- elettra
- UNIVERSITÀ DEGLI STUDI DI TRIESTE
- Dipartimento di Scienze Chimiche e Farmaceutiche
- UNIVERSITÄT ST. CLAUDIUS
- lenviros
- sensichips
- CHALMERS
- SenseAir
- SENSIC Clean air sensors
- Aerosol
- Linköpings universitet
- Imperial College London
- Newcastle University
- UNIVERSITY OF CAMBRIDGE
- WARWICK
- MANCHESTER 1824

COST Action TD1105 *EuNetAir*:

7 Non-COST Countries and 8 Non-COST Institutions

Non-COST Countries:
Australia, Canada, China,
Morocco, Russia, **Ukraine**,
USA

Non-COST Institutions:
CSIRO (**Australia**);
University of Waterloo
(**Canada**); Chinese Academy
of Sciences, Shanghai
Institute of Ceramics
(**China**); University of Agadir
IBN Zohr (**Morocco**);
National Research Center
Kurchatov Institute (**Russia**);
O.M. Marzeiev Institute for
Hygiene and Medical
Ecology of Academy of
Science of Ukraine
(**Ukraine**); Southern Illinois
University Carbondale,
NASA Ames Research
Center (**USA**).



NNC - Near Neighbour Countries
IPC - International Partner Countries

EuNetAir: List of Experts from NNC and IPC



170 EXPERTS from **28** COST Countries and **7** Non-COST Countries



AU - Australia

Dr. Phil MARTIN



CA - Canada

Prof. John YEOW



CN - China

Dr. Yongxiang LI

Dr. Zhifu LIU



RU - Russian Federation

Dr. Alexey VASILIEV



US - United States

Prof. Andrei KOLMAKOV

Dr. Meyya MEYYAPPAN



MA - Morocco

Dr. Radouane LEGHRIB

Dr. Houda LAHLOU



UA - Ukraine

Dr. Olena TUROS

Dr. Arina PETROSIAN

Dr. Oksana ANANYEVA

Dr. Liudmyla MYKHINA

Dr. Liliia PETRUK

Dr. Tetiana MAREMUKHA



Country

MC Members (52): Male (73%) - Female (27%)

Austria	Dr. Anton KOCK
Belgium	Dr Jan THEUNIS; Dr Anne-Claude ROMAIN
Bulgaria	Dr Dimiter SYRAKOV; Dr Ivan NEDKOV
Czech Republic	Dr. Vera KURKOVA; Dr. Zdenek ZELINGER
Denmark	Prof. Ole HERTEL
Finland	Prof. Kaarle HAMERI; Prof. Jyrki LAPPALAINEN
France	Prof. Marcel BOUVET; Prof. Jerome BRUNET
Germany	Prof. Andreas SCHUETZE; Dr Corinna HAHN
Greece	Prof. George PAPADOPOULOS; Prof. Kostas KARATZAS
Hungary	Ms Krisztina LABANCZ; Dr Zita FERENCZI
Iceland	Dr Arngrimir THORLACIUS
Ireland	Dr. Francesco PILLA; Prof. John WENGER
Israel	Dr. Liad ORTAR; Prof. Hossam HAICK
Italy	Dr Michele PENZA; Prof. G. SBERVEGLIERI; Dr. G. DE GENNARO
Latvia	Dr Iveta STEINBERGA
Macedonia Rep.	Dr. Igor ATASANOV; Dr. Ljupcho GROZDANOVSKI
Netherlands	Dr Sywert BRONGERSMA; Dr. Ernie WEIJERS
Norway	Dr Nuria CASTELL BALAGUER; Dr. Philipp SCHENEIDER
Poland	Dr Monika KWOKA; Prof. Janislaw GAWRONSKI
Portugal	Prof. Bernadete RIBEIRO; Prof. Carlos BORREGO
Romania	Dr Marcel IONICA; Dr Roxana Mioara PITICESCU
Serbia	Dr. Anka CVETKOVIC
Slovenia	Dr Grisa MOCNIK; Dr Raheela ZABKAR
Spain	Prof. Juan Ramon MORANTE; Prof. Eduard LLOBET VALERO
Sweden	Prof. Anita LLOYD SPETZ; Prof. Ingrid BRYNTSE
Switzerland	Dr Danick BRIAND; Dr. Nicolas MOSER
United Kingdom	Dr John SAFFELL; Prof. Roderic JONES
Turkey	Prof. Zafer ZIYA OZTURK; Prof. Mehmet Fatih DANISMAN

MC Chair: Michele Penza, ENEA, IT

MC Vice Chair: Anita Lloyd Spetz, Linkoping University, SE

Grant Holder: Eurice GmbH, Saarbrucken, DE

Country

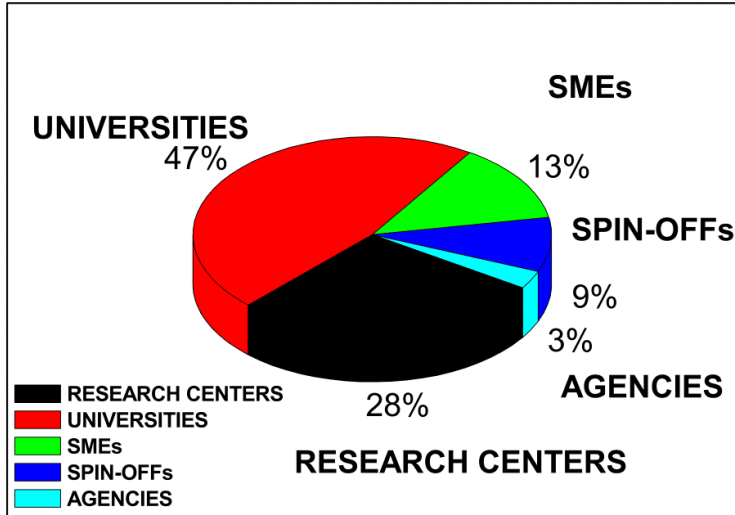
MC Substitutes (27)

Austria	Dr Stefan DEFREGGER
Belgium	Dr Julien DELVA
Czech Republic	Dr. Roman NERUDA
Denmark	Dr. Lise Lotte SORENSEN
Finland	Prof. Jorma KESKINEN
France	Dr Jean SUISSE Prof. Alain PAULY
Germany	Dr. Daniela SCHONAUER-KAMIN Dr. Thomas KUHMBUSCH
Greece	Prof. George KIRIKIADIS Dr. Roberto SIMMARANO
Italy	Dr. Marco ALVISI Dr. Saverio DE VITO
Netherlands	Dr. Rene OTJES
Poland	Prof. Jacek SZUBER
Portugal	Dr. Joao Paulo TEIXEIRA
Romania	Dr. Cristina RUSTI Dr. Marcel Adrian IONICA
Slovenia	Prof. Andrej DOBNIKAR
Spain	Prof. Albert ROMANO-RODRIGUEZ Dr. Jordi LLOSA
Sweden	Dr Ulf THOLE Dr. Marina VOINOVA
Switzerland	Dr Christoph HUEGLIN
UK	Prof. Julian GARDNER Dr Robin NORTH Prof. Florin UDREA

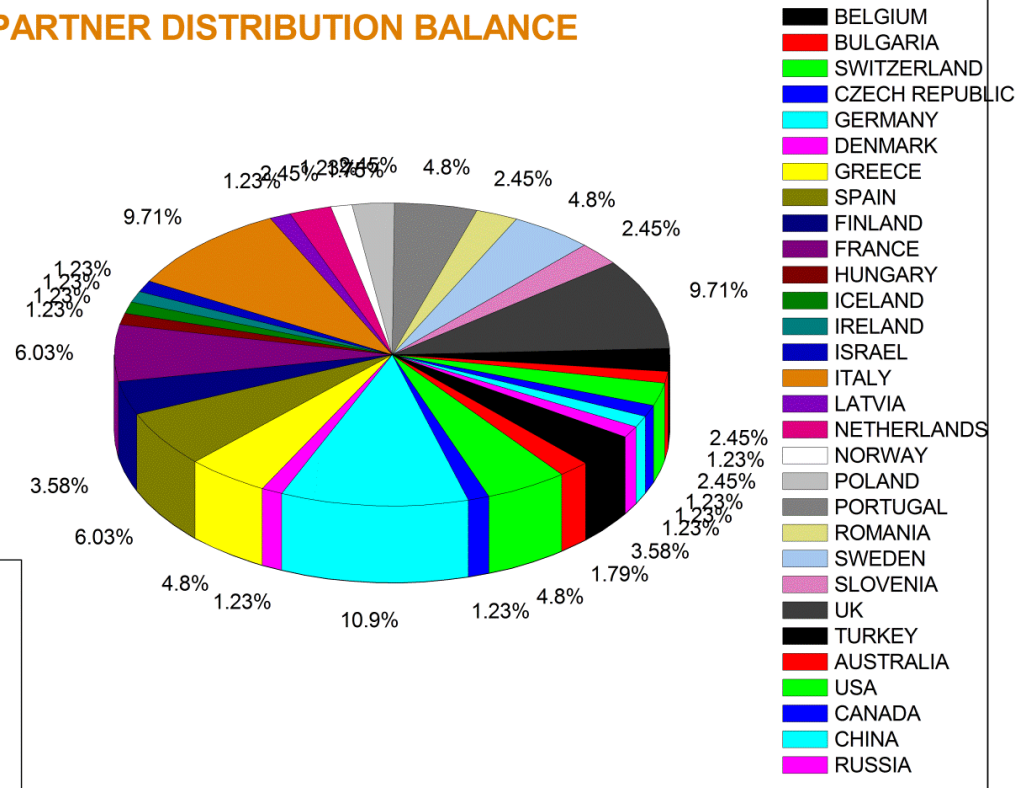
MANAGEMENT COMMITTEE
Kick-off Meeting at Brussels on 16 May 2012

COST Action TD1105 *EuNetAir*: STATISTICS

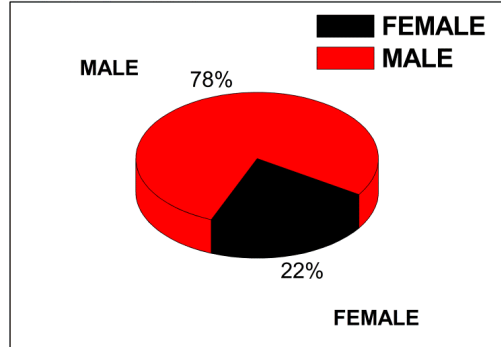
PARTNERSHIP



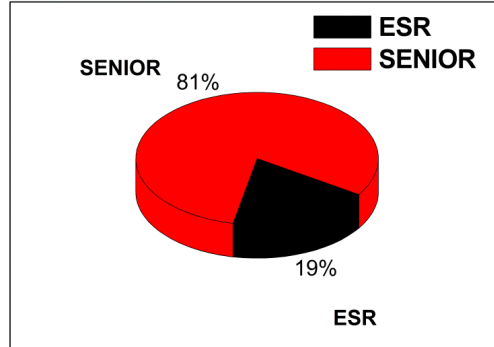
COUNTRY PARTNER DISTRIBUTION BALANCE



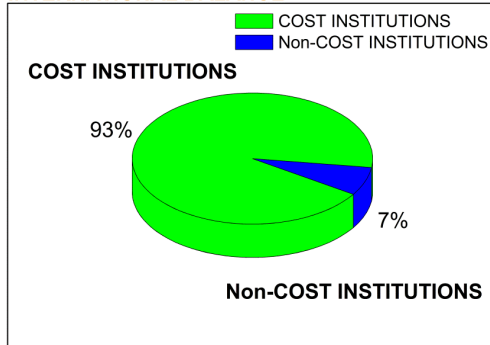
GENDER BALANCE



ESR BALANCE



INTERNATIONAL BALANCE



PARTIES: 28
Action Coordinating Partner: IT (ENEA)
Grant Holder: DE (Eurice GmbH)



COST ACTION TD1105 DISSEMINATION EVENTS: 2012 - 2013



IMCS 2012

The 14th International Meeting on Chemical Sensors
May 20 - 23, 2012, Nürnberg/Nuremberg



Special Session: Chemical Sensors and New Technologies for Air-Pollution Control

COST Action TD1105 EuNetAir

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

IMCS 2012 - The 14th International Meeting on Chemical Sensors, May 20-23, 2012 - Nuremberg, Germany



VIII International Workshop on
Semiconductor Gas Sensors

11-15 September 2012, City Hotel Cracow, Poland

SGS 2012

VIII International Workshop on
Semiconductor Gas Sensors

September 11 - 15, 2012, Cracow, Poland



3th Intelligent Systems for Quality of Life information
Services Workshop (ISQL 2012)

8th AIAI Conference, September 27- 30, 2012,
Halkidiki, Greece



TCM 2012

The 4th International Symposium on Transparent
Conductive Materials
October 21- 26, 2012, Hersonissos, Crete, Greece



EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

COST ACTION TD1105 MEETINGS (1/2)

1 July 2012 - 30 June 2013 (Year 1)



COST ACTION TD1105 *EuNetAir*
***Kick-off Meeting* of Action Management Committee**
COST Office, 16 May 2012, Brussels (BE)



COST ACTION TD1105 *EuNetAir*
***First Meeting* and 2nd Management Committee and Working Groups**
ENEA Headquarters
4-6 December 2012, Rome (IT)



COST ACTION TD1105 *EuNetAir*
***WG3-WG4 Meeting* joined to AirMonTech project**
Fraunhofer Inhaus Zentrum
4-6 March 2013, Duisburg (DE)



COST ACTION TD1105 MEETINGS (2/2)

1 July 2012 - 30 June 2013 (Year 1)



COST ACTION TD1105 *EuNetAir*

***Third Meeting* of Action Management Committee**

IREC, 21 June 2013, Barcelona (ES)



COST ACTION TD1105 *EuNetAir*

Action Workshop* - Open Satellite Event to *Transducers 2013 - Eurosensors XXVII

**Barcelona International Convention Centre
20 June 2013, Barcelona (ES)**



COST ACTION TD1105 *EuNetAir*

1st Training School of COST Action EuNetAir University of Barcelona *13-15 June 2013, Barcelona (ES)*



1ST TRAINING SCHOOL OF COST ACTION TD1105

Green Week 2013
satellite event



Training school on Environmental Technologies and Air-Quality Monitoring

13-15 June 2013

Barcelona

08:30 - 18:30

Spain



ec.europa.eu/environment/greenweek

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



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

Training school on Environmental
Technologies and Air-Quality Monitoring

Green Week 2013
satellite event



ORGANIZED BY

Universitat de Barcelona (UB)

MIND-IN2UB Department of Electronics

In collaboration with

Institute of Environmental Assessment and Water Research (IDAEA-CSIC)

Within the framework of

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

VENUE

Universitat de Barcelona (UB)

Faculty of Physics

C/ Martí i Franquès, 1, 08028 Barcelona, Spain



MORE INFORMATION

• Michele Penza, MC Chair/Proposer of COST Action TD1105 EuNetAir
ENEA, Brindisi, Italy. michele.penza@enea.it

• Albert Romano-Rodríguez, Coordinator of Action Training School Committee
U. Barcelona, Barcelona, Spain. aromano@el.ub.es

Statistics

Received Trainees Applications: 39. Participating Trainees: 36. Assigned Trainees Grants: 20

Involved Trainers: 14

COST Countries involved from Action partnership: 15

Training School Programme Committee

Albert Romano-Rodríguez, U. Barcelona, Spain

Juan Daniel Prades, U. Barcelona, Spain

Mar Viana, CSIC-IDAEA, Spain

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Eduard Llobet, U. Rovira i Virgili, Spain

Annamaria Demarinis Loiotile, U. Bari, Italy

Michele Penza, ENEA, Italy

Training School Action Committee

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Mar Viana, CSIC-IDAEA, Spain

María Cruz Minguiñón, CSIC-IDAEA, Spain

George Kiriakidis, FORTH, Greece

Philippe Schneider, NILU, Norway

Monika Kwoka, Silesian U. Technology, Poland

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Julian Gardner, U. Warwick, United Kingdom



CSIC

In collaboration with the



EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY



Short Term Scientific Missions (STSMs): A tool for networking

“COST Strategy towards increased support for Early Stage Researchers” - *COST 295/09* giving ESRs support and measures like STSMs, Training Schools, Action Think Thank, Conference Grants, inclusion of ESR in WGs, ESRs as national MC delegates.

In order to increase visibility of ESRs in this COST Action:

- ***11 STSMs have been funded in the First Year (1 July 2012 - 30 June 2013)***
- Workshop participation of ESRs
- Selection of ***best independent ideas*** from ESRs are awarded with ***grants for participation in S&T events***
- ***Invitation*** of high schools and University students to the ***training sessions and training schools***
- ***Social Scientific Network services (LinkedIn)*** based on free web software to promote cohesion in the ESRs community to outline needs
- Proposals to ***European Research Council - Starting Independent Research Grant*** and ***Marie-Curie Fellowships*** from Action ESRs are encouraged.

INTERNATIONAL WG1-WG4 MEETING on
New Sensing Technologies and Methods for Air-Pollution Monitoring
European Environment Agency - EEA
Copenhagen, Denmark, 3 - 4 October 2013



**Meeting Proceedings
at Action webpages:**

www.cost.eunetair.it

COST Action TD1105 *EuNetAir* WG1-WG4 MEETING:

New Sensing Technologies and Methods for Air-Pollution Monitoring

- **Special Issue *Urban Climate* (Elsevier)**

Proceedings of the Action EEA Meeting open to external contributors.

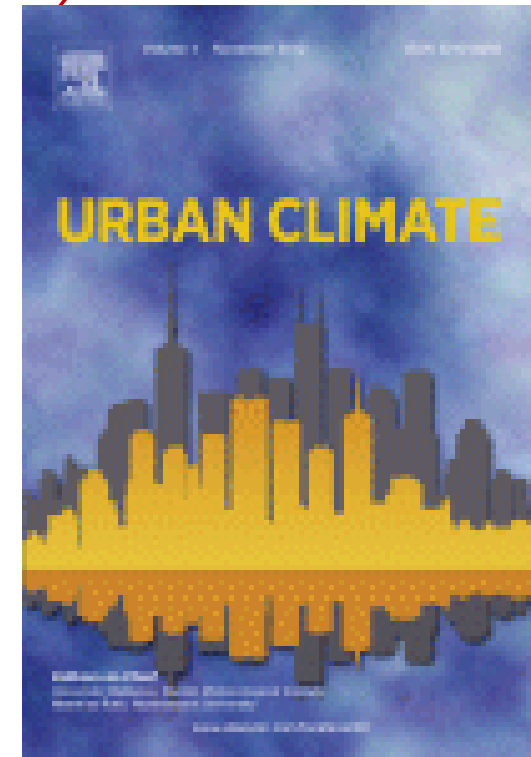
Peer-review process (<http://ees.elsevier.com/uclim/>)

- *Guest Editors:*

- ✓ Michele Penza, ENEA, Italy
- ✓ Anita Lloyd Spetz, Linköping University, Sweden
- ✓ Ole Hertel, Aarhus University, Denmark
- ✓ Ulrich Quass, IUTA eV, Germany

- **Deadline for submission: 15 January 2014**

- Expected Publication: *June 2014*



EMRS-2014 Symposium B:

Advanced Functional Materials for Environmental Monitoring and Applications



www.european-mrs.com

€·MRS

SPRING MEETING

Lille
Congress Center
France

2014

May 26th-30th

CALL FOR PAPERS

Conference chairs:
Ian BOYD, Univ. of Brunel, U.K.
Gilles DENNLER, IMRA Europe, France
Roberto FARIA, Univ. of São Paulo, Brazil
Roberto FORNARI, IKZ-Berlin, Germany
Elvira FORTUNATO, FCT-UNL, Portugal

Bilateral Energy conference. €·MRS's JSSSS

Hans RICHTER, GFWW, Germany
William TUMAS, NREL, USA



SPRING MEETING

May 26-30, 2014

Lille

Deadline for
abstract submission:

January 16, 2014

SCIENTIFIC PROGRAMME

MATERIALS FOR ENERGY AND ENVIRONMENT

- A. Thin film chalcogenide photovoltaic materials
- B. Advanced functional materials for environmental monitoring and applications
- C. Solid state ionics: thin films for energy and information applications
- D. Phonons and fluctuations in low dimensional structures

NANOMATERIALS

- E. Defect-induced effects in nanomaterials
- F. Established and emerging nanocolloids: from synthesis & characterization to applications
- G. Carbon- or nitrogen-containing nanostructured thin films
- H. AUTEC 2014 - Analytical techniques for precise characterization of nano-materials
- I. Solution processing and properties of functional oxide thin films and nanostructures

MATERIALS AND LIGHT

- J. Laser interaction with advanced materials: fundamentals and applications
- K. Challenges for group III nitride semiconductors for solid state lighting and beyond
- L. Chromogenic materials and devices

HYBRID, ORGANIC AND BIO-MATERIALS

- M. Molecular materials - Towards quantum properties
- N. Converging technology for nanobiotechnology
- O. Computational modelling of organic semiconductors: from the quantum world to actual devices
- P. Carbon materials: surface chemistry and biomedical applications
- Q. Hybrid materials engineering in biology, chemistry and physics
- R. Towards lightweight and flexible electrochemical devices
- S. Memristor materials, mechanisms and devices for unconventional computing

CRYSTAL GROWTH IN MATERIALS SCIENCE

- T. Non-classical nucleation and crystallization*
- U. Crystal growth related twins and point defects in semiconductors and dielectrics*
- V. Effect of natural and forced convection in materials crystallization*

BILATERAL ENERGY CONFERENCE

- W. Materials research for group IV semiconductors: growth, characterization and technological developments
- X. Advanced materials and characterization techniques for solar cells II
- Y. Crystals for energy conversion and storage*
- Z. Materials and complex interface architectures for solar thermal and solar fuel devices
- AA. Organic photovoltaics / polymer solar cells

*Jointly organized with the following organizations: European Crystal Growth Association

WORKSHOP: grand challenges in materials

Deadline for abstract submission: 16 Jan 2014

EMRS-2014 Symposium B Proceedings
In Special Issue JSSS
Journal of Sensors and Sensor Systems

Upcoming EuNetAir Meeting

BRINDISI, 25-26 March 2014 (TBC)

2nd International Workshop of COST Action TD1105
New Sensing Technologies for Indoor and Outdoor Air Quality Control

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



Expected Impact by Action TD1105

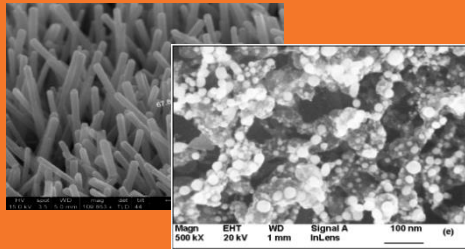
European Network on New Sensing Technologies for Air-Pollution Control and Environmental Sustainability - EuNetAir



- **European Leadership on AQC Science & Technology**
- **Development of Green-Economy**
- **Support to Sustainable Development**
- **Support to Monitoring System of Clean Air for Europe**
- **Fostering Research & Innovation on New Sensing Technologies for Environmental Monitoring**

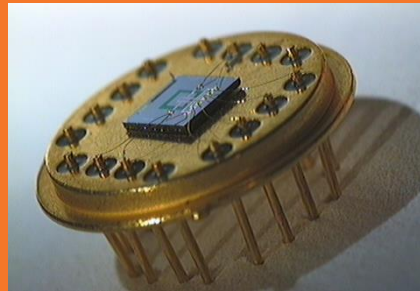
COST Action EuNetAir: CHALLENGES

MATERIALS & GAS SENSORS



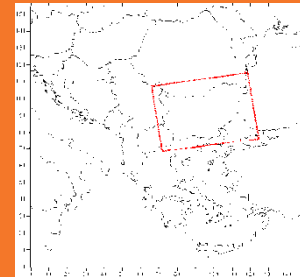
MOX by UNIBS IREC UB SICCAS
CNT by ENEA NASA URV CSIRO

AQC SENSORS & SYSTEMS



GasFET by EPFL, Switzerland

AQ MODELLING

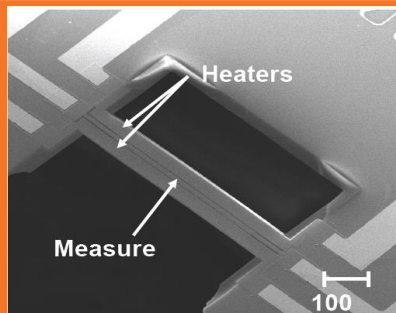


CMAQ Calculations
by NIMH, BG

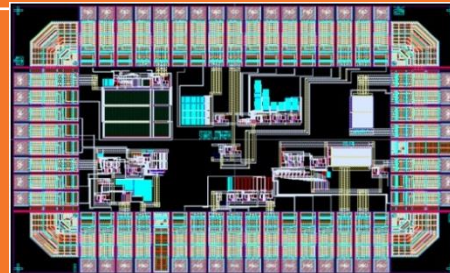
STANDARDS & PROTOCOLS



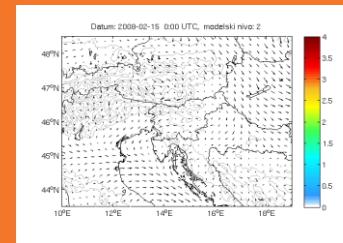
Dynamic Olfactometry (EN 13725/2003) by Univ. of Bari and Lenviros srl, IT



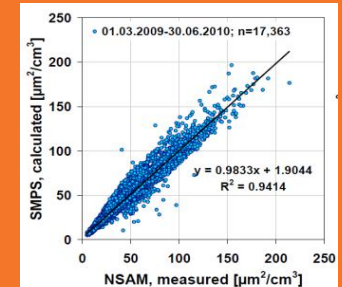
Cantilever Sensor by DTU, DK



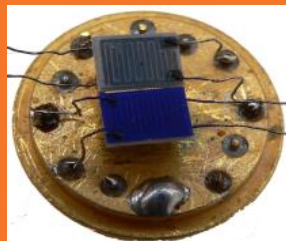
ASIC Circuit: CMOS SOI
by WARWICK & CCMOS Ltd, UK



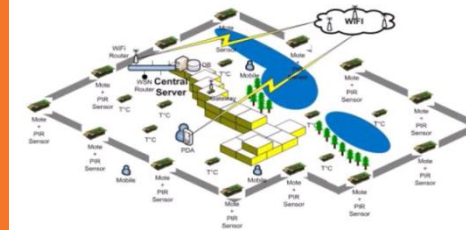
AQ Modelling dispersion in meteorological mesoscale by University of Ljubljana, SL



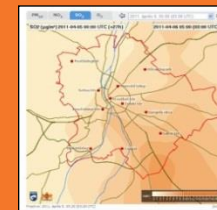
Particle Surface Area Measurements by IUTA eV, DE



Phtalocyanine Gas Sensors
by CNRS UBP-LASMEA, FR



WIRELESS SENSORS NETWORK
by ISI, Greece



Chemical Weather Forecasting and Information System
by Hungarian Meteo Service



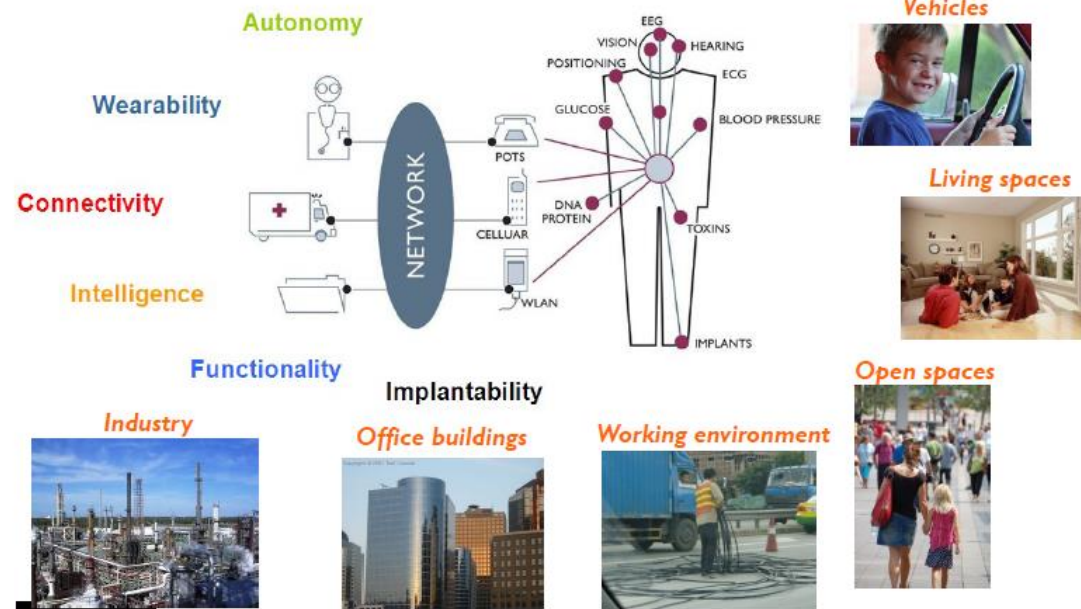
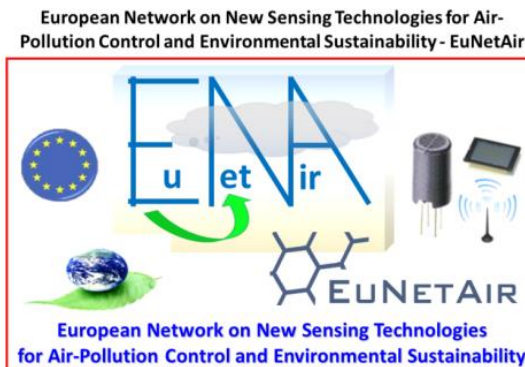
HARMONISATION:
Definition of protocols and standards for gas sensing measurements and gas sensors

CONCLUSIONS

COST Action TD1105 *EuNetAir* is proposed to solve problems in the area of:

- Air Quality Control
- Environmental Sustainability
- Indoor/Outdoor Energy Efficiency
- Climate Change Monitoring
- Health Effects of Air-Pollution

From *Body Area Network* to *Personal Area Network*



UPDATING AND BREAKING NEWS from Action TD1105

COST Action TD1105 - EuNetAir

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

Action website:

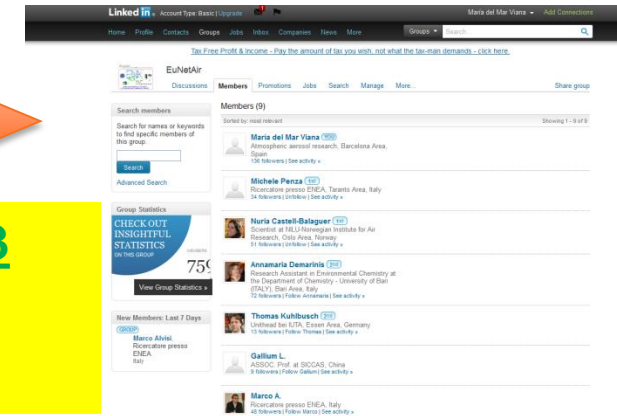
www.cost.eunetair.it

hosted by ENEA

Dr. Marco Alvisi, *Webmaster Coordinator*

Sebastiano Dipinto, Valerio Pfister, Gianfranco Zingarelli, *Webmaster Team*

Social Scientific ESRs Network (SSEN) by LinkedIn
Moderator(s): Mar Viana, Mariacruz Minguillon



2° CALL for Short Exchange Visits launched on Sept. 2013
(STSM - Short Term Scientific Mission)

Dr. Jan Theunis, STSM Coordinator EuNetAir



EuNetAir Newsletter

COST Action TD1105 Iss. 1/Dec 2012

Opening Editorial

Issue 1: published on Dec. 2012 ✓

Issue 2: published on June 2013 ✓

Issue 3: published on December 2013 ✓

Prof. Ralf Moos, *Editor-in-Chief*

Dr. Daniela Schonauer-Kamin, *Editorial Board Manager*

ACKNOWLEDGEMENTS

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***KICK-OFF MEETING of Action TD1105
at Brussels on 16 May 2012***

TD1105 MANAGEMENT COMMITTEE



Link of COST Action TD1105 EuNetAir:

Location and date:

4rd MC Meeting, 20 December 2013, and
WG1-WG4 Meeting, 18-19 December 2013

Queens' College, Cambridge, UK

- **Letter of Commitment**
to host 4th MC Meeting
and *WG1-WG4 Meeting*
from Prof. Rod Jones, Cambridge
Action SIG2 Leader and UK MC Member

18-20 December, 2013, Cambridge, UK



University of Cambridge
CENTRE FOR ATMOSPHERIC
SCIENCE
Department of Chemistry
Department of Applied Mathematics
and Theoretical Physics

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rj11001@cam.ac.uk

Monday, May 27, 2013

Dr. Michele Penza (Chair)
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Italian National Agency for New Technologies, Energy and Sustainable Economic Development,
Brindisi Research Centre,
PO BOX 51 Br-4 (Postal correspondence)
SS7, Appia, km 706,13 (Location address)
I-72100 Brindisi, Italy
E-mail: michele.penza@enea.it

Letter of invitation to host a COST Action TD1105 meeting at
Cambridge on 18-20 December 2013

Dear Michele,
I am delighted to be able to offer Queens' College, Cambridge as the venue for a COST Action TD1105 meeting to be held in Cambridge on 18-20, December 2013. The intention is that this meeting will be formally hosted by me, but local arrangements will be made through the Queens' College Catering Department, with whom I understand you have had discussions.
This invitation is based on the assumption that all costs will be covered by the COST Action TD1105, with no costs falling to either the University of Cambridge or Queens' College Cambridge.

I look forward to a very successful meeting in highly conducive surroundings, perhaps even matching those of Rome last year!

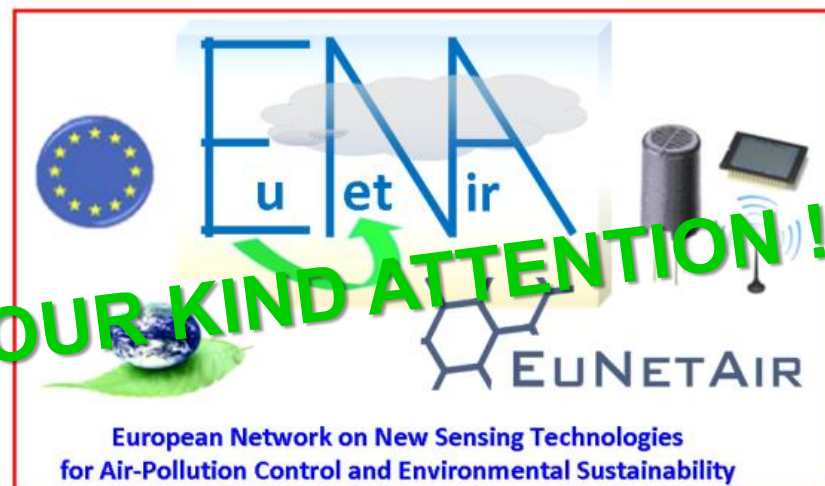
Best wishes,

Roderic L. Jones
Professor of Atmospheric Science
Department of Chemistry
Cambridge

cc Tim Shorey,
Queens' College Catering Manager

COST Action TD1105 EuNetAir at Queens' College in Cambridge

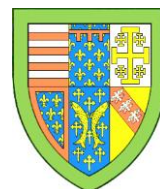
18 - 20 December 2013



THANK YOU VERY MUCH FOR YOUR KIND ATTENTION!



University of Cambridge
Center for Atmospheric Science
Department of Chemistry
Cambridge, United Kingdom



Queens' College
Silver Street, Cambridge, CB3 9ET
United Kingdom

