



COST

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

COST Action TD1105

Plenary Session at *ENEA Headquarters*, Rome, 4 Dec. 2012

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

Year: 2012-2013 (*Starting Action*)

 **cost**
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY



Michele Penza

Chair of COST Action TD1105

ENEA - Italian National Agency for New Technologies, Energy and Sustainable Economic Development / Brindisi, ITALY



Outline



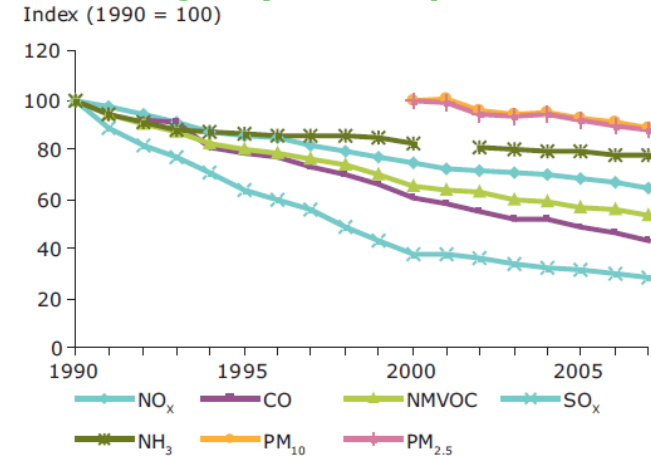
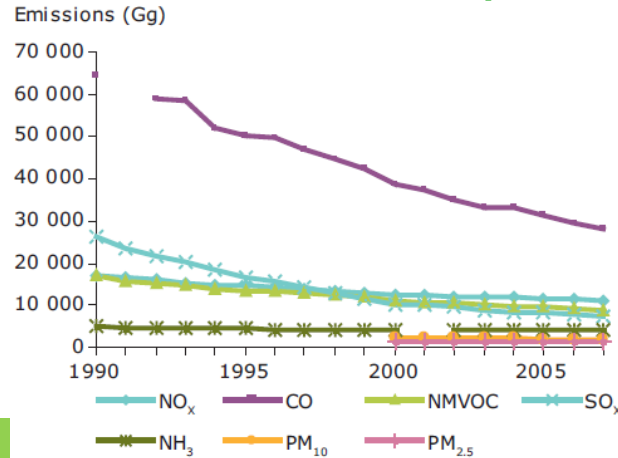
- **Background / Problem Statement:**
 - ✓ *Scientific context*
 - ✓ *Challenges addressed by the Action*
- **MoU Action's Objectives: Main and Secondary**
- **Action Research Directions:**
 - ✓ *Methodology and Innovation*
- **Working Groups**
- **Future Plans and Challenges: Expected Impact**
- **Concluding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

Scientific context: Air Quality Control (1/2)



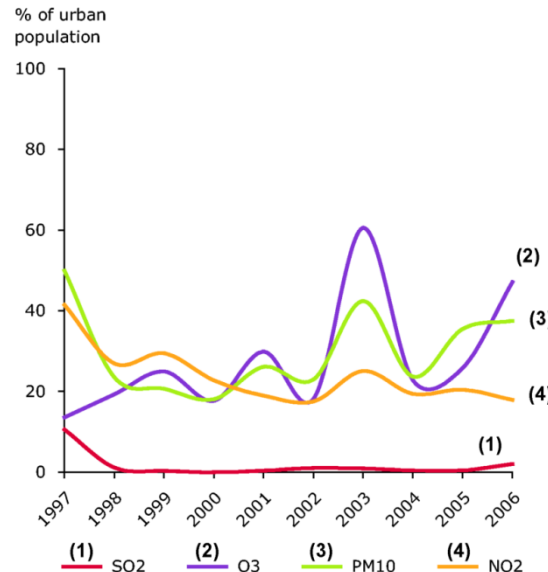
Figure ES1 EU-27 emission trends in absolute (Gg) and relative terms for NO_x, CO, NMVOCs, SO_x and NH₃ between 1990 and 2007 (index year 1990 = 100), and for PM₁₀ and PM_{2.5} between 2000–2007 (index year 2000 = 100)

European Environment Agency, EEA Report 8/2009



Some Environmental Emergencies:

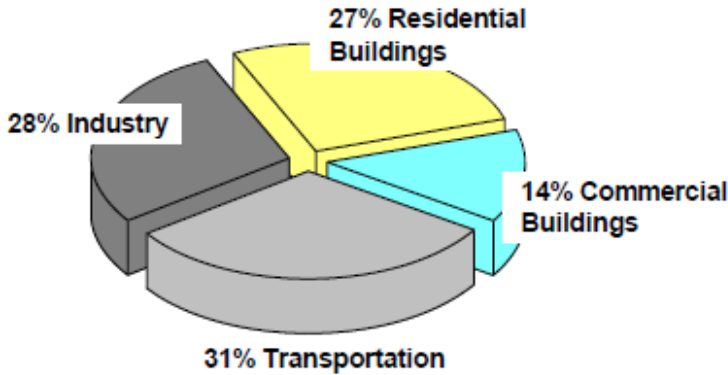
- 1930 - Meuse Valley (Belgium)
- 1952 - Great London Smog (UK)
- 1954 - Los Angeles (USA)
- 1984 - Bhopal (India)
- 2005 - Teheran (Iran)
- 2006 - Hong Kong (China)
- 2008 - Shanghai, Peking (China)
- 2012 - Taranto (Italy)



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}	-

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

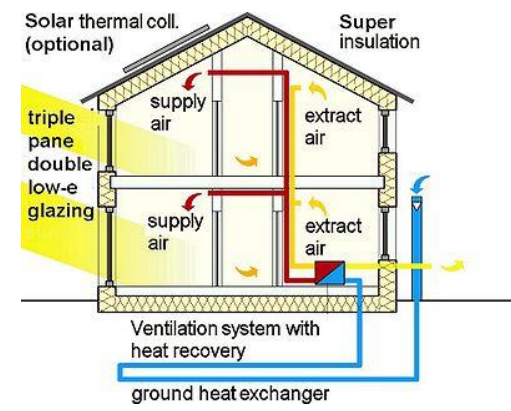
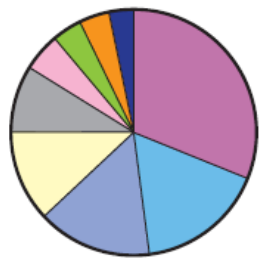
41% Primary Energy consumed in Buildings:

- 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

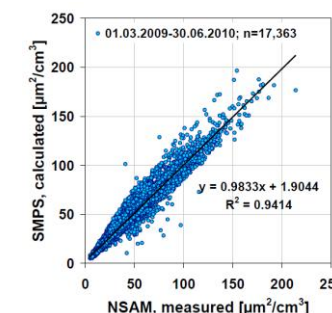
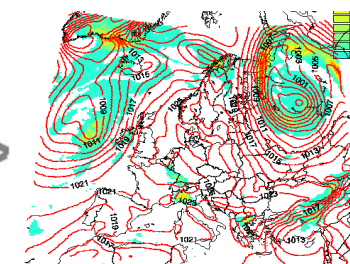
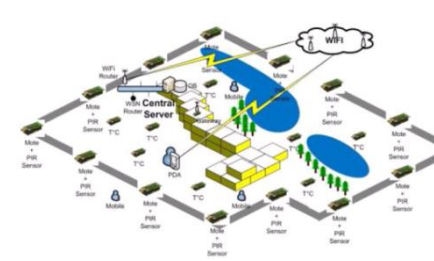
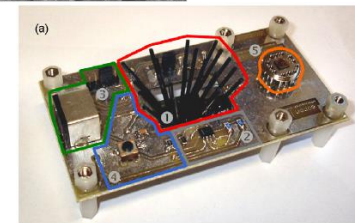
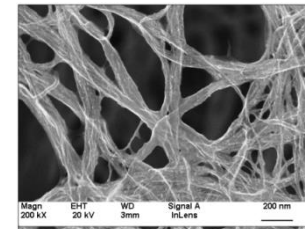
IAQ by WORLD HEALTH ORGANIZATION

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: ...
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

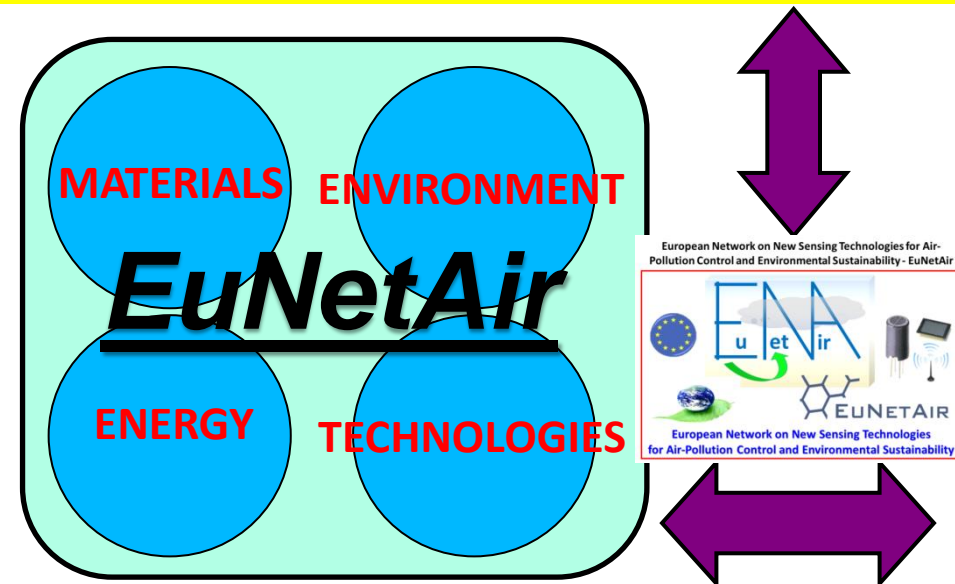
COST Action EuNetAir

COST Action EuNetAir

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

Complementarity with other COST Actions:

- ES0602 Chemical Weather Forecasting and Information Systems
- 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
- 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



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

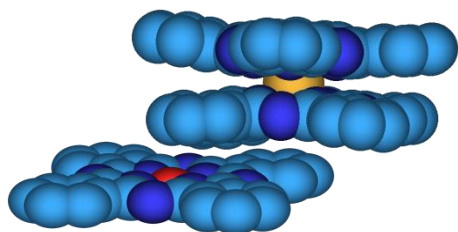
- *Editorial Board*
- *Dissemination*
- *Training Schools*
- *Gender Balance*
- *Early Stage Researchers (ESR)*
- *Short-Term Scientific Mission (STSM)*
- *Intellectual Property Rights (IPR)*
- *Local Organizing Committee (LOC)*

- **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**

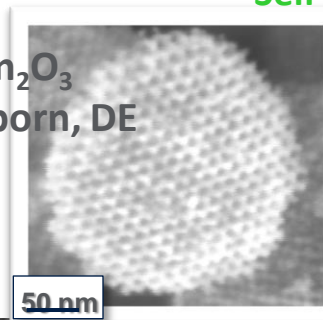
- Sub-Working Group 1.1:**
Metal oxides nanostructures for AQC gas sensors.

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

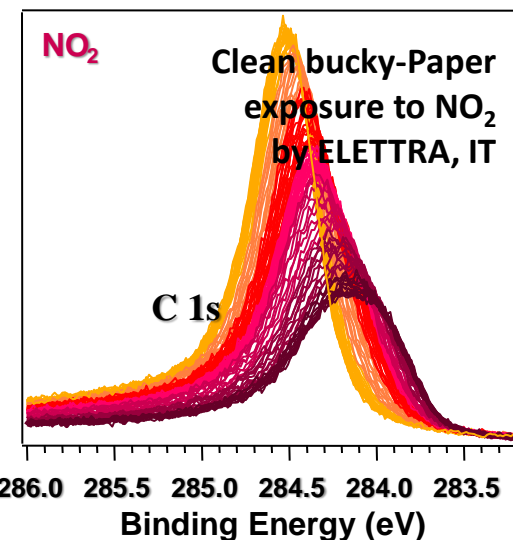
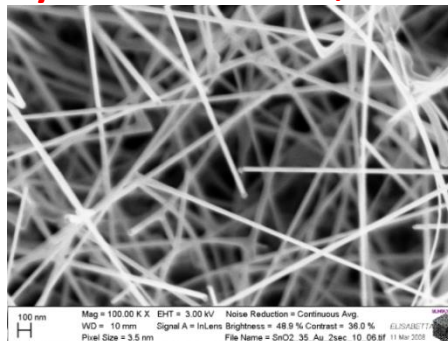
- Sub-Working Group 1.3:**
Emerging sensor materials (organic/inorganic, hybrid, nanocomposites, polymers, functional, etc.).



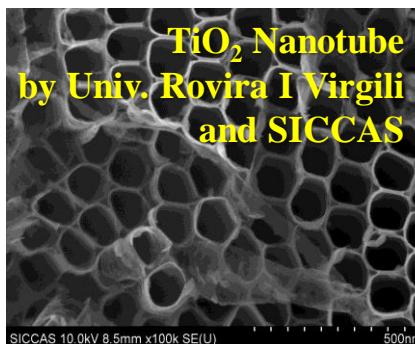
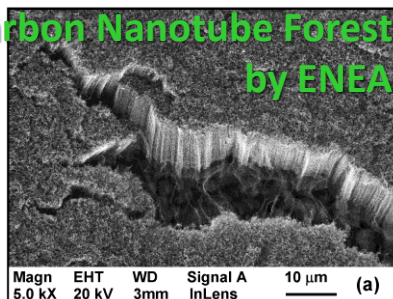
Mesoporous In₂O₃
by Univ. of Paderborn, DE



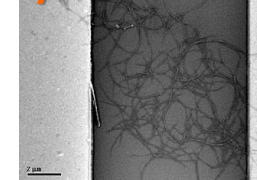
Metal oxide (SnO₂)
Nanowires nets
by Univ. of Brescia, IT



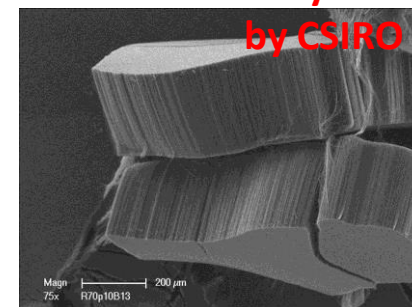
Carbon Nanotube Forest
by ENEA



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)

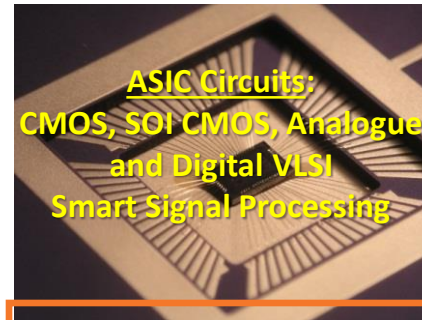
WG2 Chair: Prof. Andreas Schuetze, Saarland University, Germany

IT PATENT ENEA

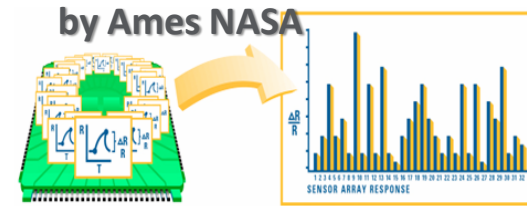
Carbon Nanotube Gas Sensors



EnviroWatch mote by Newcastle University



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

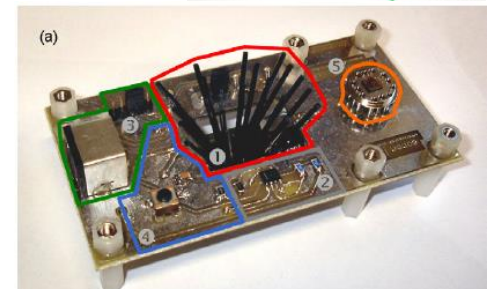


Using pattern matching algorithms, the data is converted into a unique response pattern

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

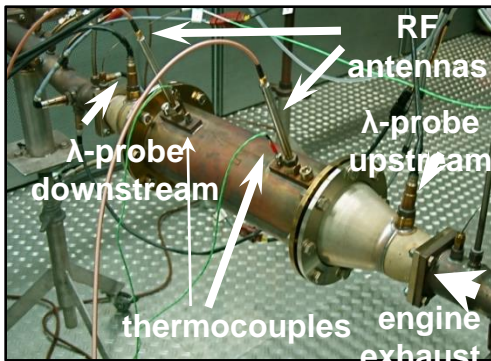


Low-ppb sensitivity for NO₂ GaN-based sensor concept



Autonomous Gas Sensor System by IREC and Univ. of Barcelona

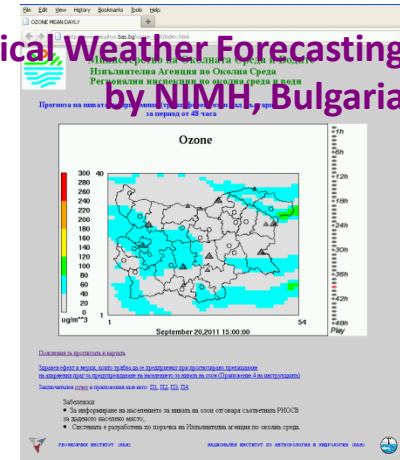
- Sub-Working Group 2.1: Gas sensors and new transducers.
- Sub-Working Group 2.2: Portable gas sensor-systems.
- Sub-Working Group 2.3: Wireless technology and AQC sensors network.
- Sub-Working Group 2.4: Intelligence algorithms and distributed computing for networked AQC gas sensors.



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

ERATION IN SCIENCE AND TECHNOLOGY

Chemical Weather Forecasting by NIMH, Bulgaria

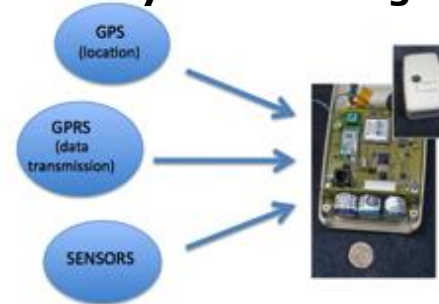


by Aristotle University, EL

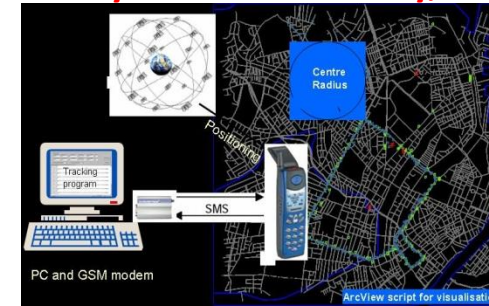


AirMerge system for Chemical Weather Models

Mobile and static sensor
network configurations
by University of Cambridge.



AQ Modeling: Tracking routes by Aarhus University, DK



Sub-Working Group 3.1:

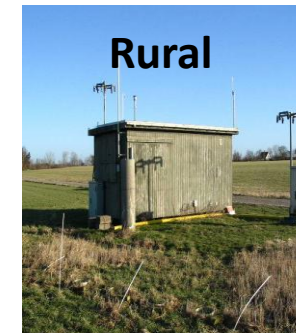
Environmental measurements at laboratory and in field air-quality stations.

Sub-Working Group 3.2:

Air-quality modelling and chemical weather forecasting.

Sub-Working Group 3.3:

Harmonisation of environmental measurements.



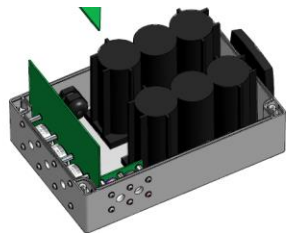
Environmental measurements of PM and air pollution by CSIC, ES

AQ monitoring station by ARPA-PUGLIA, IT

AQ monitoring station by Aarhus University, DK

AQ monitoring station by Lithuanian EPA

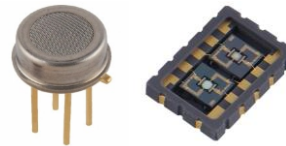
- **Sub-Working Group 4.1**:
Protocols, standards and methods for AQC by analyzers/instruments (no-sensors) technologies.
- **Sub-Working Group 4.2**:
Protocols, standards and methods for AQC by sensors (no-analyzers) technologies.
- **Sub-Working Group 4.3**:
Benchmarking of new products and market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



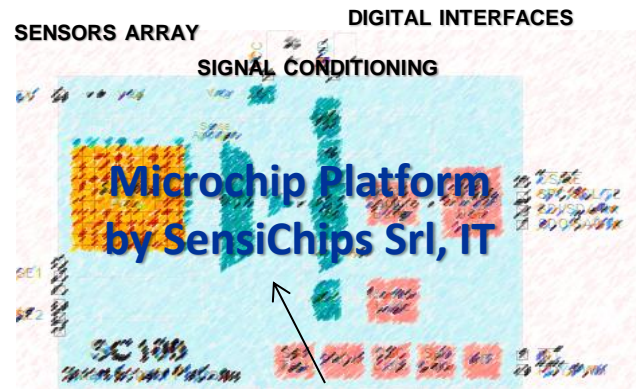
Battery-Powered Sensors by Alphasense Ltd, UK

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

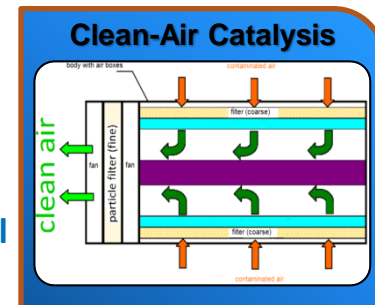
Dynamic olfactometry EN13725
by Univ. of Liege, Odometric SA,
Univ. of Bari, Lenviros srl.



**Packaged Sensors
by E2V, CH**



New precision multi-parametric analytical tool

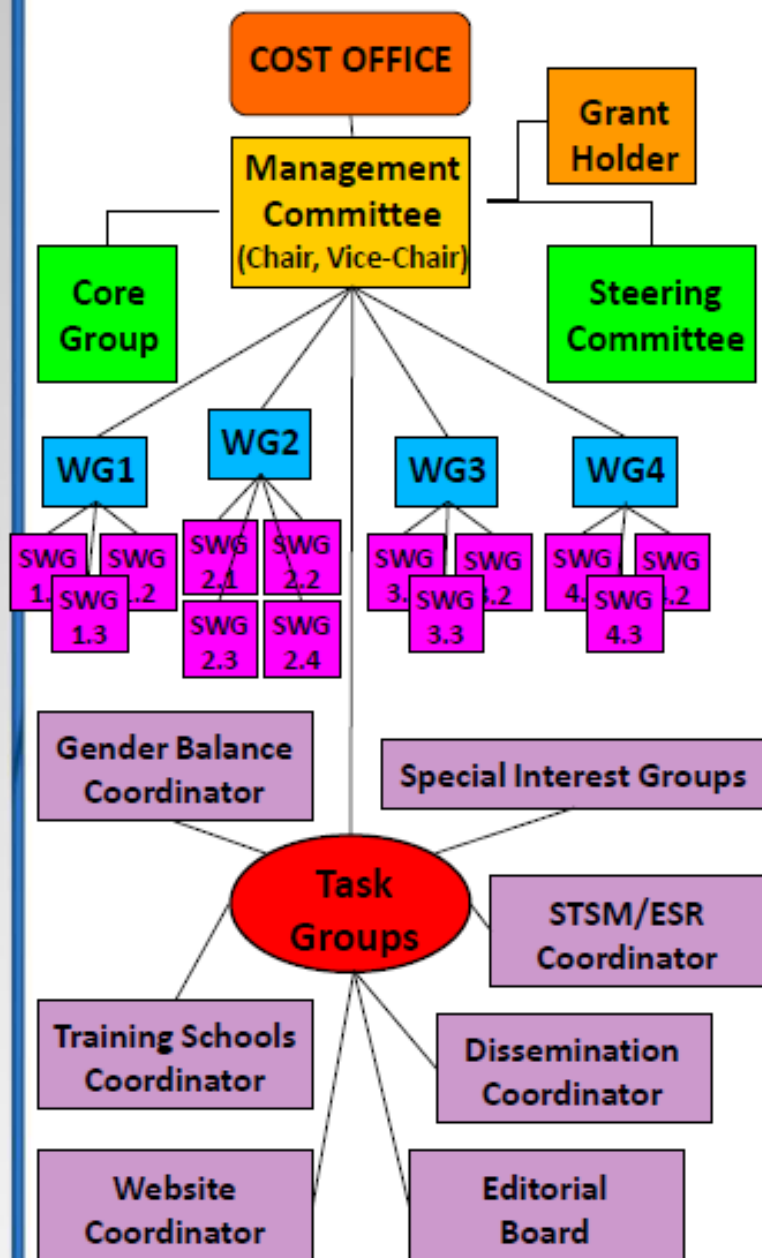


Becker Gruppe, DE



**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**

First Period TD1105 WORKPLAN (1 July 2012 - 30 June 2013)

YEAR 1	MILESTONES	DELIVERABLES
<p>Year 1 from 07/2012 to 06/2013</p>	<p><u>Quarter 1: July 2012 - September 2012</u> Kick-off Meeting. MC setup. Action Workplan established. MC Meeting 1.</p> <p><u>Quarter 2: October 2012 - December 2012</u> Action website setup. Start-up of Editorial Board for Leaflet, Brochure, Newsletter.</p> <p><u>Quarter 3: January 2013 - March 2013</u> MC Meeting 2. WGs Meeting 1. Scientific activities.</p> <p><u>Quarter 4: April 2013 - June 2013</u> Scientific strategies: State-of-art on AQC. Training School organization. Workshop organization.</p>	<p><u>Quarter 1: July 2012 - September 2012</u> MC setup Action Workplan established.</p> <p><u>Quarter 2: October 2012 - December 2012</u> Definition of WGs and WGs Workplans. <i>Newsletter: Issue 1. Leaflet/Brochure: Release 1.</i></p> <p><u>Quarter 3: January 2013 - March 2013</u> Publication of the List of EuNetAir Action R&D <i>Infrastructures</i> and main <i>Facilities</i>. Scientific Activities. ESR/STSM Report and Dissemination.</p> <p><u>Quarter 4: April 2013 - June 2013</u> Action website fully operational with publication of <i>Curricula</i> of partners. <i>Newsletter: Issue 2.</i> <i>State-of-Art on AQC tech: Release 1.</i> <i>Training School 1. Workshop 1. Annual Report.</i></p>

COST Action: EuNetAir PARTICIPANTS



 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	Institute of Computer Science, Academy of Sciences of the Czech Republic
 DE - Germany	Institute of Energy and Environmental Technology – IUTA eV; Saarland University; University of Bayreuth; University of Paderborn; UST GmbH; Alfred Becker GmbH; 3S GmbH
 DK - Denmark	Aarhus University; Technical University of Denmark - DTU
 EL - Greece	Aristotle University; Foundation of Research and Technology; Industrial Systems Institute
 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
 HU - Hungary	Hungarian Meteorological Service
 IS - Iceland	Agricultural University of Iceland
 IE - Ireland	Trinity College Dublin
 IL - Israel	AirBase Systems
 IT - Italy	ENEA; ELETTRA; Univ. of Bari; Univ. of Brescia; Univ. of Trieste; Lenviros srl; Sensichips srl
 LT - Lithuania	Lithuania Environmental Protection Agency
 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	University of Coimbra
 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; University of Cambridge; University of Warwick; Cambridge CMOS Sensors Ltd; Alphasense Ltd
 TR - Turkey	GEBZE Institute of Technology

COST Action TD1105 *EuNetAir*: 5 Non-COST Countries and 7 Non-COST Institutions

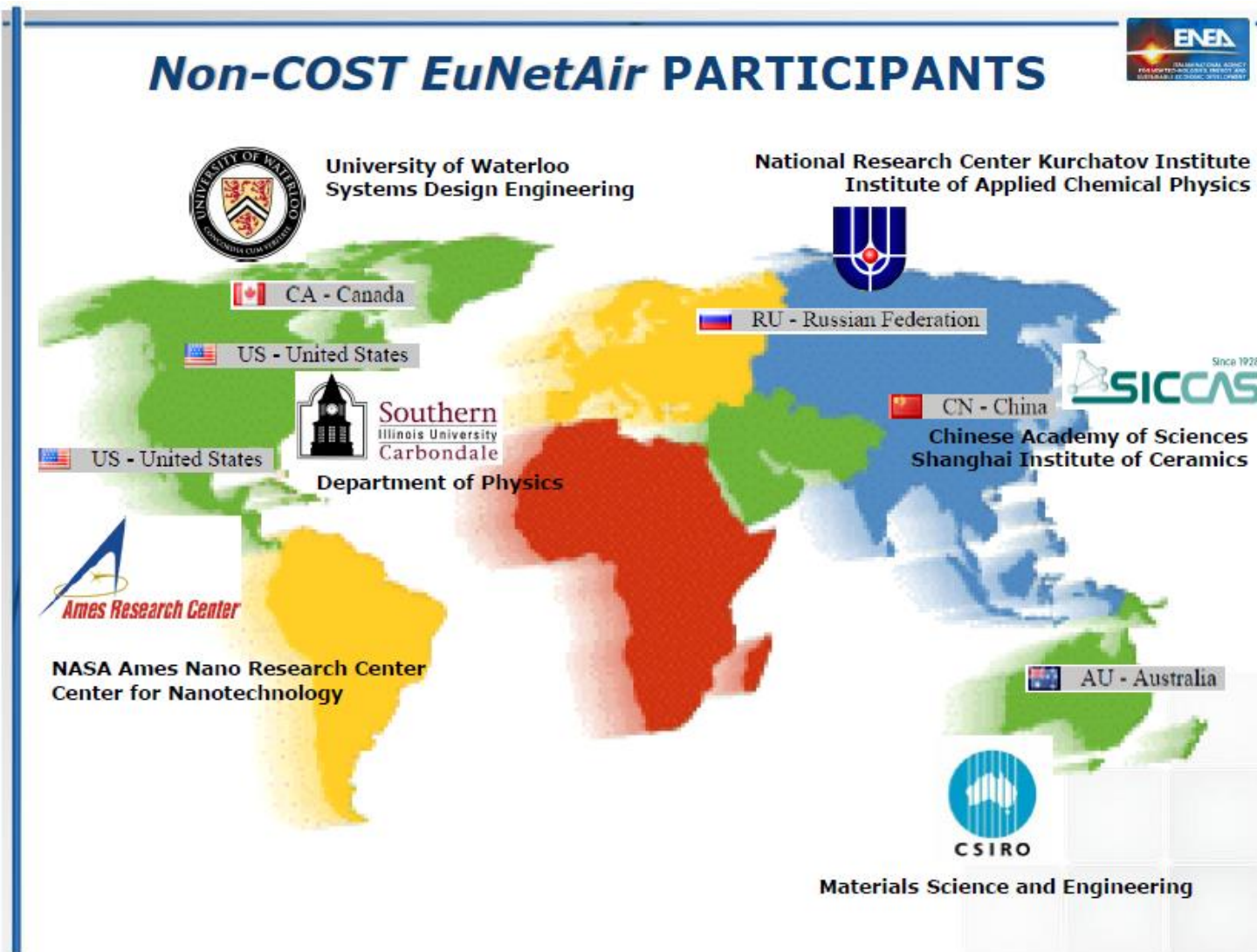
Non-COST Countries:

Australia, Canada,
China, Russia, USA

Non-COST Institutions:

CSIRO (Australia*);
University of Waterloo
(Canada); Chinese Academy
of Sciences, Shanghai
Institute of Ceramics
(China); National Research
Center Kurchatov Institute
(Russia); Southern Illinois
University Carbondale,
NASA Ames Research
Center (USA).

* *Reciprocal Agreement
Country.*



COST Action EuNetAir: List of Experts

(* Reciprocal Agreement)



Total of Experts: 103 from **25** COST Countries and **5** Non-COST Countries

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

DE - Germany

Dr. Thomas A. J. KUHNBUSCH
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

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 PAPAPOULOS


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
 HU - Hungary
Dr. Zita FERENCZI
Dr. Krisztina LABANCZ

IS - Iceland

Dr. Arngrimur THORLACIUS

IE - Ireland

Dr. Francesco PILLA

IL - Israel

Dr. Liad ORTAR

IT - Italy

Dr. Michele PENZA
Dr. Marco ALVISI
Dr. Saverio DE VITO
Dr. Andrea GOLDONI
Dr. Livia TRIZIO
Dr. Annamaria DEMARINIS
Dr. Gianluigi DE GENNARO
Dr. Luigi BARBIERI
Dr. Roberto SIMMARANO
Prof. Giorgio SBERVEGLIERI

LV - Latvia

Prof. Iveta STEINBERGA

NL - Netherlands

Dr. Sywert BRONGERSMA
Dr. Ernie WEIJERS

PL - Poland

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

PT - Portugal

Prof. Bernadete RIBEIRO

SE - Sweden

Prof. Anita LLOYD SPETZ
Dr. Marina VOINOVA
Dr. Mike ANDERSSON
Dr. Ruth PEARCE
Dr. Ulf THOLE
Prof. Ingrid BRYNTSE

SI - Slovenia

Prof. Rahela ZABKAR
Dr. Grisa MOCNIK
Prof. Andrej DOBNIKAR

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

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

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

Country MC Members (43): Male (71%) - Female (29%)

Belgium	Dr Jan THEUNIS; Dr Anne-Claude ROMAIN
Bulgaria	Dr Dimiter SYRAKOV; Dr Ivan NEDKOV
Czech Republic	Dr. Vera KURKOVA
Denmark	Prof. Ole HERTEL
Finland	Prof. Kaarle HAMERI; Prof. Jyrki LAPPALAINEN
France	Prof. Marcel BOUVET; Prof. Jerome BRUNET
Germany	Prof. Andreas SCHUETZE; Dr Thorsten CONRAD
Greece	Prof. George PAPADOPOULOS; Prof. Kostas KARATZAS
Hungary	Ms Krisztina LABANCZ; Dr Zita FERENCZI
Iceland	Dr Arngrimur THORLACIUS
Ireland	Dr. Francesco PILLA
Israel	Dr. Liad ORTAR
Italy	Dr Michele PENZA; Prof. G. SBERVEGLI; Dr. G. DE GENNARO
Latvia	Dr Iveta STEINBERGA
Netherlands	Dr Sywert BROUWERS; Dr. Ernie WEIJERS
Norway	Dr. Nils Christian B. LAGUER; Dr. Philipp SCHENEIDER
Poland	Dr Monika KWOKA; Prof. Janislaw GAWRONSKI
Portugal	Prof. Bernadete RIBEIRO
Romania	Dr Marcel IONICA; Dr Roxana Mioara PITICESCU
Slovenia	Dr Grisa MOCNIK; Dr Rahela 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

MC Chair: Michele Penza, ENEA, IT

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

Grant Holder: University of Bari, IT

Kick-off Meeting at Brussels on 16 May 2012

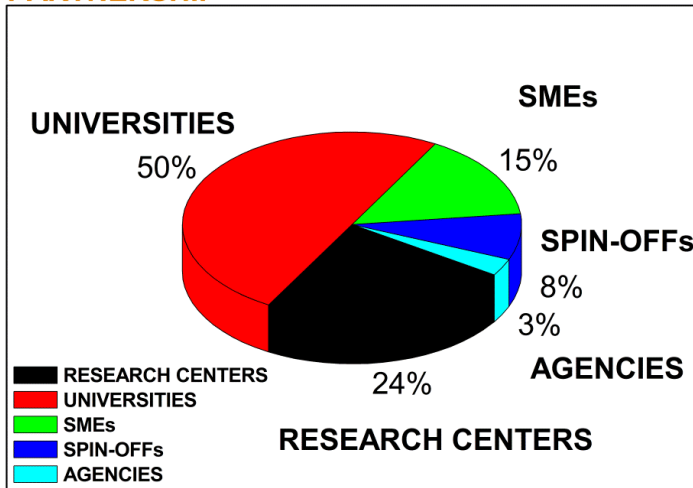
Country MC Substitutes (24)

Belgium	Dr Julien DELVA
Czech Republic	Dr. Roman NERUDA
Denmark	Dr. Lise Lotte SORENSEN
Finland	Dr. Jarmo KEKKONEN
France	Dr Jean SUISSE Prof. Alain PAULY
Germany	Dr. Daniela SCHONAUER-KAMIN Dr. Thomas KUHNBUSCH
Greece	Prof. George KIRIKIADIS Dr. Roberto SIMMARANO
Italy	Dr. Marco ALVISI Dr. Saverio DE VITO
Poland	Prof. Jacek SZUBER
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

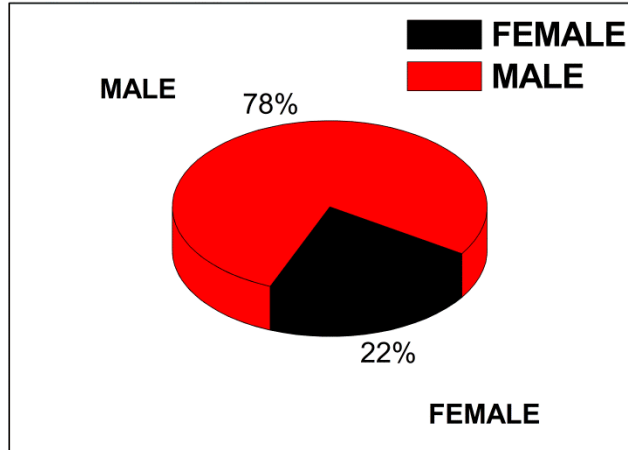
COST Action TD1105 *EuNetAir*: STATISTICS



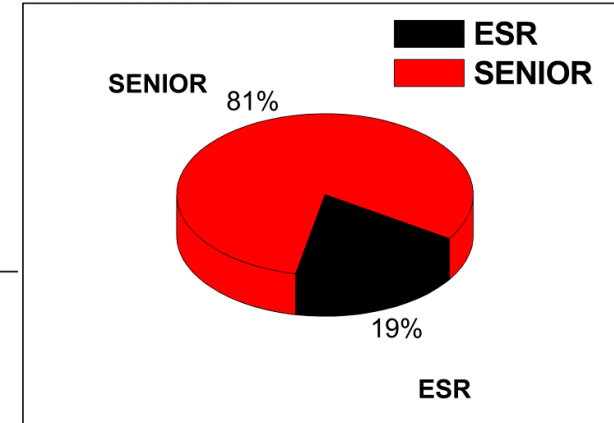
PARTNERSHIP



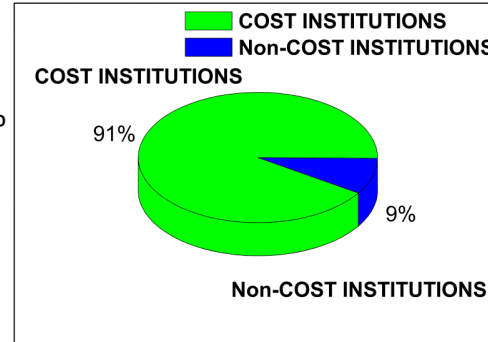
GENDER BALANCE



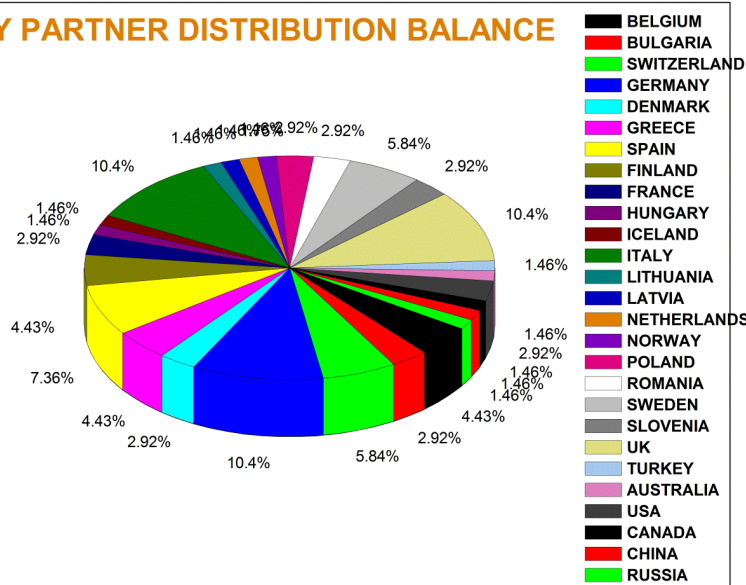
ESR BALANCE



INTERNATIONAL BALANCE



COUNTRY PARTNER DISTRIBUTION BALANCE



PARTIES: 25

Action Coordinating Partner: IT (ENEA)

Grant Holder: IT (University of Bari)



Expected Impact by Action TD1105



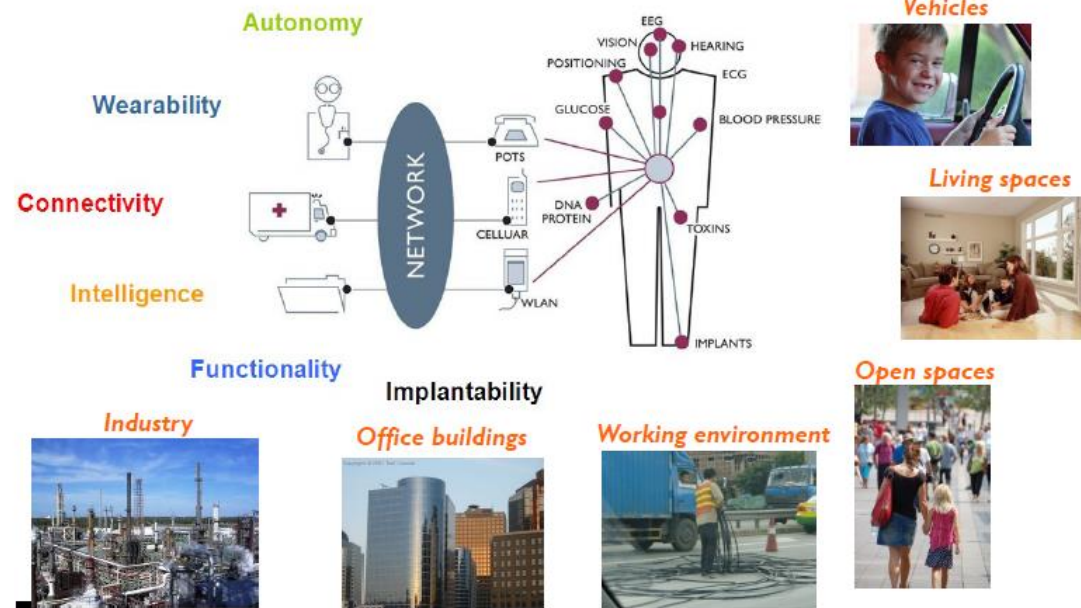
- **European Leadership on AQC Science & Technology**
- **Development of Green-Economy**
- **Support to Sustainable Development**
- **Support to Monitoring System of Clean Air for Europe**
- **Fostering Research & Innovation on New Sensing Technologies for Environmental Monitoring**

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*



ACKNOWLEDGEMENTS

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

TD1105 MANAGEMENT COMMITTEE



Link of COST Action TD1105 EuNetAir:

http://www.cost.eu/domains_actions/essem/Actions/TD1105?

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Linköping University, SE
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Science Officer:

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**Administrative
Officer:**

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Rapporteur ESSEM:

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Rapporteur MPNS:

Prof. Joaquim Manuel Vieira (PT)
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Rapporteur CMST:

Prof. Antonio Lagana (IT)
lagana05@gmail.com

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:

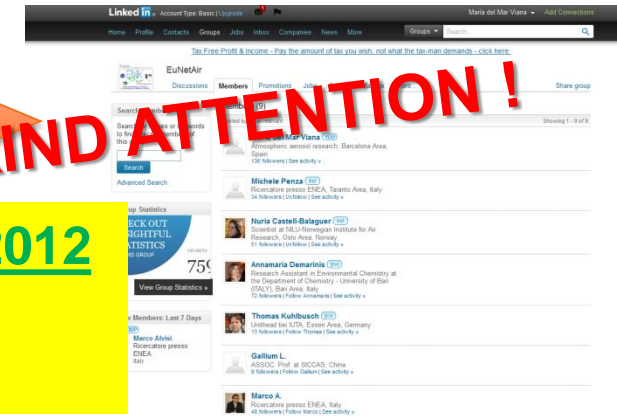
www.cost.eunetair.it

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



CALL for Short Exchange Visits launched on 20 Nov. 2012
(STSM - Short Term Scientific Mission)

Dr. Jan Theunis, STSM Coordinator EuNetAir

THANK YOU VERY MUCH FOR YOUR KIND ATTENTION!



EuNetAir Newsletter

COST Action TD1105 Iss. 1/Dec 2012

Opening Editorial

Issue 1:

finished and published - Dec. 2012 ✓

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

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

NOLOGY