



EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

ENEA

ITALIAN NATIONAL AGENCY
FOR NEW TECHNOLOGIES, ENERGY AND
SUSTAINABLE ECONOMIC DEVELOPMENT

Overview of the COST Action TD1105 EuNetAir

IMCS 2012 - Nuremberg, 22 May 2012

Call Full Proposal reference oc-2011-1-9706 for a COST new Action TD1105

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

Proposer/Chair: Dr. Michele Penza

ENEA

***Italian National Agency for New Technologies, Energy
and Sustainable Economic Development***

Technical Unit Brindisi Technologies for Materials

SS. 7, APPIA, Km 714 - PO BOX 51 Br-4, I-72100 Brindisi, Italy

Tel.: +39 0831 201422

Email: michele.penza@enea.it

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



OUTLINE

- ***What is Program COST ?***
- ***Objectives of a COST Action***
- ***COST Action TD1105 EuNetAir:***
Objectives, WorkPlan, Structure and Coordination,
Gender Balace, Early Stage Researchers, Short Term
Scientific Missions, Timetable, Dissemination Plan
- ***Conclusions***

WHAT IS COST ?

COST is an intergovernmental framework for European Cooperation in Science and Technology, allowing the coordination of nationally-funded research on a European level.



COST has a very specific *mission and goal*.
It contributes to reducing the fragmentation in European research investments and opening the European Research Area to cooperation worldwide.

MISSION OF A COST ACTION

As a precursor of advanced multidisciplinary research, COST plays a very important role in building a European Research Area (ERA). It anticipates and complements the activities of the EU Framework Programmes, constituting a “bridge” towards the scientific communities of emerging countries. It also increases the mobility of researchers across Europe and fosters the establishment of scientific excellence in the nine key domains:

- Biomedicine and Molecular Biosciences
- Food and Agriculture
- Forests, their Products and Services
- Materials, Physics and Nanosciences
- Chemistry and Molecular Sciences and Technologies
- Earth System Science and Environmental Management
- Information and Communication Technologies
- Transport and Urban Development
- Individuals, Societies, Cultures and Health

In addition, Trans-Domain Proposals allow for broad, multidisciplinary proposals to strike across the nine scientific domains.



Eligible Costs and Reimbursement Rules



Costs are incurred along these following categories:

- Travel and subsistence allowances for meeting participants
- Organisation of meetings (Local Organiser Support)
- Short-Term Scientific Missions (STSMs)
- Training Schools
- Dissemination, e.g. Scientific Publication, Action website, Action promotion for Meetings and Training Schools, Communication, Outreach activities
- Other Expenses Related to Scientific Activities (such expenses need an approval from the COST Office)
- Financial and Scientific Administration and Coordination of the Action (*Fee up to 15% of the actual science expenditure*)

NO FUNDING FOR RESEARCH !!

Estimated TOTAL BUDGET for 4 Years: € 560.000



HISTORY: SELECTION STEPS FOR COST ACTION *EuNetAir*



- OPEN COST CALL: 5 FEBRUARY 2011
- COLLECTION DATE FOR FIRST STAGE PROPOSAL: 25 March 2011
ABOUT 2000 PROPOSALS IN THE 10 COST DOMAINS
- INVITATION FOR FULL PROPOSAL: 15 MAY 2011
80 PROPOSALS INVITED TO SUBMIT FULL PROPOSAL
Score EuNetAir: 31.64/36.00 (88%) - Threshold: 25/36 (70%)
- DEADLINE FOR FULL PROPOSAL: 29 JULY 2011
FULL PROPOSAL EUNETAIR SUBMITTED !
Score EuNetAir: 69/75 (92%) - Threshold: 55/75 (73%)
- HEARINGS AT TRANS-DOMAIN COMMITTEE: 30 SEPTEMBER 2011
5 TD PROPOSALS INVITED TO HEARINGS at BRUSSELS:
3 TD PROPOSALS SHORTLISTED TO BE APPROVED:
(EuNetAir ranked to 3rd place) approved together 30 new Actions by
Committee of Senior Officials (CSO) Meeting on 1 DECEMBER 2011
- KICK-OFF MEETING OF ACTION *EuNetAir*: 16 MAY 2012 !!



COST ACTION *EuNetAir*: WHY ?



PROPOSED SOLUTION

Networking of Coordinated Action on Integrated and Multidisciplinary Scale of Science and Technologies:

**NANOMATERIALS, GAS SENSORS, WIRELESS TECHNOLOGY,
AIR-QUALITY MODELLING, STANDARDS & PROTOCOLS**

TARGETED OPEN PROBLEMS

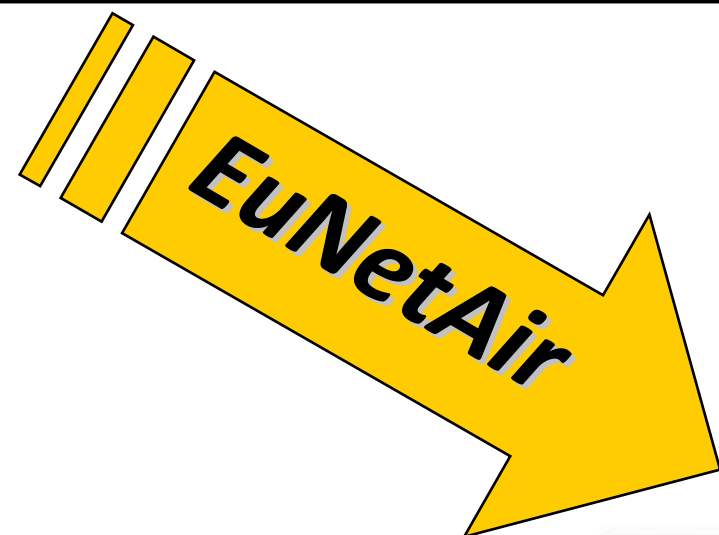
AIR QUALITY CONTROL

INDOOR/OUTDOOR ENERGY EFFICIENCY

ENVIRONMENTAL SUSTAINABILITY

CLIMATIC CHANGES MONITORING

HEALTH EFFECTS OF AIR-POLLUTION



BENEFIT & IMPACT

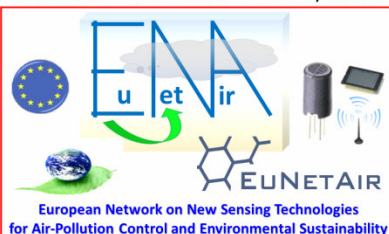
European Leadership on AQC Science & AQC Technologies

Development of Green-Economy

Support to Sustainable Development

Monitoring System for Clean Air for Europe

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



ACTION *EuNetAir* KEY ISSUES



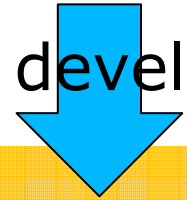
- Research and Development on **New Sensing Technologies for low-cost Air-Pollution Control** through field studies and laboratory experiments.
- Innovation and Transfer of the results in **preventive real-time control practises** and **global sustainability for monitoring climate changes** and **outdoor/indoor energy efficiency**.
- Networking of international experts and Coordination of AQC Research for **development of new environmental technologies** and **industrial applications**.

COST ACTION *EuNetAir*: AIM



***Increase scientific and technological knowledge
at integrated and multidisciplinary scale***

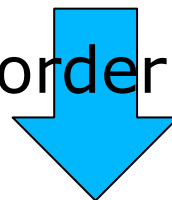
to develop



- **Nanomaterials for AQC sensors**
- **Improved gas sensor systems & sensing microdevices**
- **Wireless Sensor Networks & Distributed Intelligence**
- **Air-Quality Modelling & Chemical Weather Forecasting**
- **New Protocols, Standards & Methods for AQC sensors**
- **Harmonisation of environmental measurements**
- **Guidelines for AQC systems & transducers**
- **Environmental Sustainability & Energy Efficiency**



in order to



implementation in real-world applications
support **green-economy of European Countries**
and *competitiveness of European SMEs*

COST ACTION *EuNetAir*: OBJECTIVES

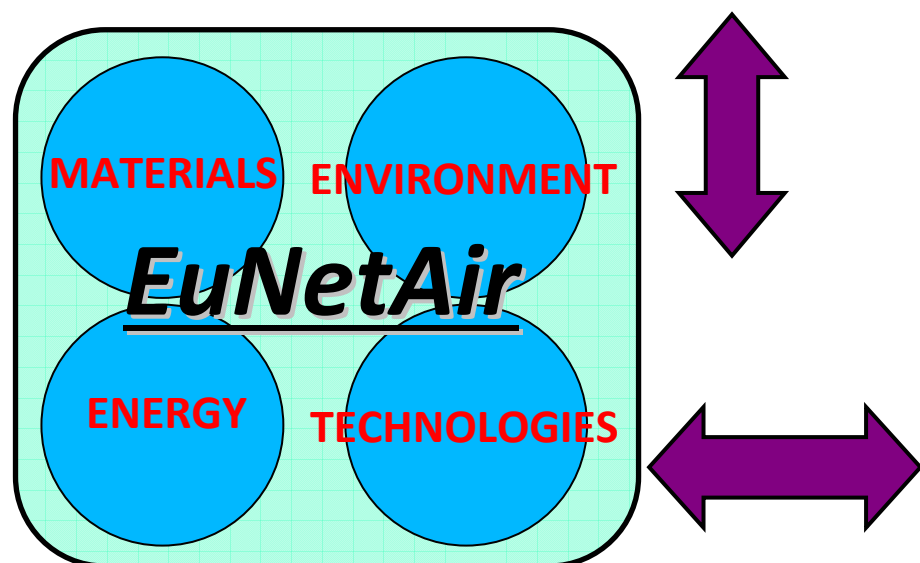


- ❑ **Establishment** of a ***Pan-European and multidisciplinary research*** and technological platform including research institutions, universities, agencies, industries, stakeholders and policy-makers.
- ❑ **Achievement** of a ***common understanding and knowledge*** at the European level of requirements on AQC and global sustainability.
- ❑ **Definition** of ***protocols and pre-standardised methods for AQC sensors*** and ***harmonisation of environmental measurements***.
- ❑ **Training** and involvement of ***Early Stage Researchers*** in the Coordinated Action at multidisciplinary style and international level.
- ❑ **Creation** of long standing ***collaborative research teams*** in the area of nanomaterials, AQC sensors and systems, AQ modelling, environmental measurements, standards and protocols for AQC, commercialisation of AQC sensors and environmental technologies.
- ❑ **Razionalization** of ***European research on AQC*** with emphasis on environmental sustainability and energy efficiency, ***including top-level worldwide collaborations***.
- ❑ **Promotion** of ***women's participation*** in S&T for ***gender balance***.
- ❑ **Dissemination** activities on AQC for ***sustainable development***.

COST Action EuNetAir: **SPECIFIC FEATURES AND INNOVATION**

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.

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, AQC SENSORS
Lead Partner: ...

Nat. Res. Project: NANOSENSORS
NANOMATERIALS, GAS SENSORS
Lead Partner: SIC - Chinese Academy of Science
Country: China

Nat. Res. Project: SNAQ-Heat
Sector: SECURITY
Lead Partner: ... of Cambridge
Lead Partner: Alphasense Ltd
Country: UK

Nat. Res. Project: ... ENERGY EFF.CY
Lead Partner: 3S GmbH
Country: Germany

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

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

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

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

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

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: NAWACS
Sector: NANO, GAS SENSORS
Lead Partner: IREC
Country: Spain

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

Nat. Res. Projects:
FC Aeth, Air Pollution
Sector: ENV TECHNOLOGY
Lead Partner: Aerosol
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, SISEDAR, ...
Sector: ICT, Materials, ENV
Lead Partner: ENEA
Country: Italy

Lead Partner: ...
Country: Italy

Nat. Res. Projects: NOVANA, ARCTIC
Sector: AQC, ENV, AQ-MODELLING
Lead Partner: Aarhus University
Country: Denmark

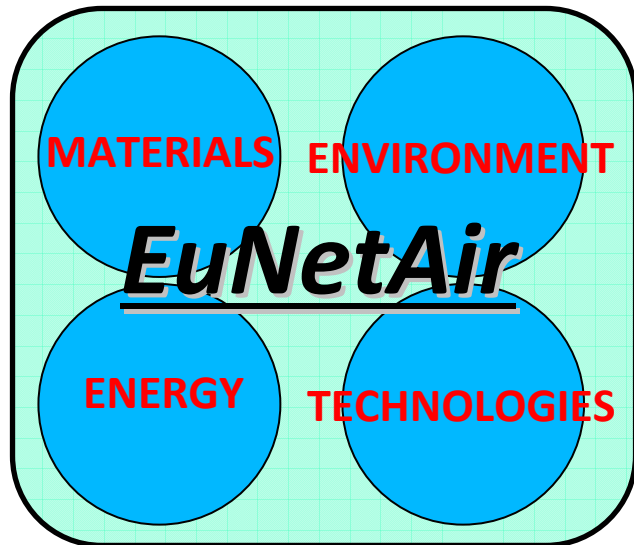
Nat. Res. Projects: FIRB, NANOTHER, CARIPLO
Sector: NANOMATERIALS, GAS SENSORS, ENERGY
Lead Partner: UNIBS; ... Country: Italy

Nat. Res. Projects: EXO THERMO
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: EXPECTED IMPACT



Benefit of Concerted Action:

- Better integration of researches in the ERA on AQC
- Mutual enrichment, cross-validation and linking
- Identifying important areas for future AQC research
- Providing a flexible forum for planning future activities

Benefit in Science & Technology:

- New sensing technologies
- Identification of sensing mechanisms
- Increased knowledge in nanomaterials for AQC sensors
- Improvement of sensor technologies
- Harmonisation of environmental measurements
- Standards, methods, protocols for calibration
- Experimental datasets for evaluating models in coordination

Benefit for Society:

- Sensing technologies for AQC at rural, remote, traffic, road networks in smart cities
- Improved AQ modelling and chemical weather forecasting
- Real-time mapping of Air Pollution by wireless sensor networks or GSM
- Innovation into preventive practises to monitor climate changes and outdoor/indoor energy efficiency

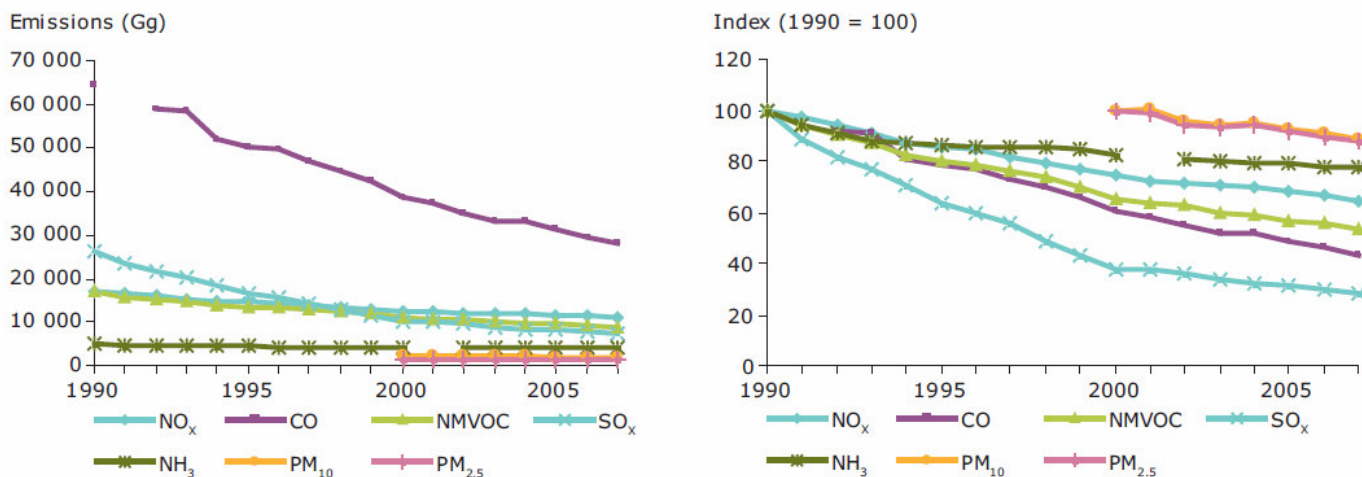
Specific scientific impacts of Action:

- A list of strengths and weaknesses of the existing knowledge-base
- Established strengthened communications between different research fields involved
- Enhanced connections with end-users and beneficiaries (citizens) of distributed AQ sensors technology
- A mid-to-long term common research agenda for the future

EuNetAir BACKGROUND: AIR QUALITY CONTROL



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)



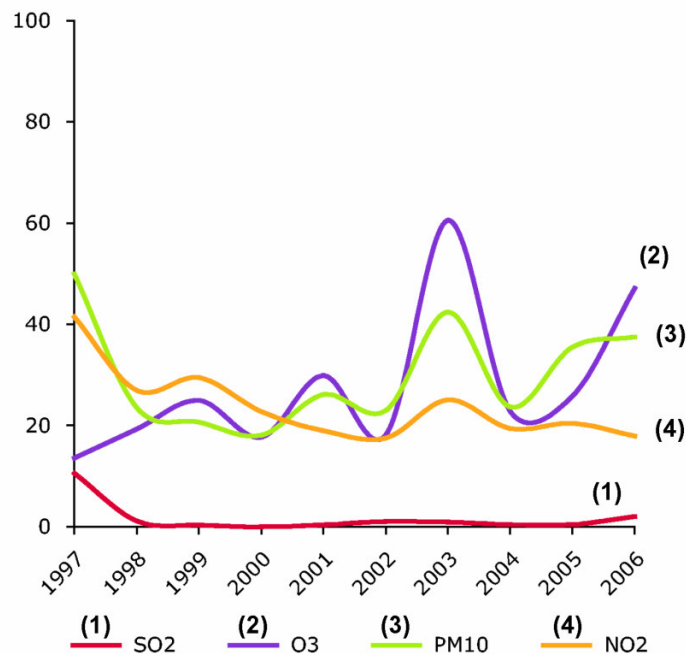
European Environment Agency, EEA Report 8/2009

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)
- 2009 - Taranto (Italy)
-

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

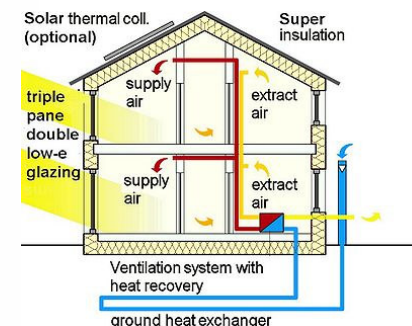
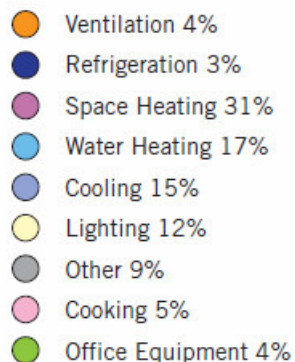
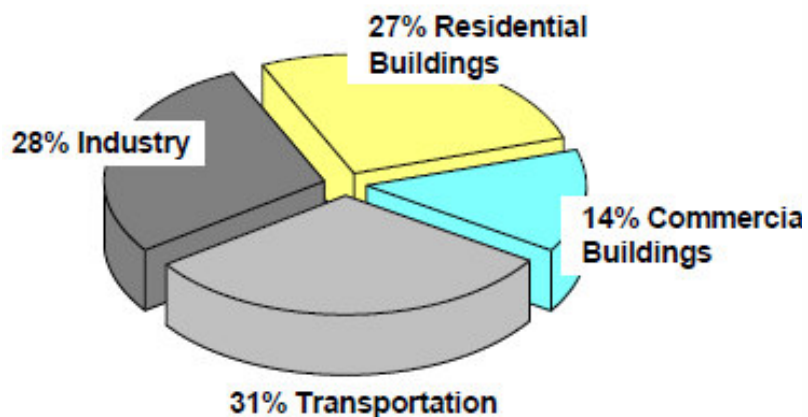
% of urban population



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}	-

EuNetAir BACKGROUND: INDOOR/OUTDOOR ENERGY EFFICIENCY

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



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

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

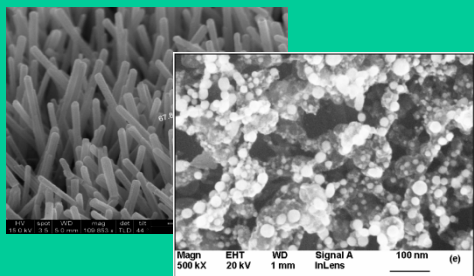
Indoor Air		Typical Substances		Cure	
Contamination Source	Emission Source	VOCs	Others		
• Human Being	• Breath	Acetone, Ethanol, Isoprene	CO ₂	demand controlled ventilation	
	• Skin Respiration & Transpiration	Nonanal, Decanal, α-Pinene	Humidity		
	• Flatus	Methane, Hydrogen			
	• Cosmetics	Limonene, Eucalyptol			
	• Household Supplies	Alcohols, Esters, Limonene			
	• Combustion (Engines, Appliances, Tobacco Smoke)	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)

IAQ by WORLD HEALTH ORGANIZATION

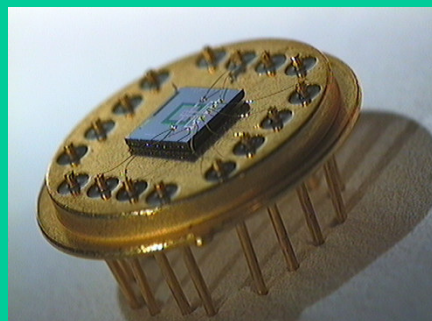
COST Action EuNetAir: CHALLENGES

MATERIALS & GAS SENSORS



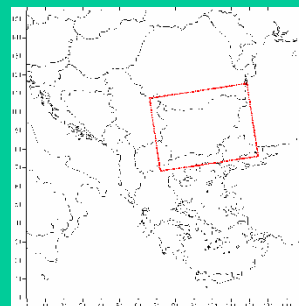
MOX by UNIBS IREC UB SICCAS
CNT by ENEA NASA URV CSIRO

AQC SENSORS & SYSTEMS



GasFET by EPFL, Switzerland

AQ MODELLING

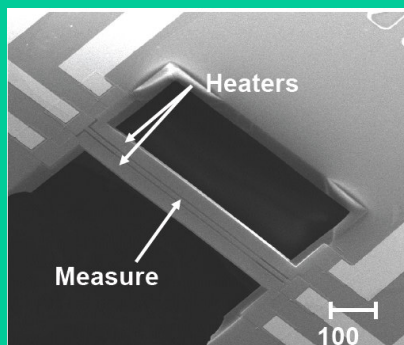


CMAQ Calculations
by NIMH, BG

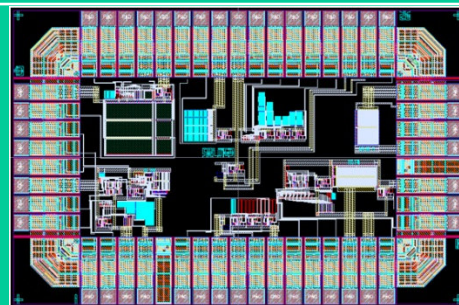
STANDARDS & PROTOCOLS



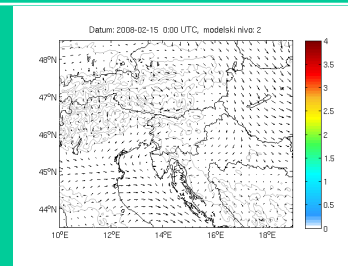
Dynamic Olfactometry (EN 13725/2003) by Univ. of Bari and Lenviros srl, IT



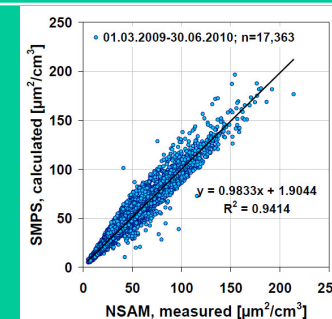
Cantilever Sensor by DTU, DK



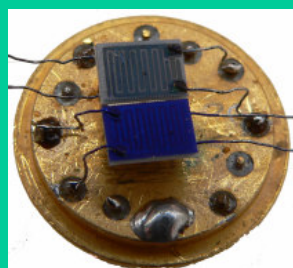
ASIC Circuit: CMOS SOI
by WARWICK & CCMOS Ltd, UK



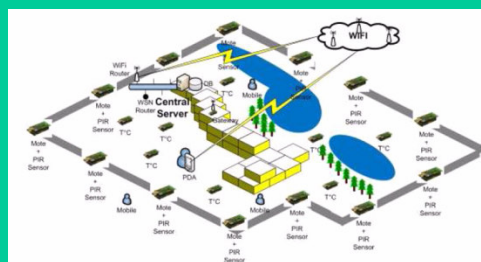
AQ Modelling dispersion in meteorological mesoscale by University of Ljubljana, SL



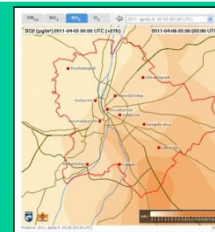
Particle Surface Area Measurements by IUTA eV, DE



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

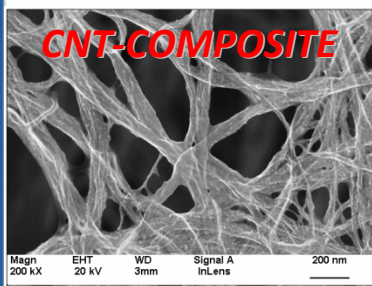
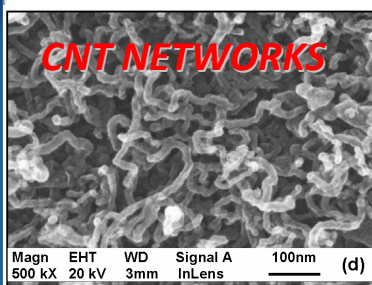
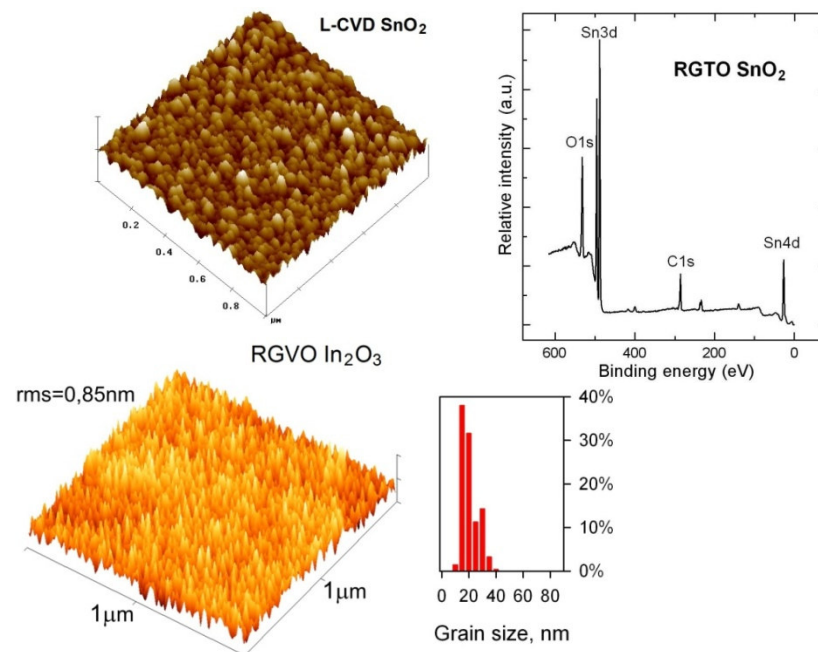
EuNetAir SOLUTIONS: NANOMATERIALS AND NANOTECHNOLOGIES

Metal Oxides Nanostructures by University of Brescia, Italy.



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.

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



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

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 cm ² Vs ⁻¹ , at 300K
High structural/chemical reactivity	Bending at high angle (< 40°)
High thermal stability	1800 - 6000 Wm ⁻¹ K ⁻¹ therm. cond.
Electrical Resistivity	1 - 100 kΩ (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.

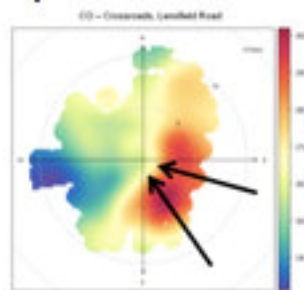
Designed for easy deployment on lighting columns etc.

Low cost, rapid deployment and high spatial resolution. **The Envirowatch mote**

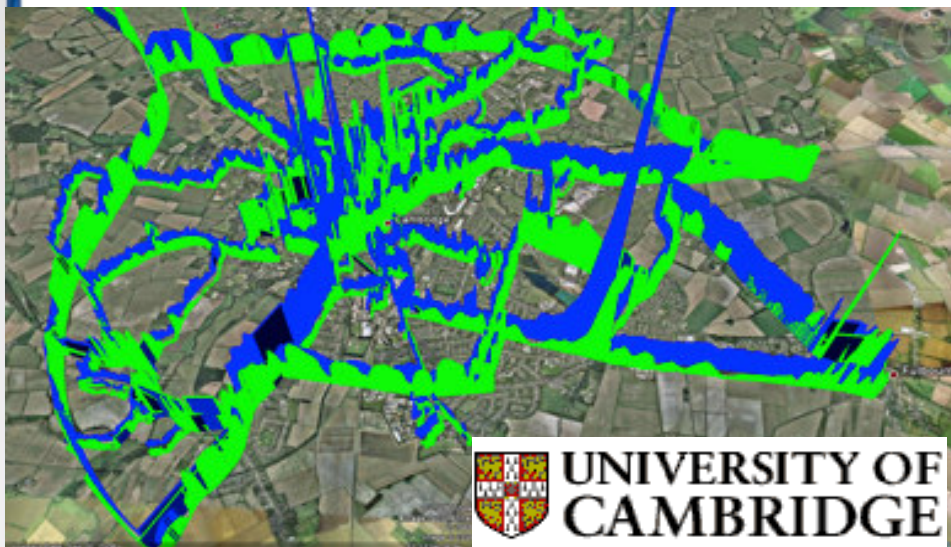
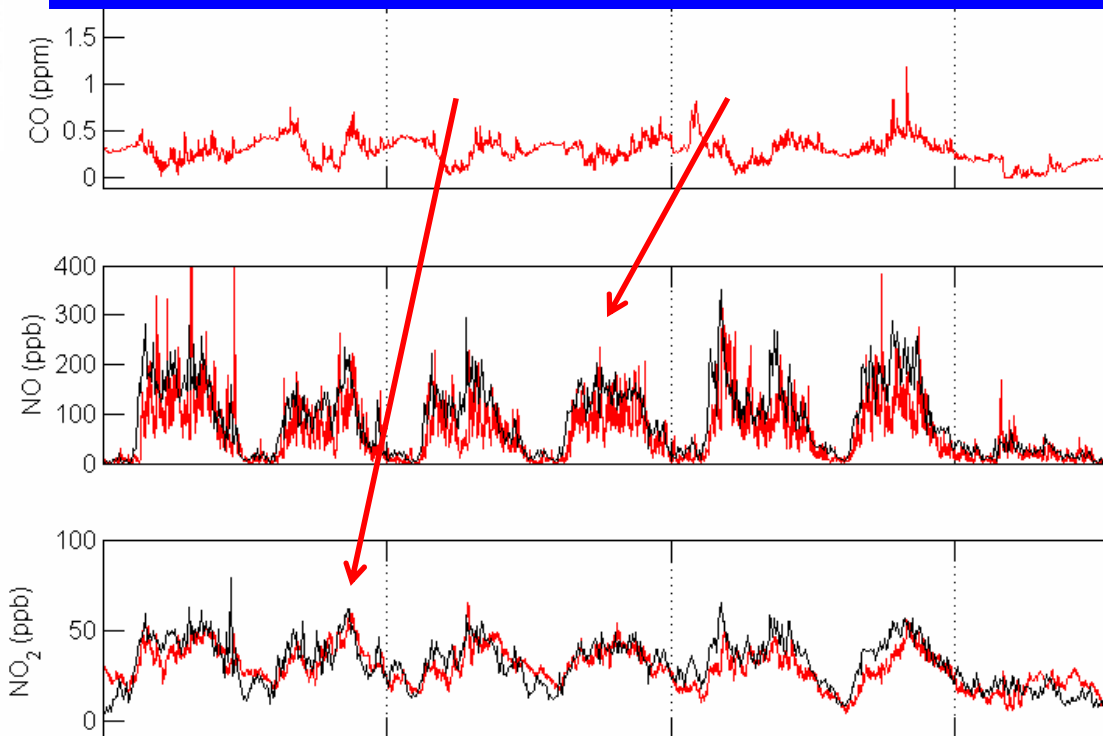


High granularity evaluation of air quality (e.g. NO_x , below), source attribution (right).

WIRELESS SENSORS NETWORK for AQC

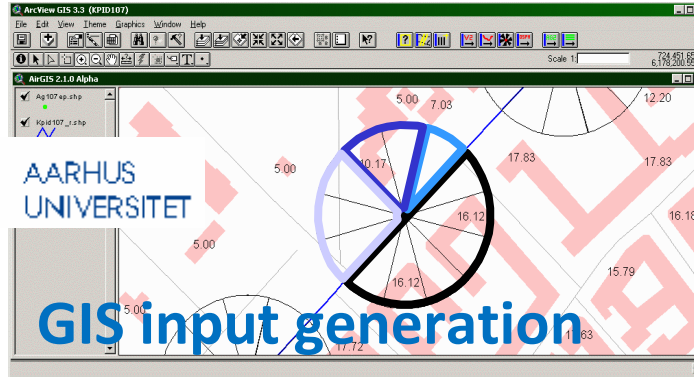
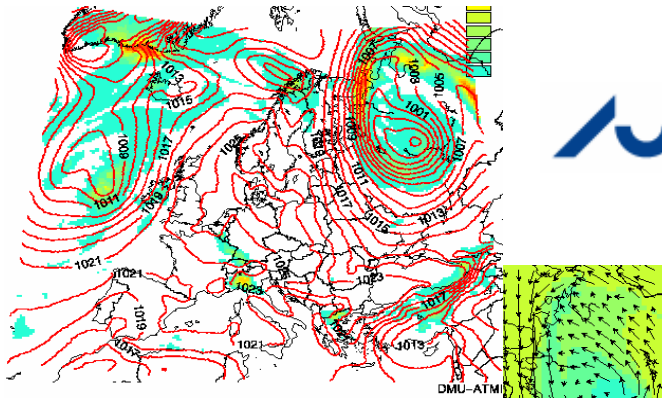


Automatically corrects mote electrochemical sensor data for temp and humidity (red) to achieve excellent agreement with precision instruments (black)

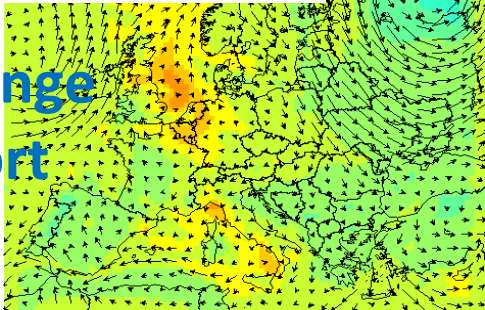


EuNetAir SOLUTIONS: AIR QUALITY MODELLING

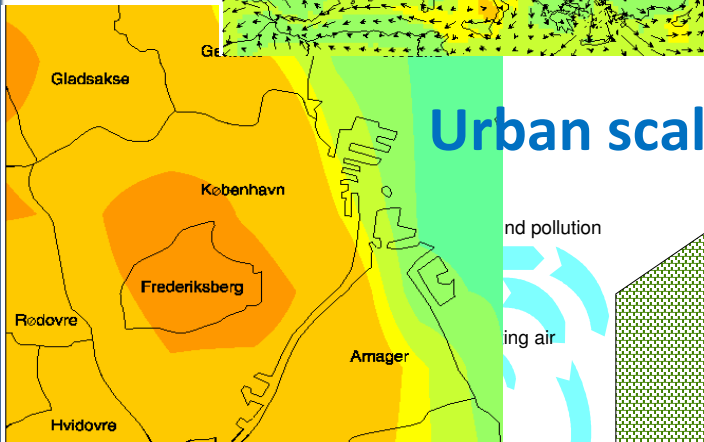
Chemical weather



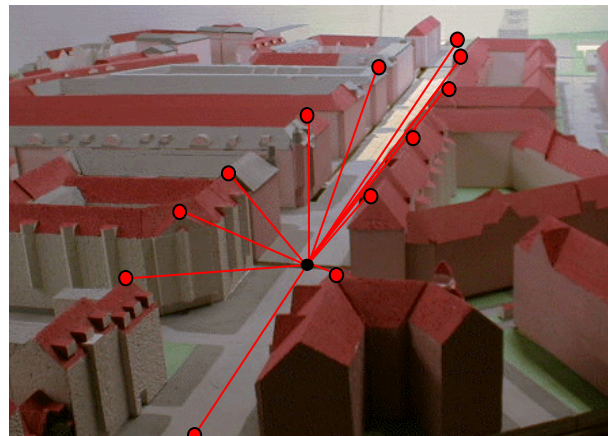
Long-range transport



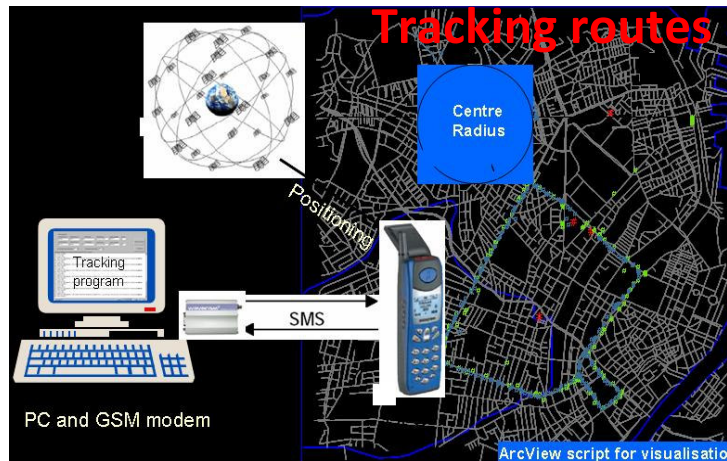
Urban scale



Mapping addresses

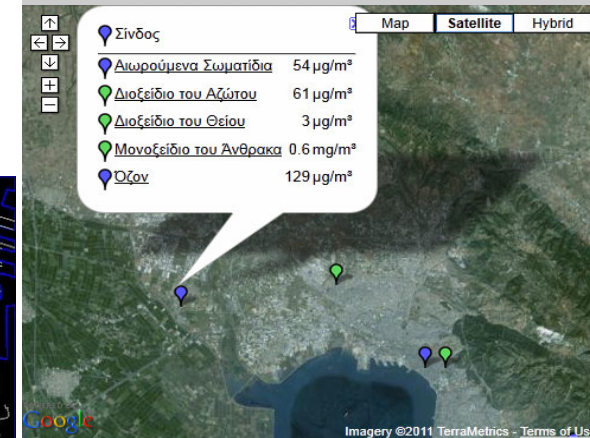


Tracking routes

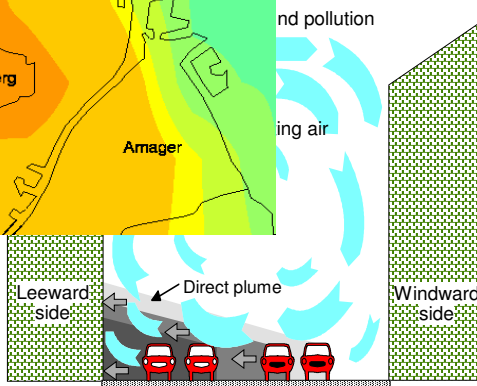


AirTHESS: operational AQ management and information system for Thessaloniki, Greece, employing Computational Intelligence for AQ forecasting and mobile phone technology for early warning messages.

By Aristotle University, Greece.



Street scale



COST Action TD1105 EuNetAir: **Working Groups (WGs) and Special Interest Groups (SIGs)**

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



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:

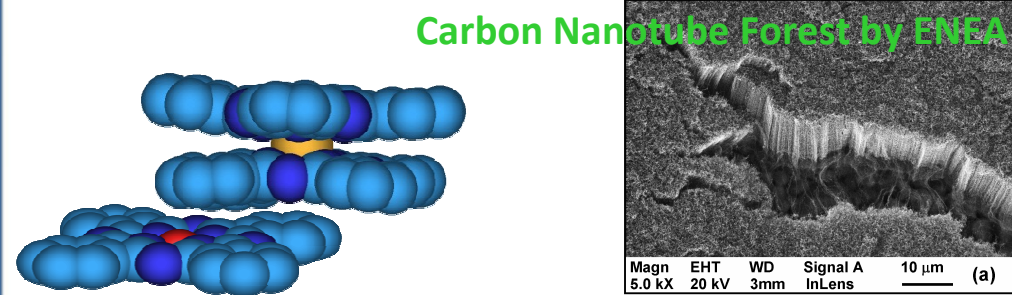
CORE-GROUP

- *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*

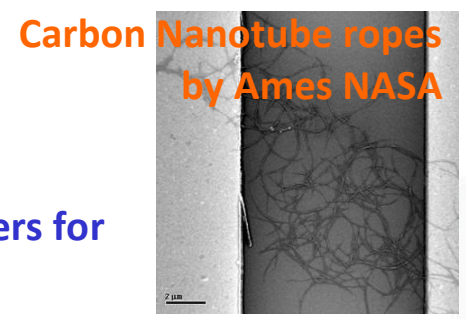
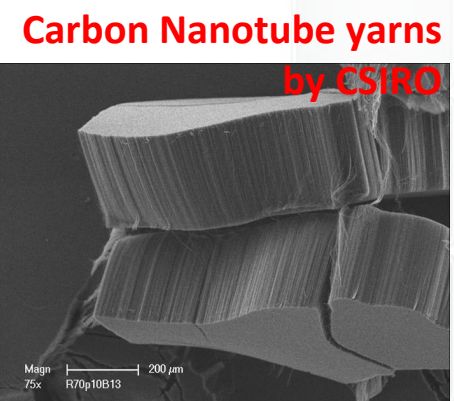
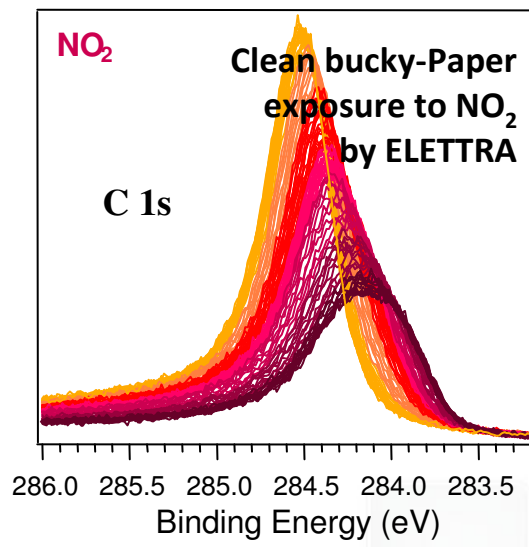
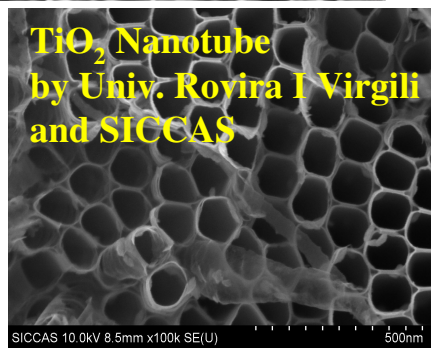
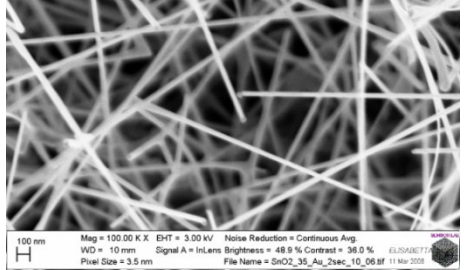
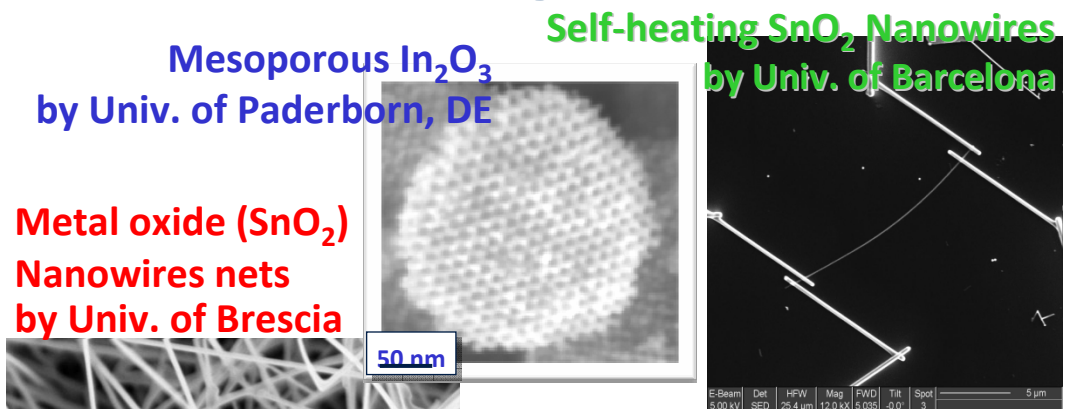
COST - EuNetAir

WG1: Sensor Materials and Nanotechnology

- **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.).

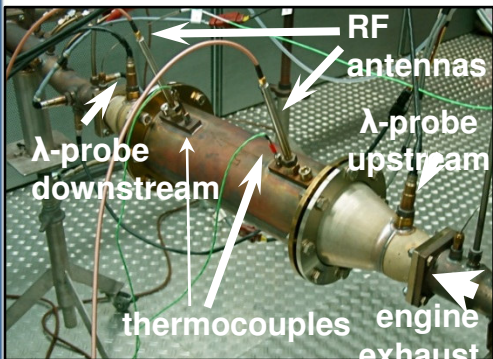


New molecular materials of polymer-macrocycles as transducers for polluting gas sensing by University of Bourgogne



WG2: Sensors, Devices and Systems for AQC

- **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.

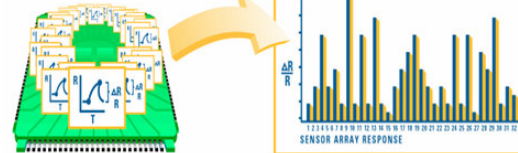


Direct status measurement of automotive catalysts by radio-frequency technique by University of Bayreuth, DE.



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

by Ames NASA



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

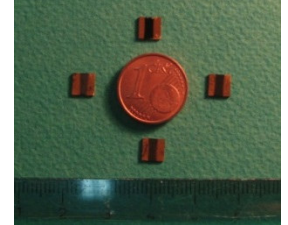
A versatile platform for the efficient development of gas detection systems based on automatic device adaptation by University of Saarland.

Environmental Sensor demo by IMEC, NL

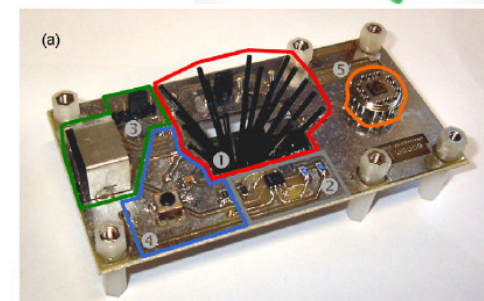
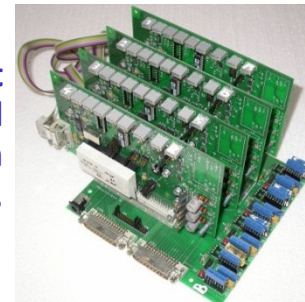


Low-ppb sensitivity for NO₂ GaN-based sensor concept

IT PATENT ENEA
Carbon Nanotube Gas Sensors



EnviroWatch mote by Newcastle University



Autonomous Gas Sensor System by IREC and Univ. of Barcelona

COST - EuNetAir

WG3: Environmental Measurements and Air-Pollution Modelling

- **Sub-Working Group 3.1:** Environmental measurements at laboratory and in field air-quality stations.
- **Sub-Working Group 3.2:** Air-quality modeling and chemical weather forecasting.
- **Sub-Working Group 3.3:** Harmonisation of environmental measurements

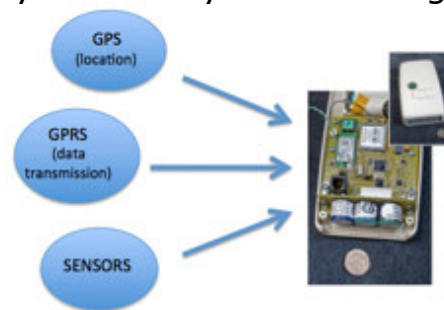


by Aristotle University, EL

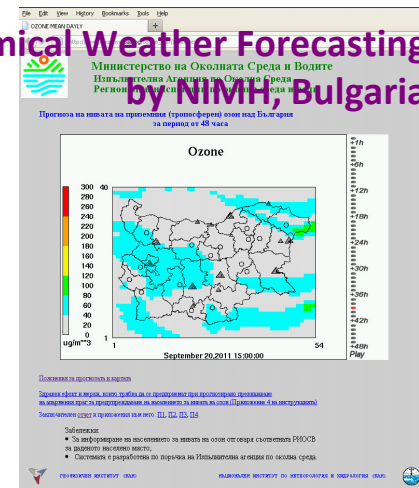


AirMerge system for Chemical Weather Models

Mobile and static sensor network configurations by University of Cambridge.



Chemical Weather Forecasting by NIMH, Bulgaria



AQ Modeling: Tracking routes by Aarhus University, DK

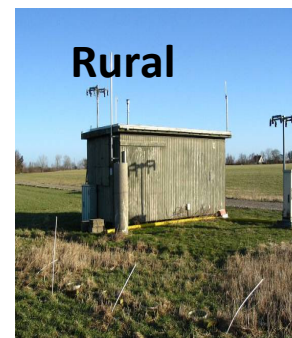


Environmental measurements of PM and air pollution: Protocols and standardisation methods by CSIC, ES



Industrial

AQ monitoring station by ARPA-PUGLIA, IT



Rural

AQ monitoring station by Aarhus University, DK



Urban/Street

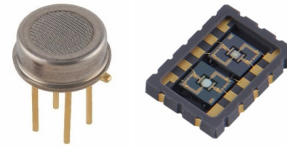
AQ monitoring station by Lithuanian EPA

WG4: Protocols and Standardisation Methods

- **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.

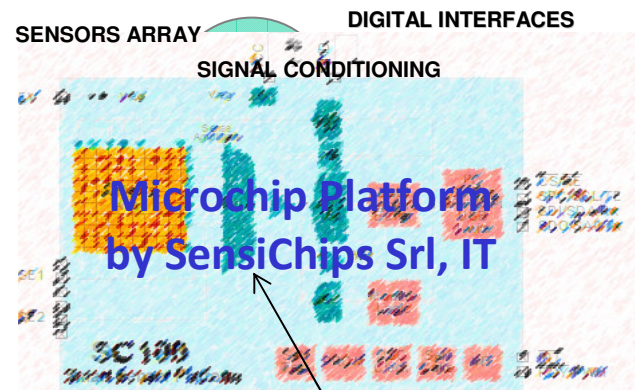
Battery-Powered Sensors by Alphasense Ltd, UK

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

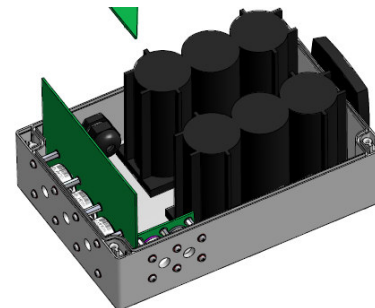


Packaged sensors by E2V, CH

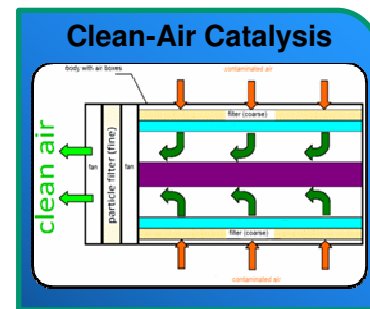
Dynamic olfactometry EN13725 by Univ. of Liege, Odometric SA, Univ. of Bari, Lenviros srl.



New precision multi-parametric analytical tool

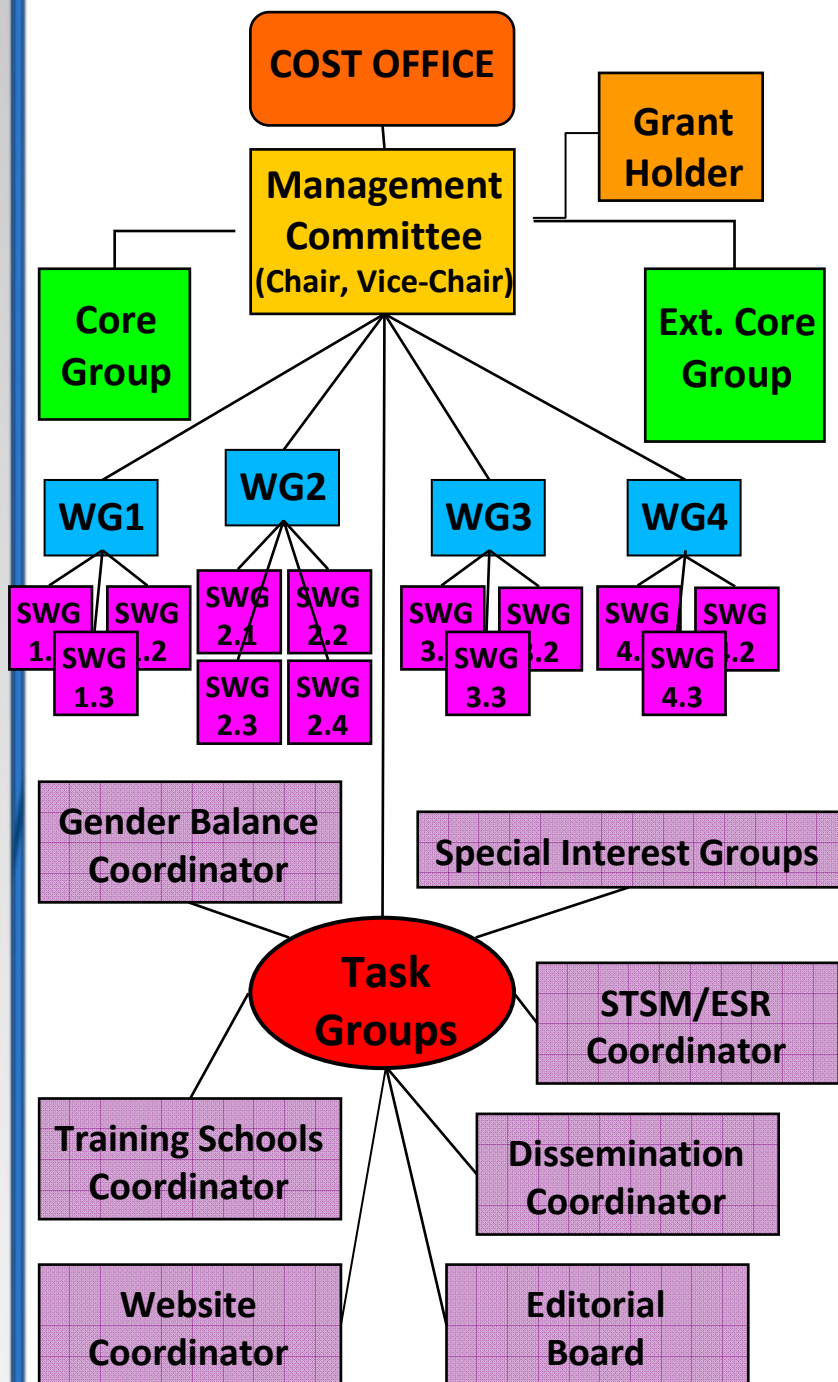


CO₂ IR sensor for alarm System by SenseAir AB, Sweden



Becker Gruppe, DE

COST Action EuNetAir: COORDINATION AND ORGANIZATION



MANAGEMENT COMMITTEE

2 Representatives of participating Countries

Core Group:

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

Extended 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 EuNetAir: EARLY STAGE RESEARCHERS



The Action adopts the “***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 as WGs Chair, ESRs as national MC delegates.

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

- **ESR Coordinator** will be preferably one of the *ESRs MC-members*
- Nomination of an **ESR as WG Coordinator** will be encouraged
- Workshop participation of ESRs
- Selection of **best independent ideas** from ESRs will be 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** based on free web software to promote cohesion inside ESRs community in order to outline needs and overcome
- Proposals to **European Research Council - Starting Independent Research Grant** from Action ESRs will be encouraged

COST Action EuNetAir: GENDER BALANCE

At the moment **20% of the participants are female** with the final aim to reach hopefully up to **50% female participation**.

In this COST Action:

- **Gender Coordinator** will be preferably one of the *female MC-members*
- Female Nomination in Working Groups and Sub-Working Groups, including **WG Coordinator**, will be encouraged
- **Female scientist will be encouraged to top-management**
- **Networks of women in S&T**
- **Career advice of women**
- **Set target numbers and quotas**
- **Awards for women in S&T**
- **Childcare supports (travel with children)**
- **Support for female scientists with family**



COST Action EuNetAir: DISSEMINATION

Target Audience

- *Research community*
- *Industry*
- *End-users*
- *Environmental agencies*
- *Policy makers and regional planners*
- *International organizations*
- *Students and Early Stage Researchers*
- *General Public*
- *Local and Government Authorities*

Methods

- *Website*
- *Electronic communications*
- *Publications*
- *Meetings*
- *International Conferences*
- *Workshops and Side-Events*
- *Industrial Forum and ILOs*
- *Training Schools*
- *Short Term Scientific Missions*
- *Media*

Publications

- *State-of-the-Art on AQC*
- *Roadmap for future research on AQC technologies*
- *Guidelines for Transduction Methods on AQC*
- *Books and Reviews*
- *Scientific and Technological Joint-Publications*
- *Non-Technical Publications*



Other Partners interested to COST Action EuNetAir:

- **JRC Ispra**, Institute for Environment and Sustainability, EU
- **ARPA-PUGLIA**, Regional Environmental Protection Agency, IT
- **ECN**, Environmental Assessment Energy Research Centre of the Netherlands, NL
- **World Health Organization Europe**, by Centre for Air Quality Management and Air Pollution Control, Federal Environmental Agency, Germany.
- **VDI DIN**, Commission on Air Pollution Prevention Standard Committee, DE
- **European Environment Agency**, Copenhagen

COST Action EuNetAir: TIMETABLE



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. 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.</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. WGs Meeting 3. 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. WGs Meeting 5. 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

ROADMAP 2012-2016. **Year 1: 1 July 2012 - 30 June 2013**



Start of Action TD1105: Kick-off Meeting on 16 May 2012

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

COST Action: EuNetAir PARTICIPANTS

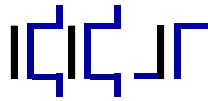


 BE - Belgium	VITO, Université de Liège, Odometric S.A.
 BG - Bulgaria	National Institute of Meteorology and Hydrology - BAS; Institute of Electronics - BAS
 CH - Switzerland	Ecole Polytechnique Fédérale de Lausanne; e2v Microsensors S.A.; EnvEve S.A.; EMPA
 DE - Germany	Institute of Energy and Environmental 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
 IT - Italy	ENEA; ELETTRA; University of Bari; University of Brescia; University of Trieste; Lenviros srl; Sensichips srl
 LT - Lithuania	Lithuania Environmental Protection Agency
 LV - Latvia	University of Latvia
 NL - Netherlands	IMEC - Holst Centre
 NO - Norway	NILU - Norwegian Institute for Air Research
 PL - Poland	Silesian University of Technology; Warsaw University of Life Science
 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 EuNetAir PARTICIPANTS



vision on technology



CAMBRIDGE CMOS SENSORS



e2v



TAMPERE UNIVERSITY OF TECHNOLOGY



FUNCTIONAL MATERIALS



UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft



Aristotle University Thessaloniki



UNIVERSITÀ DEGLI STUDI DI TRIESTE
Dipartimento di Scienze Chimiche e Farmaceutiche



sensichips

Univerza v Ljubljani



CHALMERS



SenSiC AB
sensors for a clean environment



Imperial College London



WARWICK




Non-COST EuNetAir PARTICIPANTS





**University of Waterloo
Systems Design Engineering**

**National Research Center Kurchatov Institute
Institute of Applied Chemical Physics**




 CA - Canada

 RU - Russian Federation


 US - United States



**Southern
Illinois University
Carbondale**

 CN - China


**Chinese Academy of Sciences
Shanghai Institute of Ceramics**


 US - United States

Department of Physics



**NASA Ames Nano Research Center
Center for Nanotechnology**

 CN - China

 AU - Australia



CSIRO

Materials Science and Engineering

COST Action EuNetAir: List of Experts



Total of Experts: 95 from **21 COST Countries** and **5 Non-COST Countries**

(* Reciprocal Agreement)

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

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 PAPAPOPOULOS

ES - Spain

Prof. Juan Ramon MORANTE
Dr. Francisco HERNANDEZ
Dr. Xavier QUEROL
Dr. Mar VIANA
Prof. Eduard LLOBET
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

HU - Hungary

Dr. Zita FERENCZI
Dr. Krisztina LABANCZ

IS - Iceland

Dr. Arngrimur THORLACIUS

IT - Italy

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

LT - Lithuania

Dr. Donatas PERKAUSKAS

LV - Latvia

Prof. Iveta STEINBERGA

NL - Netherlands

Dr. Sywert BRONGERSMA

PL - Poland

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

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

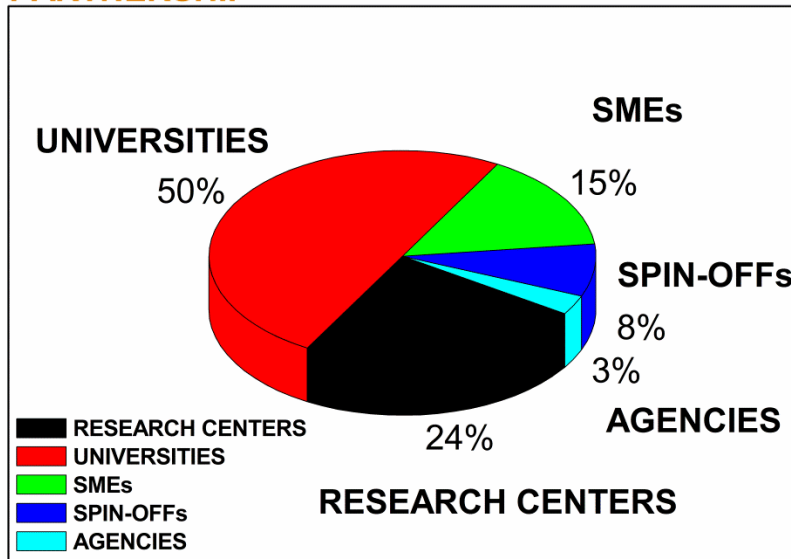
US - United States

Prof. Andrei KOLMAKOV
Dr. Meyya MEYYAPPAN

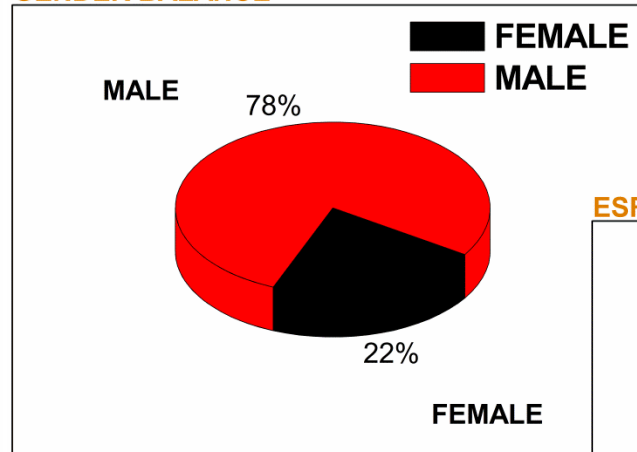
COST Action EuNetAir: STATISTICS



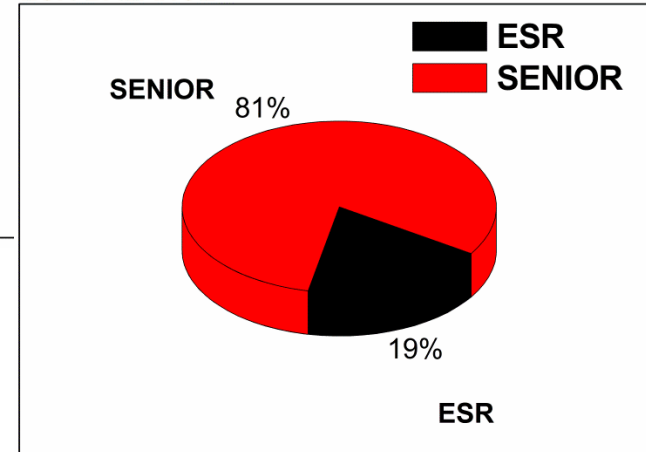
PARTNERSHIP



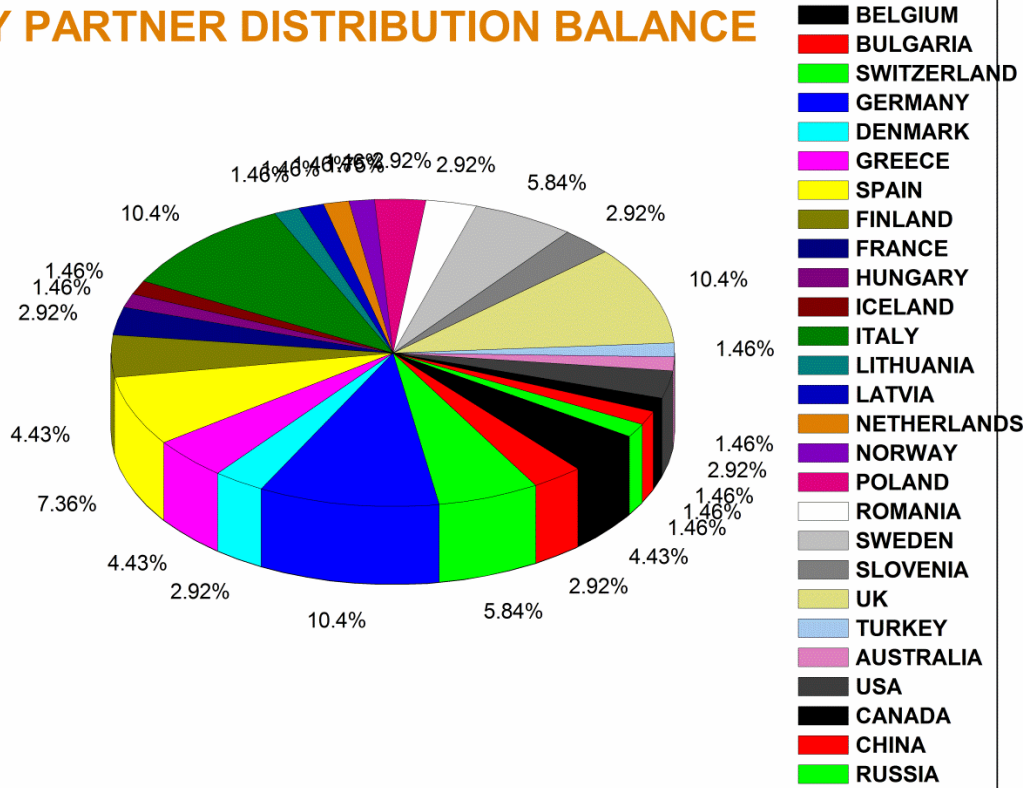
GENDER BALANCE



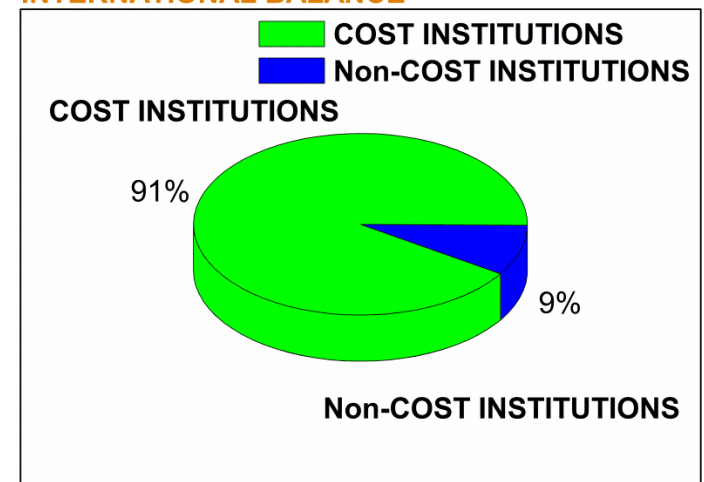
ESR BALANCE



COUNTRY PARTNER DISTRIBUTION BALANCE



INTERNATIONAL BALANCE



ACTION TD1105 EuNetAir MANAGEMENT COMMITTEE



Kick-off Meeting on 16 May 2012 at Brussels

COST Countries that signed MoU: 21

Country MC Members (37): Male (73%) - Female (27%)

Belgium	Dr Jan THEUNIS; Dr Anne-Claude ROMAIN
Bulgaria	Dr Dimiter SYRAKOV; Dr Ivan NEDKOV
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
Italy	Dr Michele PENZA; Prof. Giorgio SBERVEGLIERI
Latvia	Dr Iveta STEINBERGA
Netherlands	Dr Sywert BRONGERSMA
Norway	Dr Nuria CASTELL BALAGUER; Dr. Philipp SCHENEIDER
Poland	Dr Monika KWOKA; Prof. Janislaw GAWRONSKI
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

Country MC Substitutes (23)

Belgium	Dr Julien DELVA
Denmark	Dr. Lise Lotte SORENSEN
Finland	Prof. Jorma KESKINEN
France	Dr Jean SUISSE Prof. Alain PAULY
Germany	Dr. Daniela SCHONAUER-KAMIN Dr. Thomas KUHLBUSCH
Greece	Prof. George KIRIKIADIS Dr. Roberto SIMMARANO
Italy	Dr. Marco ALVISI Dr. Gianluigi DE GENNARO
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 Prof. Julian GARDNER
UK	Dr Robin NORTH Prof. Florin UDREA

ELIGIBLE PARTICIPANTS



- **MANAGEMENT COMMITTEE MEMBERS**

*Each Country participating in an Action can nominate up to 2 MC Members (**in addition to the MC Chair**) and up to 2 MC Substitutes (Deputies). Members are nominated by COST National Coordinator (CNC).*

In Italy, CNC is MIUR - Ministry of Education, University and Research.

- **WORKING GROUP (WG) MEMBERS and NEW PARTICIPANTS (Rules)**

The Working Groups usually consist of a small number of researchers selected by the MC or by a procedure decided by the MC.

*WG members may be MC members or **other researchers from a participating Country** contributing to the achievement of the objectives of the Action, under balance of COST Countries, that have signed MoU.*

*As a general rule, **2 Experts per participating Country** could be included in a **Working Group**. **More flexibility** could be explored to enlarge partnership in a WG coming from the same COST Country, that signed Memorandum of Understanding (MoU).*

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

Visit Link of COST Action TD1105 EuNetAir:

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

COST ACTION TD1105 MANAGEMENT COMMITTEE

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

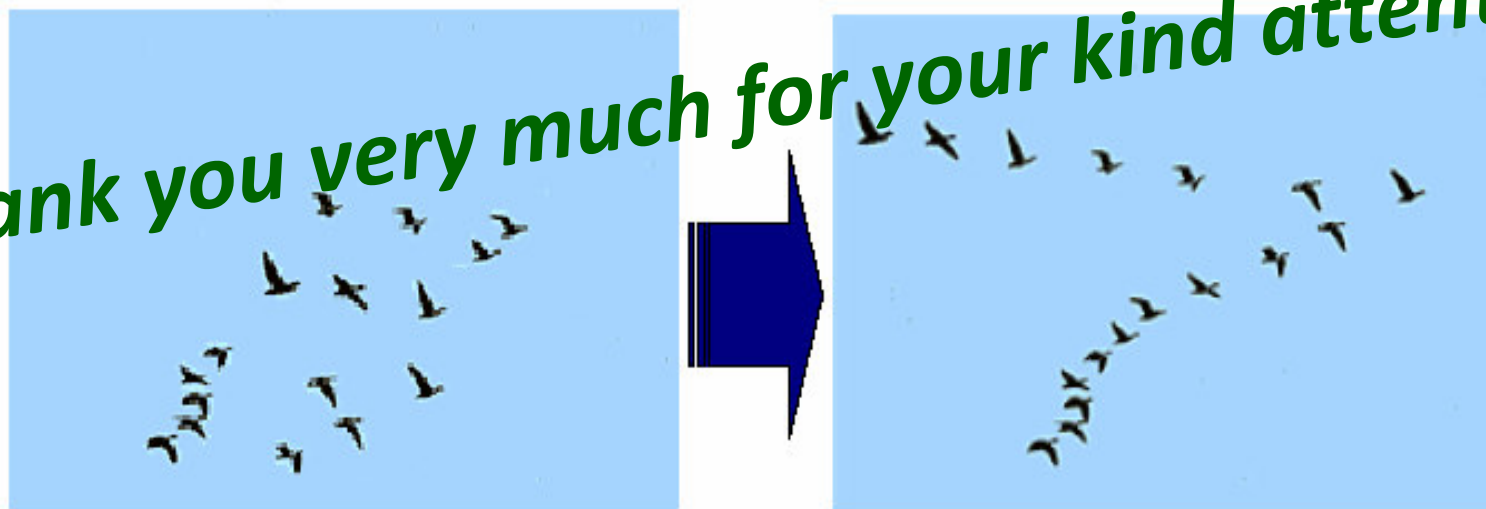


FINAL CONSIDERATIONS

NETWORKING of INTERNATIONAL EXPERTS in a Multidisciplinary Framework of COORDINATED ACTION on AQC RESEARCH with special focus on SMEs for Exploitation of Results to support Green-Economy and Sustainable Development for growth in Europe.

SPIRIT of COST Action EuNetAir

Thank you very much for your kind attention !



***COORDINATED EFFORTS ENHANCE
SYSTEM EFFICIENCY !***





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

Tuesday 22 May 2012
10.30 - 12.30

SPECIAL SESSION PROGRAM

Session Chair(s): Prof. G. Sberveglieri and Dr. Michele Penza

PART I: Sensor Materials and Techniques

Speaker 1: Dr. Michele Penza, ENEA, IT - Action Coordinator
Speaker 2: Prof. Juan Ramon Morante, IREC, ES
Speaker 3: Prof. Eduard Llobet, University Roviri I Virgili, ES
Speaker 4: Dr. Daniela Schonauer-Kamin, University of Bayreuth, DE
Speaker 5: Dr. Andrea Ponzoni, SENSOR Lab. CNR-IDASC, Brescia, IT
Speaker 6: Dr. Danick Briand, EPFL, CH

Wednesday 23 May 2012
10.30 - 12.30

SPECIAL SESSION PROGRAM

Session Chair(s): Prof. G. Sberveglieri and Dr. Michele Penza

PART II: Sensor-Systems, Technologies and Applications

Speaker 7: Prof. Andreas Schutze, Saarland University, DE
Speaker 8: Prof. Anita Lloyd Spetz, Linkoping University, SE
Speaker 9: Dr. Sywert Brongersma, IMEC-Holst Centre, NL
Speaker 10: Prof. Rod Jones, University of Cambridge, UK
Speaker 11: Dr. Saverio De Vito, ENEA, IT
Speaker 12: Prof. Julian W. Gardner, University of Warwick, UK

