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

COST Action TD1105

Special Session in AirMonTech, Duisburg, 4-6 March 2013

Environmental Case Studies from Mediterranean, Central and Eastern Europe

Action Start date: 16/05/2012 - Action End date: 15/05/2016

Michele Penza

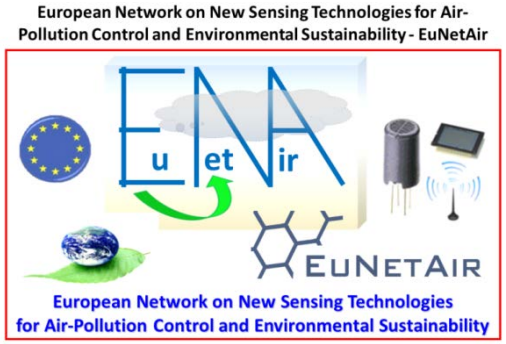
Chair of COST Action TD1105

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

COST is supported by the EU Framework Programme

ESF provides the COST Office through a European Commission contract

Outline

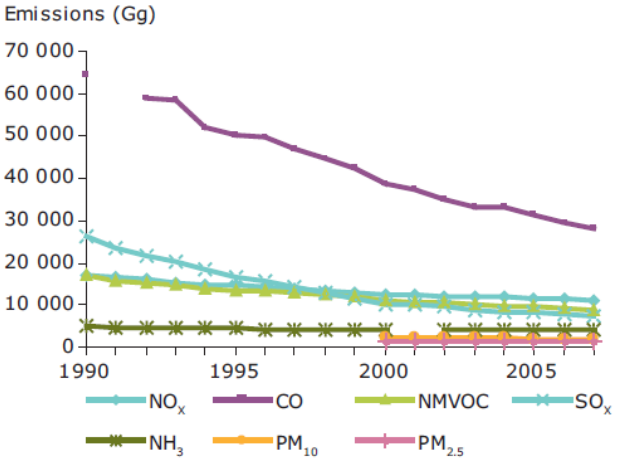


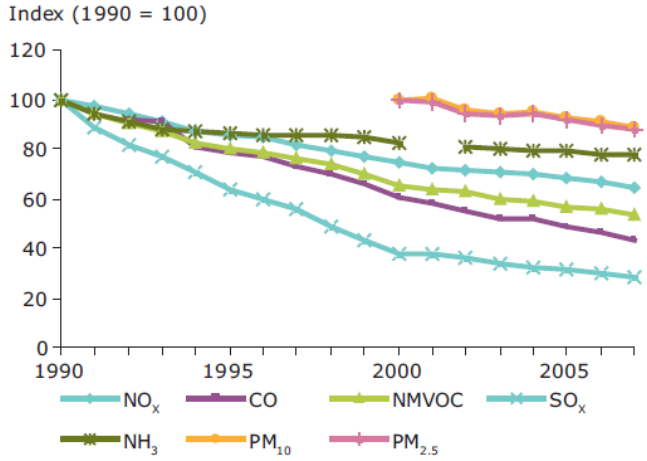
- **Background / Problem Statement:**
  - ✓ *Scientific context*
  - ✓ *Challenges addressed by the Action*
- **MoU Action's Objectives:** *Main and Secondary*
- **Action Research Directions:**
  - ✓ *Methodology and Innovation*
- **Working Groups**
- **Future Plans and Challenges:** *Expected Impact*
- **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 NH_3 between 1990 and 2007 (index year 1990 = 100), and for PM_{10} and $PM_{2.5}$ between 2000–2007 (index year 2000 = 100)

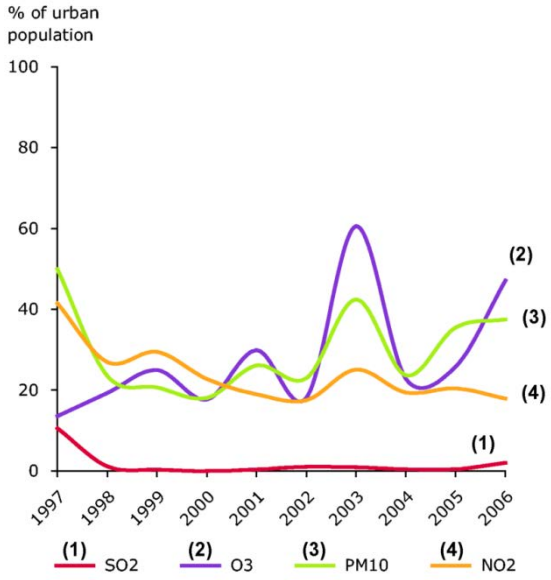
European Environment Agency, EEA Report 8/2009





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/m³
PM_{10}	50 μg/m³
BTEX	6 μg/m³
PAH (BaP)	1 ng/m³
$PM_{2.5}$	-

AMBIENT AIR QUALITY
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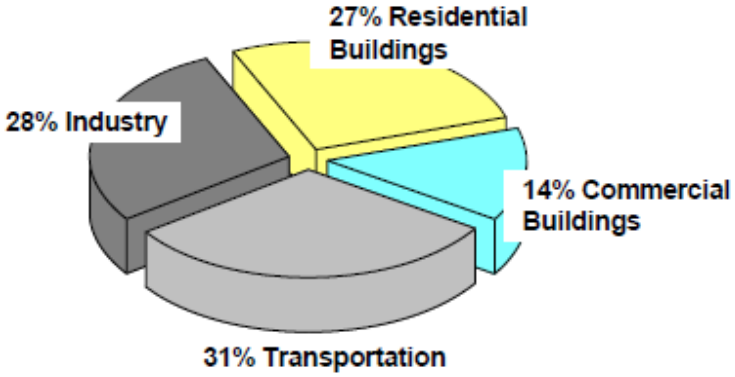
Scientific context: Indoor/Outdoor Energy Efficiency (2/2)



Primary energy consumption in the EU[1]

[1] *O. Seppanen,*

11th Conference on Indoor Air Quality

2008, Copenaghen, Denmark

41% Primary Energy consumed in Buildings:

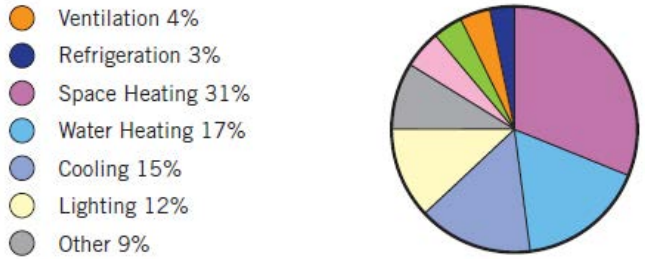
- **2/3 in Residential Buildings**
- **1/3 in Commercial Buildings**

Energy Performance of Buildings EU Directive

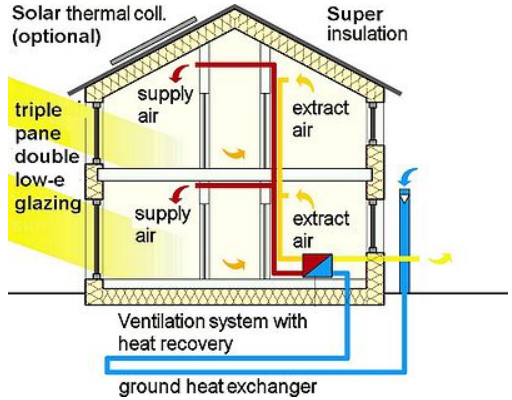
EPBD 2010/31/EC

Figure 2 – Total Energy Consumption by End Use

Adapted from E Source, 2006



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



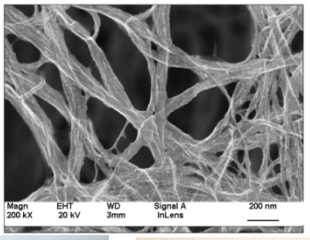
IAQ by WORLD HEALTH ORGANIZATION

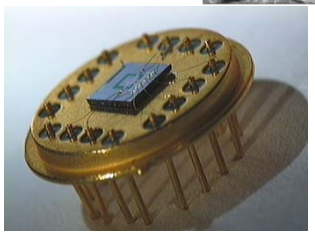
Indoor Air		Typical Substances		Cure
Contamination Source	Emission Source	VOCs	Others	
• Human Being	• Breath	Acetone, Ethanol, Isoprene		demand controlled ventilation
		CO_2		
		Humidity		
	• Skin Respiration & Transpiration	Nonanal, Decanal, α-Pinene		
		Humidity		
	• Flatus	Methane, Hydrogen		
	• 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		

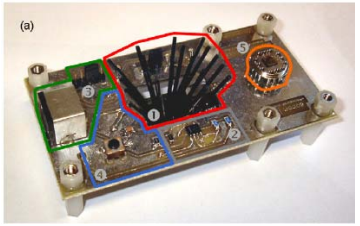
Table 1 – Typical Indoor Air Contaminants (VOCs and others)

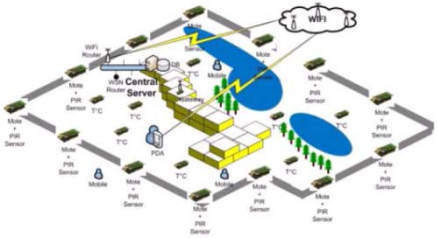
Challenges addressed by Action TD1105 (1/1)

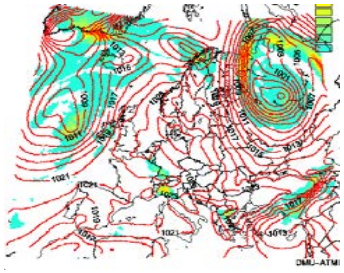
- **Nanomaterials for AQC sensors**
- Low-cost Gas Sensors
- **Low-power Sensor-Systems**
- **Wireless Technology (*Environmental Sensors Network*)**
- **Air Quality Modelling**
- **Environmental Measurements**
- **Standards and Protocols**

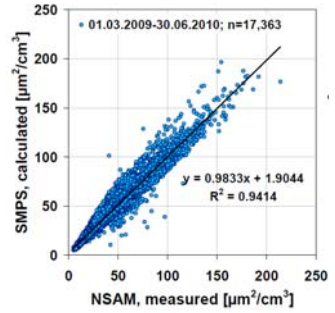












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EuNetAir

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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:

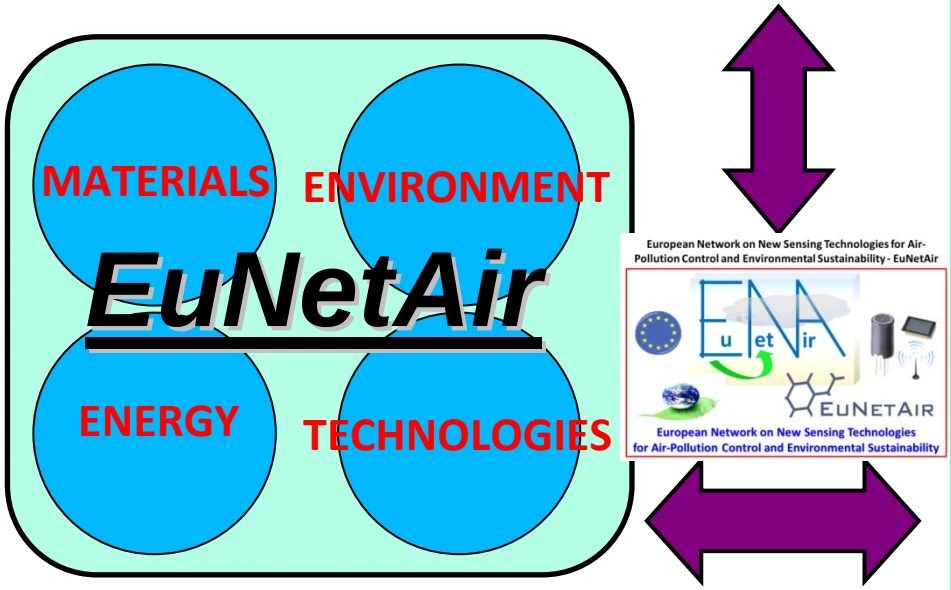
- *To monitor* real-world environmental conditions with *experimental campaigns* to assess composition of *indoor air* (buildings: house and office) and *outdoor air* (urban areas and industrial sites) and to investigate how such data can be utilised in air pollution modelling.
- *To approach* *standardisation 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

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**
- **CITI-SENSE, ENV**
- **GOSPEL, Network of Excellence in Artificial Olfaction**
- **FLEXSMELL, PEOPLE Marie-Curie Action**

INNOVATION of ACTION:

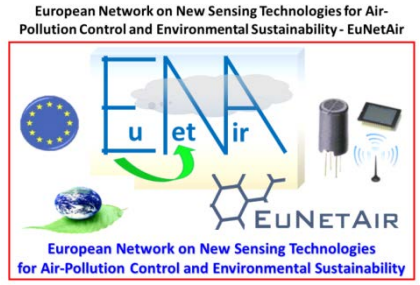
Integrated approach **on AQC for environmental sustainability by cooperative networking of multidisciplinary research on nanomaterials, gas sensing technologies, wireless sensor technologies and networks, environmental measurements, ambient intelligence, air quality modelling, chemical weather forecasting,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

Action Research Directions: *Innovation* (2/2)

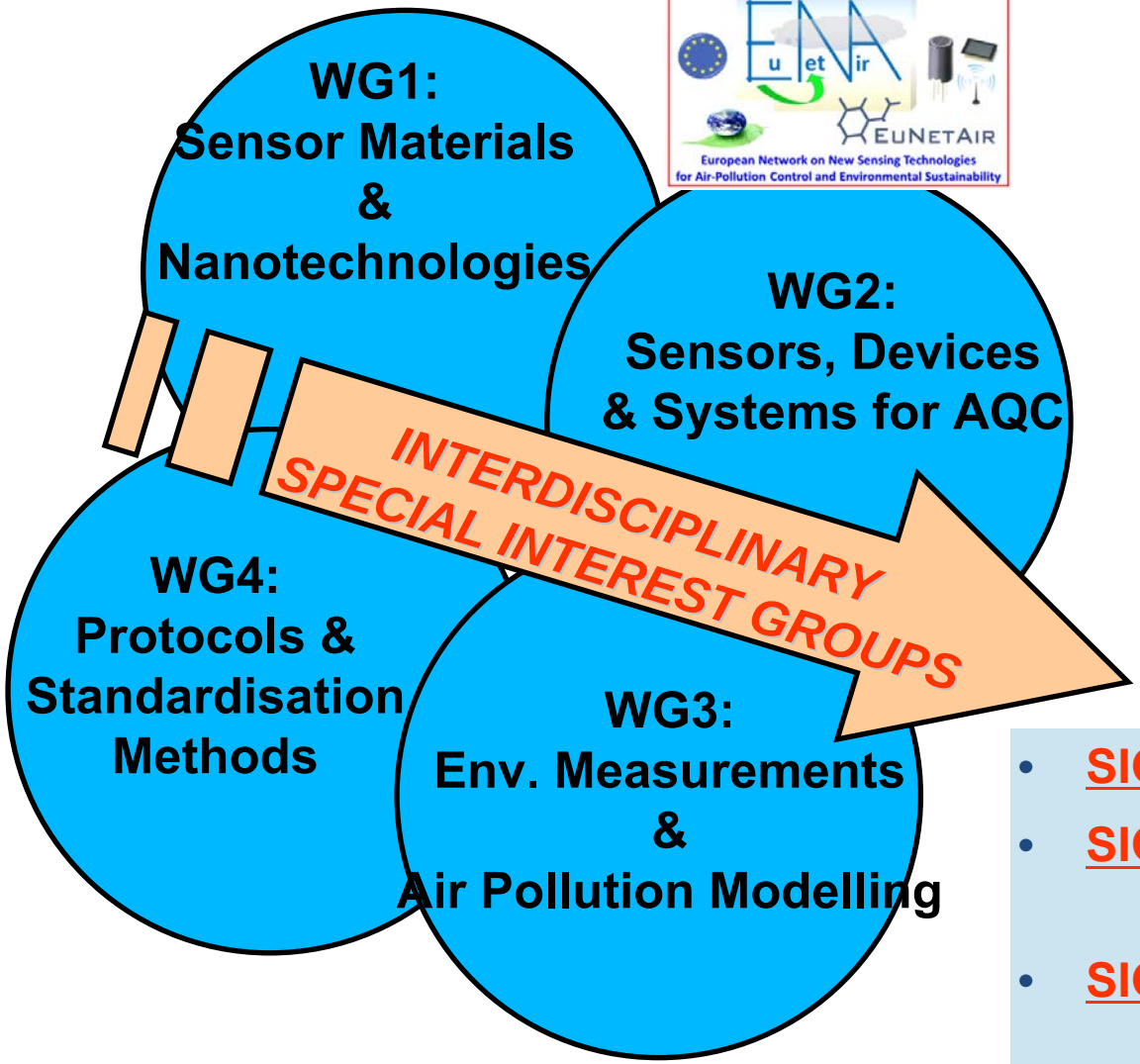
Innovation Highlights of COST Action TD1105 *EuNetAir*:

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)



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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***

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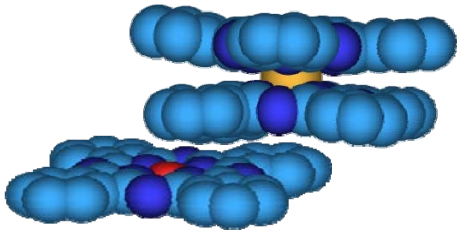
TD1105 *EuNetAir* WG1: Sensor Materials & Nanotechnologies (2/5)

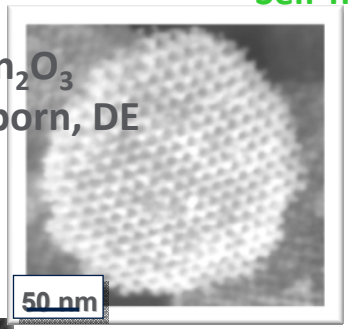
WG1 Chair: Prof. Juan Ramon Morante, IREC, Spain

- **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.).

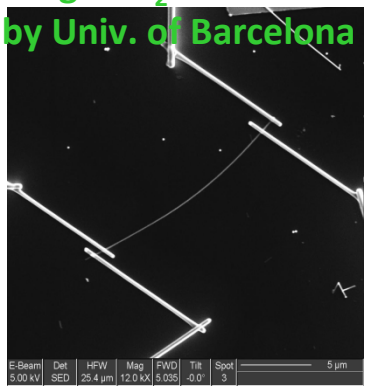


New molecular materials of polymer-macrocycles as transducers for polluting gas sensing by University of Bourgogne

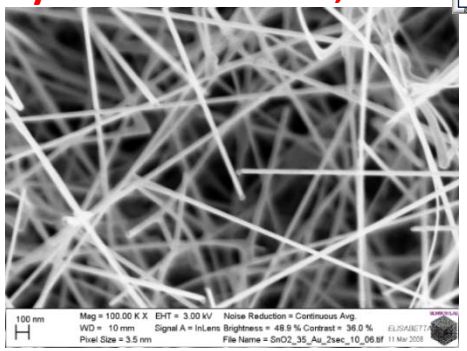
Mesoporous In_2O_3 by Univ. of Paderborn, DE

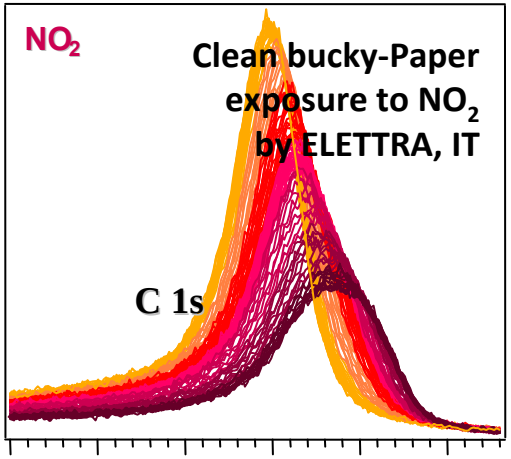


Self-heating SnO_2 Nanowires by Univ. of Barcelona

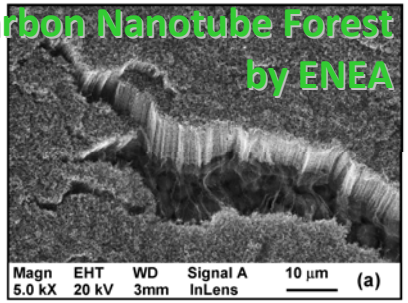


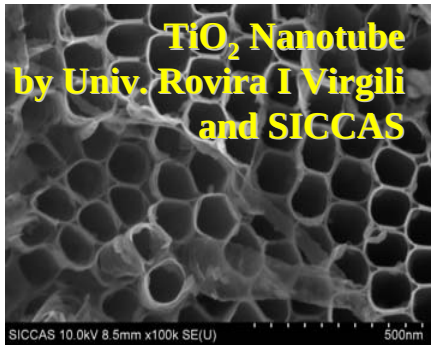
Metal oxide (SnO_2) Nanowires nets by Univ. of Brescia, IT



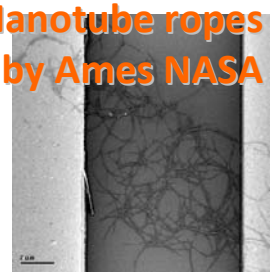


Carbon Nanotube Forest by ENEA

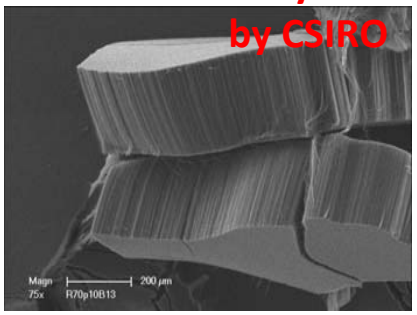




Carbon Nanotube ropes by Ames NASA



Carbon Nanotube yarns by CSIRO



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

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

- **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**:

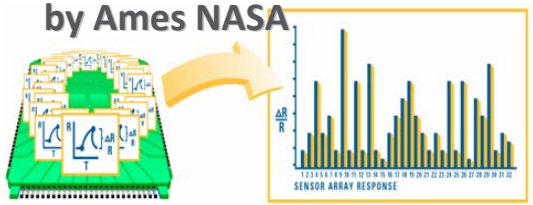
  Intelligence algorithms and distributed computing for networked AQC gas sensors.

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

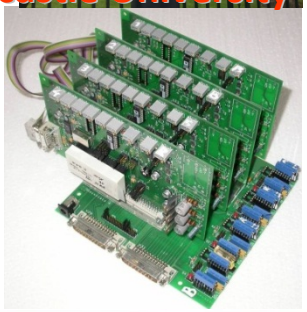
IT PATENT ENEA
Carbon Nanotube Gas Sensors

EnviroWatch mote by Newcastle University

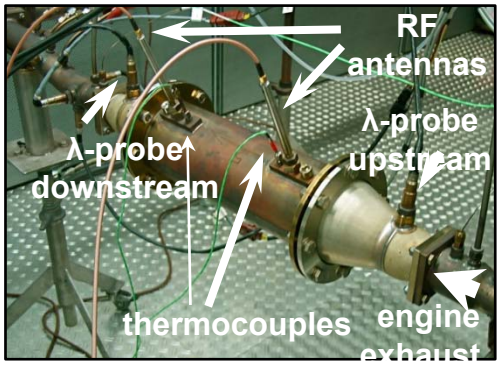
by Ames NASA



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.



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

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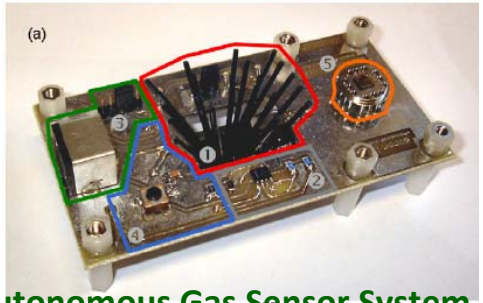
Low-ppb sensitivity for NO_2
GaN-based sensor concept



Autonomous Gas Sensor System by IREC and Univ. of Barcelona

TD1105 WG3: Environmental Measurements and Air-Pollution Modelling (4/5)

WG3 Chair: Prof. Ole Hertel, Aarhus University, Denmark

- **Sub-Working Group 3.1**:

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

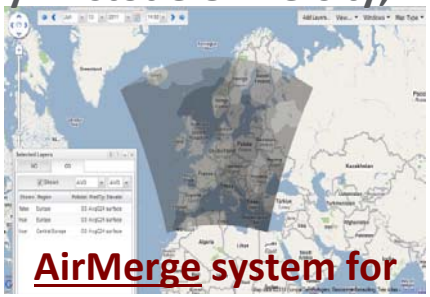
- **Sub-Working Group 3.2**:

  Air-quality modelling and chemical weather forecasting.

- **Sub-Working Group 3.3**:

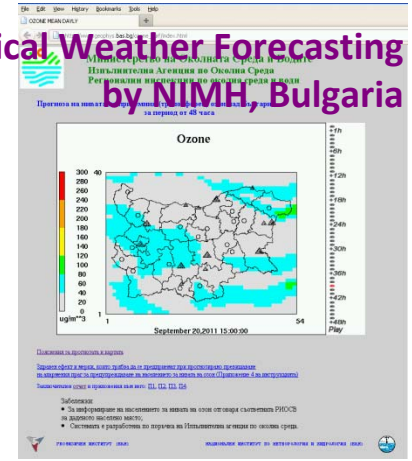
  Harmonisation of environmental measurements.

by Aristotle University, EL

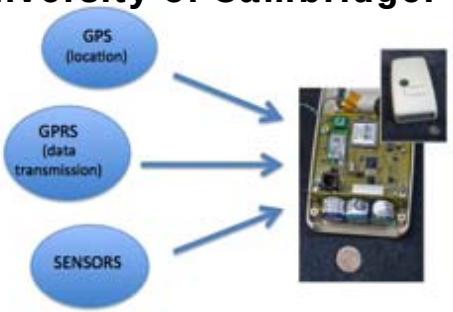


AirMerge system for Chemical Weather Models

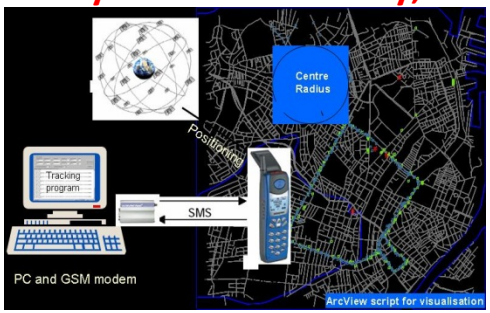
Chemical Weather Forecasting by NIMH, Bulgaria



Mobile and static sensor network configurations by University of Cambridge.



AQ Modeling: Tracking routes by Aarhus University, DK



Environmental measurements of PM and air pollution by CSIC, ES

AQ monitoring station by ARPA-PUGLIA, IT

AQ monitoring station by Aarhus University, DK

AQ monitoring station by Lithuanian EPA

TD1105 *EuNetAir* WG4: Protocols and Standardisation Methods (5/5)

WG4 Chair: Prof. Ingrid Bryntse, SenseAir AB, Sweden

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

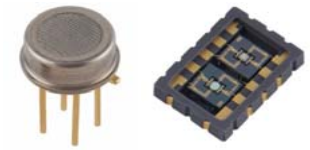
European Directive 2008/50/EC: Ambient Air Quality

EU standard EN 13725/2003: Dynamic Olfactometry

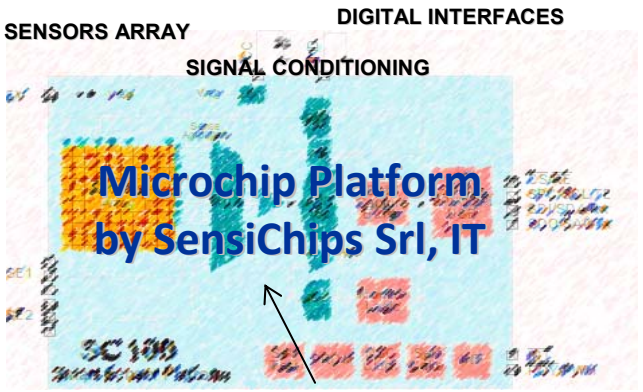
Protocols and Standardised Methods for Gas Sensors

Guidelines of Best Transducers applied to specific gases

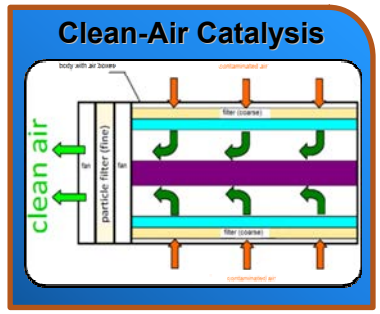
Dynamic olfactometry EN13725
by Univ. of Liege, Odometric SA,
Univ. of Bari, Lenviros srl.



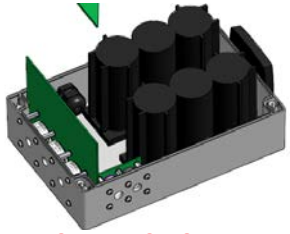
Packaged Sensors
by SGX-Sensortech, CH



New precision multi-parametric analytical tool



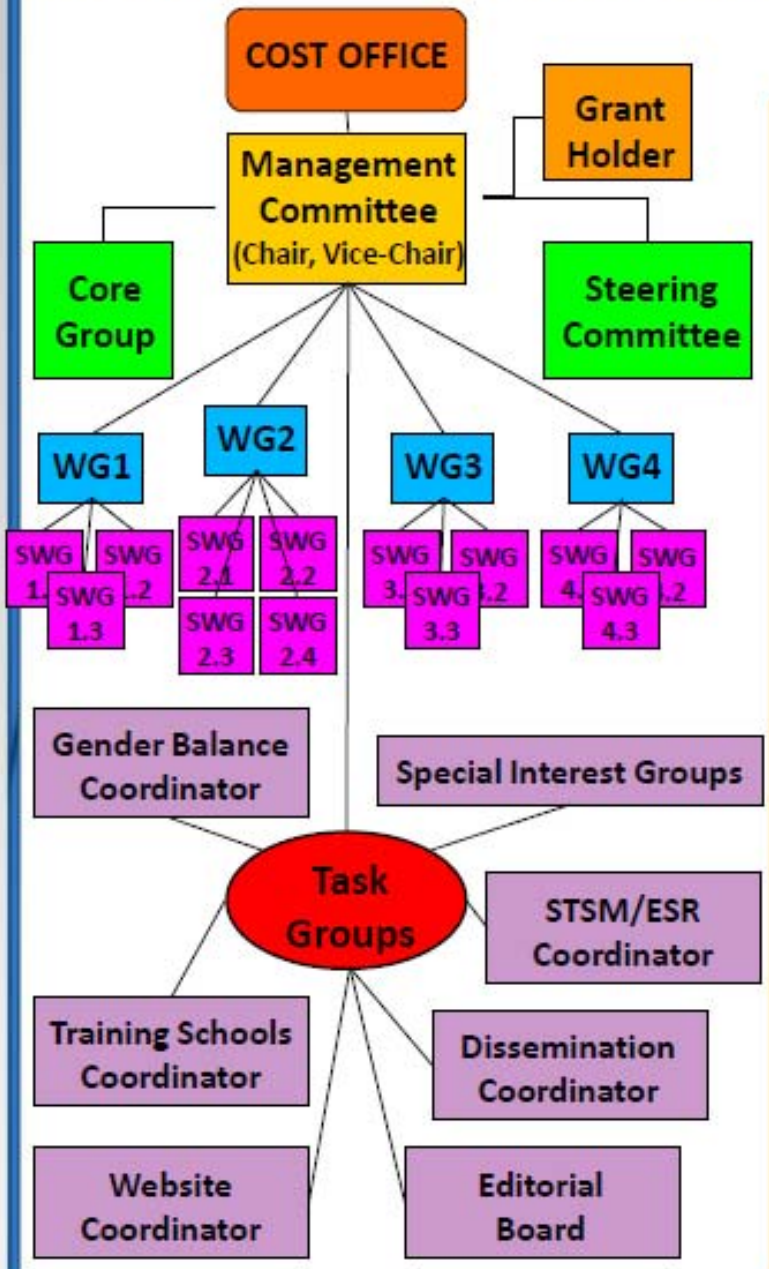
Becker Gruppe, DE



Battery-Powered Sensors by Alphasense Ltd, UK

CO_2 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	**M**: Kick-Off Meeting. MC Meeting 1. **D**: MC setup and Action Workplan established	**M**: Editorial Board for Leaflet, Brochure, Newsletter. Action website setup. **D**: Definition of WGs and WGs Workplans	**M**: MC Meeting 2. WGs Meeting 1. **D**: Scientific activities, ESR/STSM program, Dissemination	**M**: Workshop 1. Training School 1. State-of-Art on AQC. **D**: Evaluation and Activity Report.
2	**M**: MC Meeting 3. WGs Meeting 2. Update Action website. **D**: Scientific activities. Liason with EU Programs	**M**: Editorial Board meeting. ESR/STSM. **D**: Dissemination. Newsletter. Reporting	**M**: MC Meeting 4. WGs Meeting 3. Workshop 2. Training School 2. **D**: S&T strategies	**M**: **International Conference 1**. Edit. Board. ESR/STSM. **D**: Dissemination. Reporting
3	**M**: MC Meeting 5. WGs Meeting 4. **D**: Dissemination. Strategies & Activities	**M**: Edit. Board: State-of-art AQC. ESR/STSM **D**: Dissemination. Strategies. Reporting	**M**: MC Meeting 6. WGs Meeting 5. Workshop 3. Training School 3. **D**: S&T strategies	**M**: Edit. Board: Newsletter. ESR/STSM **D**: Dissemination. Reporting
4	**M**: . MC Meeting 7. WGs Meeting 6. **D**: S&T strategies. Link to EU programs, Industry	**M**: Workshop 4. Training School 4. **D**: Dissemination. ESR/STSM. S&T strategic activity.	**M**: WGs Meeting 7. **D**: S&T strategies and activities. ESR/STSM. Dissemination	**M**: **International Conference 2**. MC Meeting 8. **D**: Final Evaluation. Reporting

M: ***Milestones*** **D**: ***Deliverables***

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

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

COST Action: EuNetAir PARTICIPANTS

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

COST Action TD1105 *EuNetAir*: 25 COST Countries (Parties) have already signed Memorandum of Understanding (MoU)

PARTIES

already accepted

MoU: 25 Countries

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

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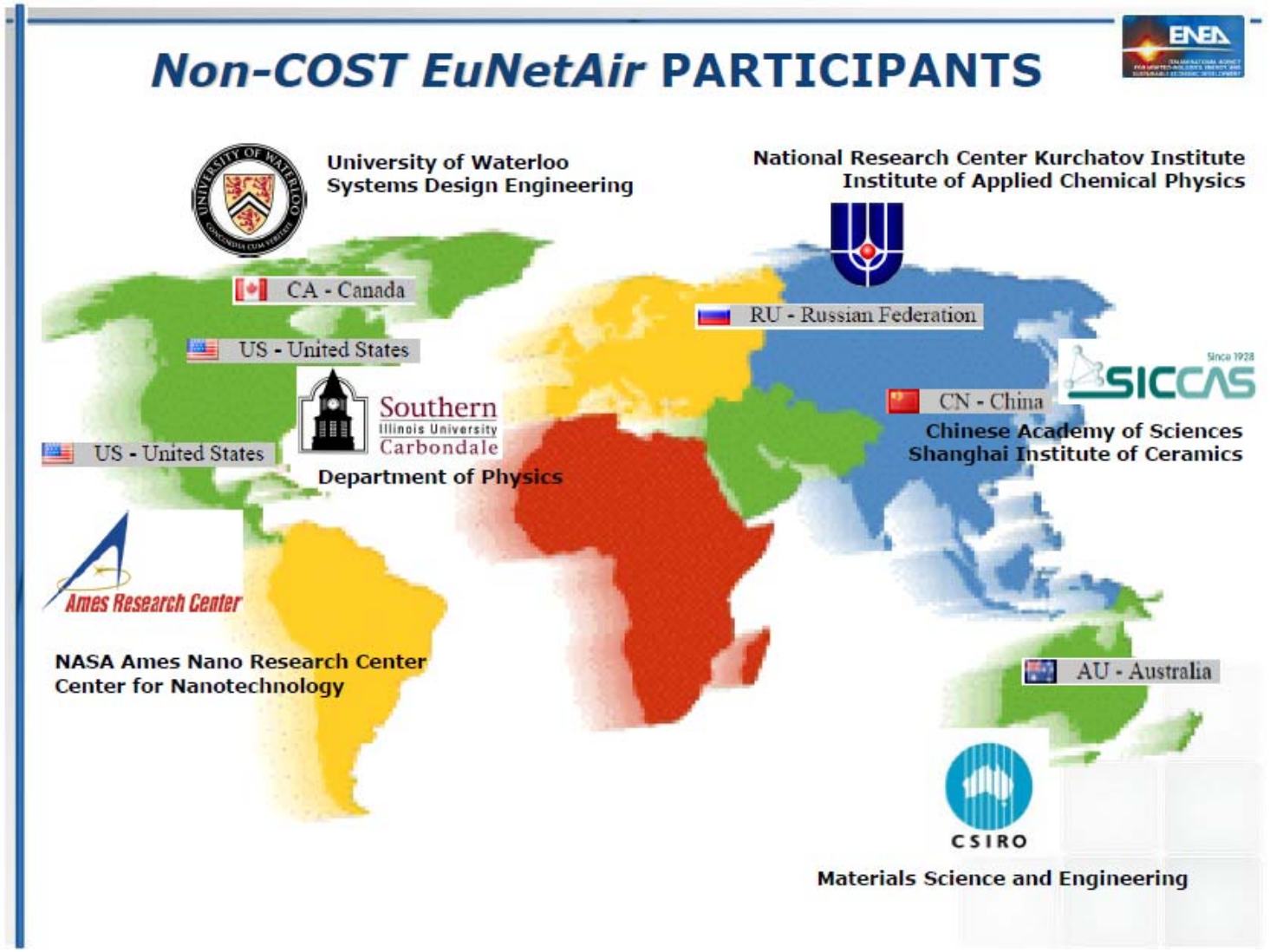
COST Action TD1105 *EuNetAir*: 5 Non-COST Countries and 7 Non-COST Institutions

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*.



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EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

COST Action EuNetAir: List of Experts

(* Reciprocal Agreement)

Total of Experts: 118 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
Dr. Zdenek ZELINGER

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

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 PAPADOPOULOS
Prof. Tatiana TAMBOURATZIS

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

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

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

HU - Hungary
Dr. Zita FERENCZI
Dr. Krisztina LABANCZ

IS- Iceland
Dr. 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. Magda BRATTOLI
Dr. Annamaria DEMARINIS
Dr. Gianluigi DE GENNARO
Dr. Luigi BARBIERI
Prof. Giorgio ASSENNATO
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
Prof. Carlos BORREGO
Dr. Joao Paulo TEIXEIRA
Prof. Cristina MAGUAS
Dr. Miguel COUTINHO
Dr. Ana Margarida COSTA

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

SI - Slovenia
Prof. Rahela ZABKAR
Dr. Grisa MOCNIK
Prof. Branko STER

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

NO - Norway
Dr. Nuria Castell-BALAGUER
Dr. Philippe SCHNEIDER

RO - Romania
Dr. Roxana Mioara PITICESCU
Dr. Marcel IONICA
Dr. Cristina RUSTI
Dr. Radu Adrian IONICA

TR - Turkey
Prof. Zafer Ziya OZTURK
Prof. Mehmet Fatih DANISMAN

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 (45): *Male (73%) - Female (27%)*
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. SBERVEGLIERI; Dr. G. DE GENNARO
Latvia	Dr Iveta STEINBERGA
Netherlands	Dr Sywert BRONGERSMA; Dr. Ernie WEIJERS
Norway	Dr Nuria CASTELL BALAGUER; Dr. Philipp SCHENEIDER
Poland	Dr Monika KWOKA; Prof. Janislaw GAWRONSKI
Portugal	Prof. Bernadete RIBEIRO; Prof. Carlos BORREGO
Romania	Dr Marcel IONICA; Dr Roxana Mioara PITICESCU
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; Prof. Mehmet Fatih DANISMAN

MANAGEMENT COMMITTEE

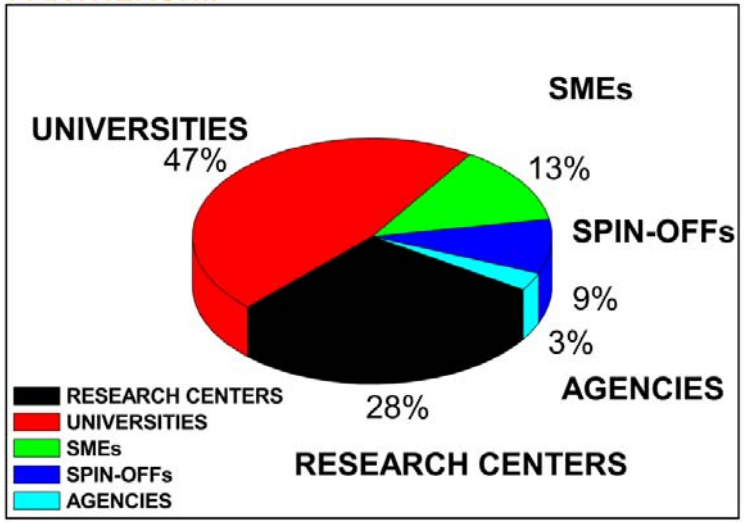
MC Chair:	Michele Penza, ENEA, IT
MC Vice Chair:	Anita Lloyd Spetz, Linkoping University, SE
Grant Holder:	University of Bari, IT

Kick-off Meeting at Brussels on 16 May 2012

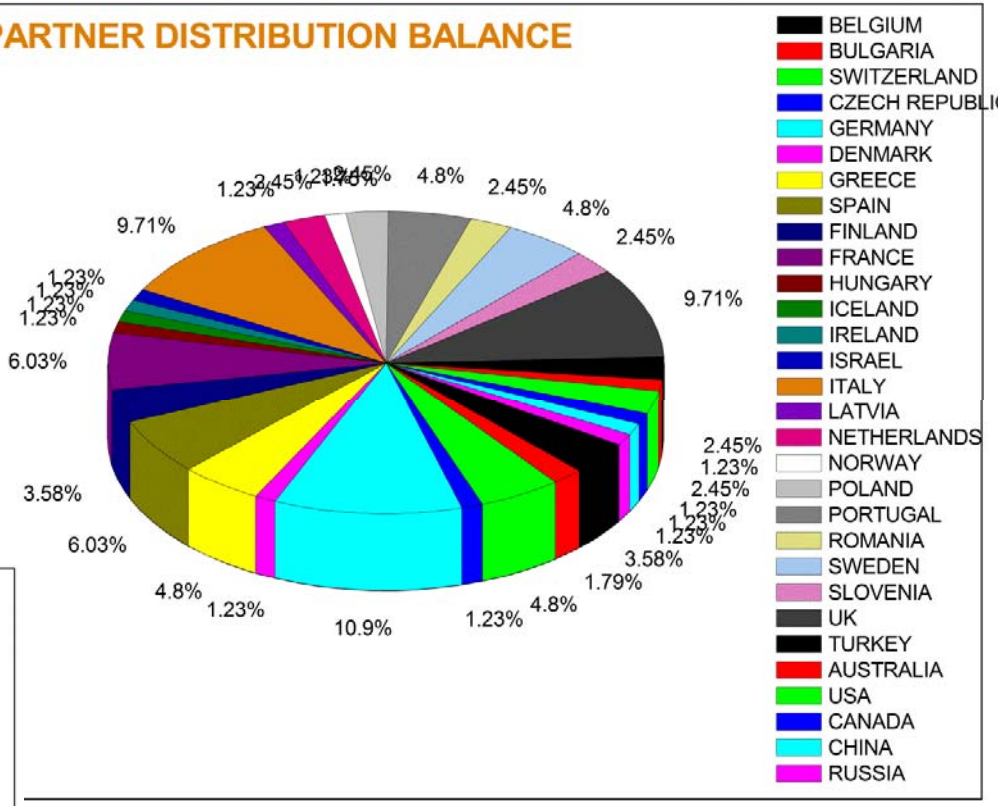
Country	MC Substitutes (26)
Belgium	Dr Julien DELVA
Czech Republic	Dr. Roman NERUDA
Denmark	Dr. Lise Lotte SORENSEN
Finland	Prof. Jorma KESKINEN
France	Dr Jean SUISSE Prof. Alain PAULY
Germany	Dr. Daniela SCHONAUER-KAMIN Dr. Thomas KUHLBUSCH
Greece	Prof. George KIRIKIADIS
Italy	Dr. Roberto SIMMARANO Dr. Marco ALVISI Dr. Saverio DE VITO
Poland	Prof. Jacek SZUBER
Portugal	Dr. Joao Paulo TEIXEIRA
Romania	Dr. Cristina RUSTI Dr. Marcel Adrian IONICA
Slovenia	Prof. Andrej DOBNIKAR
Spain	Prof. Albert ROMANO-RODRIGUEZ Dr. Jordi LLOSA
Sweden	Dr Ulf THOLE Dr. Marina VOINOVA
Switzerland	Dr Christoph HUEGLIN
UK	Prof. Julian GARDNER Dr Robin NORTH Prof. Florin UDREA

COST Action TD1105 *EuNetAir*: STATISTICS

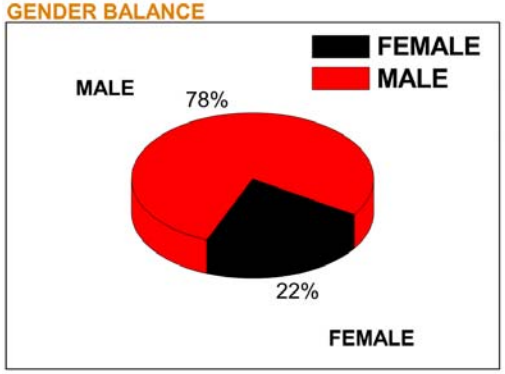
PARTNERSHIP



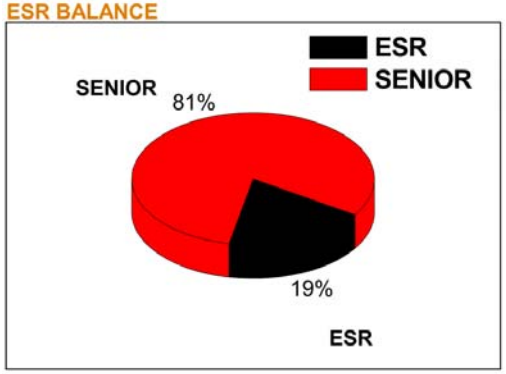
COUNTRY PARTNER DISTRIBUTION BALANCE



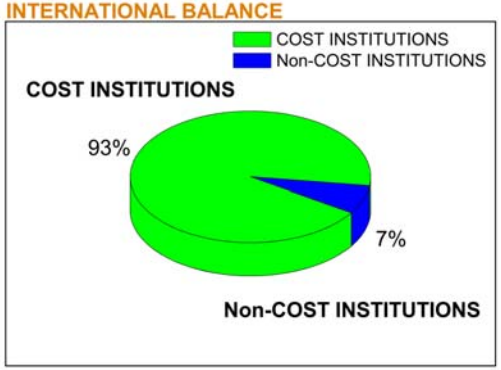
GENDER BALANCE



ESR BALANCE



INTERNATIONAL BALANCE



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

PARTIES: 25

Action Coordinating Partner: IT (ENEA)

Grant Holder: IT (University of Bari)

RATION IN SCIENCE AND TECHNOLOGY

COST ACTION TD1105 DISSEMINATION EVENTS

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

EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

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

Special Session: **Chemical Sensors and New Technologies for Air-Pollution Control**
COST Action TD1105 EuNetAir
European Network on New Sensing Technologies for Air-Pollution Control and Environmental Sustainability
IMCS 2012 - The 14th International Meeting on Chemical Sensors, May 20-23, 2012 - Nuremberg, Germany

VIII International Workshop on Semiconductor Gas Sensors
11-15 September 2012, City Hotel Cracow, Poland

SGS 2012
VIII International Workshop on Semiconductor Gas Sensors
September 11 - 15, 2012, Cracow, Poland

3th Intelligent Systems for Quality of Life information Services Workshop (ISQL 2012)
8th AIAI Conference, September 27- 30, 2012, Halkidiki, Greece

IS-TCMs www.tcm2012.org 2012

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

COST ACTION TD1105 EVENTS

COST ACTION TD1105 *EuNetAir*

Kick-off Meeting **of Action Management Committee**

COST Office, 16 May 2012, Brussels (BE)

COST ACTION TD1105 *EuNetAir*

First Meeting **and 2nd Management Committee and Working Groups**

ENEA Headquarters, 4-6 December 2012, Rome (IT)

COST ACTION TD1105 *EuNetAir*

WG3-WG4 Meeting **joined to AirMonTech project**

Fraunhofer Inhaus Zentrum, 4-6 March 2013, Duisburg (DE)

COST ACTION TD1105 *EuNetAir*

Third Meeting **of Action Management Committee,**
Action Workshop (TBC) and Training School

Transducers-2013, 14-21 June 2013, Barcelona (ES)

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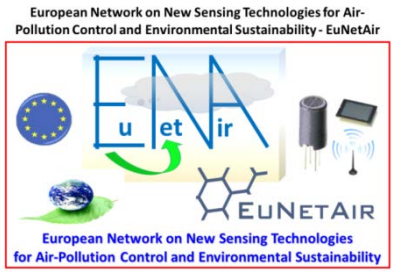
Expected Impact by Action TD1105



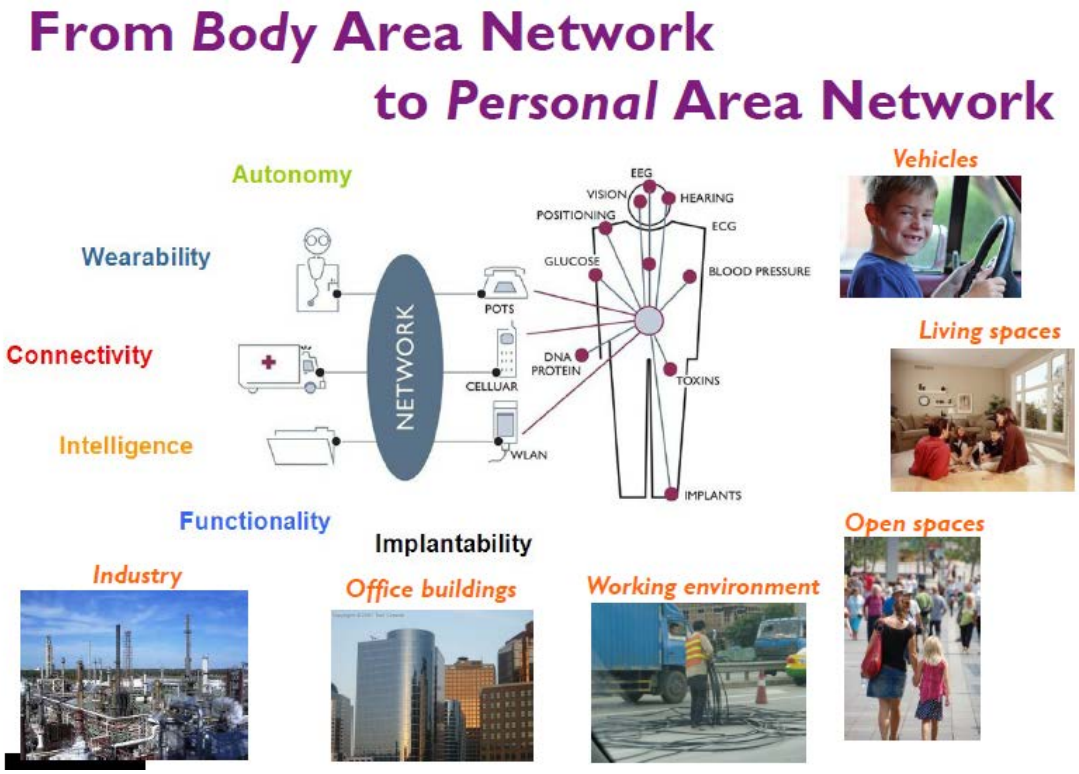
- **European Leadership on AQC Science & Technology**
- **Development of Green-Economy**
- **Support to Sustainable Development**
- **Support to Monitoring System of Clean Air for Europe**
- **Fostering Research & Innovation on New Sensing Technologies for Environmental Monitoring**

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

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



ACKNOWLEDGEMENTS

MC Chair:	Dr. Michele Penza, ENEA, IT michele.penza@enea.it
MC Vice Chair:	Prof. Anita Lloyd Spetz Linkoping University, SE spetz@ifm.liu.se
Grant Holder:	University of Bari, IT gianluigi.degennaro@uniba.it
Scientific Secretary:	Dr. Annamaria Demarinis Loiotile annamaria.demarinis@uniba.it
Science Officer:	Dr. Deniz Karaca deniz.karaca@cost.eu
Administrative Officer:	Dr. Kent Hung kent.hung@cost.eu
Rapporteur ESSEM:	Prof. Kostantinos Kourtidis (GR) kourtidi@env.duth.gr
Rapporteur MPNS:	Prof. Joaquim Manuel Vieira (PT) jvieira@cv.ua.pt
Rapporteur CMST:	Prof. Antonio Lagana (IT) lagana05@gmail.com

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?

UPDATING AND BREAKING NEWS from Action TD1105

Action website:

www.cost.eunetair.it

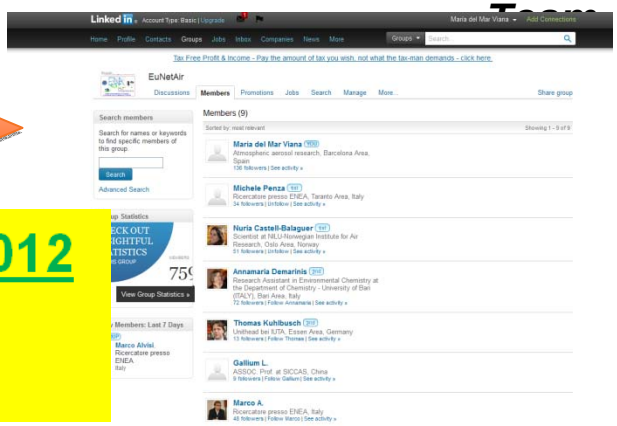
hosted by ENEA

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

Issue 1: finished and published - Dec. 2012 ✓

Issue 2: planned on April - June 2013

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

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

NOLOGY

COST Action WG3-WG4 Meeting on Wednesday March 6

Wednesday, 6 March 2013

Action TD1105 Working Groups and Special Interest Groups Meetings

University Duisburg-Essen, Gerhard-Mercator-Haus, Lotharstr. 57, D-47057 Duisburg, Germany

6 March 2013 - Wednesday	COST Action TD1105 EuNetAir WG3-WG4 Meeting
09:00 - 13:00	*REGISTRATION*
09:00 - 16:00	Action WG3-WG4 Joint MEETING
09:00 - 11:00	Action WG3 Session chaired by WG3 Leader
11:00 - 11:30	*Coffee-break*
11:30 - 13:00	Action WG4 Session chaired by WG4 Leader
13:00 - 14:00	*Lunch*
14:00 - 16:00	Joint WG3-WG4 Discussions with Presenters from inside/outside Action
16:00	*End of the COST Action WG3-WG4 Meeting*

ALL AirMonTech participants are kindly invited to join to Open Meeting of the COST Action TD1105 *EuNetAir* as guest

No meeting Registration is necessary !

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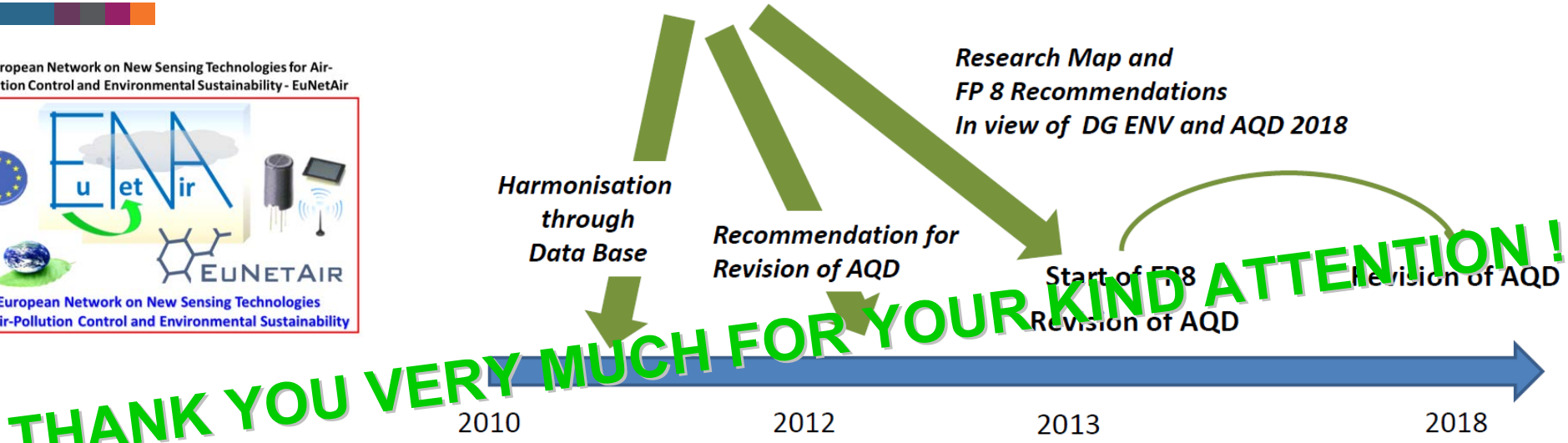
Timeline of Air-Pollution EU Policy

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

EuNetAir

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



THANK YOU VERY MUCH FOR YOUR KIND ATTENTION !

2013: Year of Air

declared by European Environment Agency and EC

EU Thematic Strategy on Air Pollution

http://ec.europa.eu/environment/air/quality/index.htm

Consultation by EC DG ENV from Citizens and Experts

Deadline for Consultation: April 03, 2013

Winner of 'Imaginair' youth prize

cost
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY