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

COST Action TD1105

INTERNATIONAL WG1-WG4 MEETING on

Air Quality Monitoring and Calibration: Horizons in Sensing Technologies, Methods and Modelling

organized by VINCA Institute and Public Health Institute of Belgrade
hosted by Faculty of Mechanical Engineering, University of Belgrade
Belgrade, Serbia, 13 - 14 October 2015

Action Start date: 01/07/2012 - Action End date: 30/06/2016 - Year 3: 2014-15 (*Ongoing Action*)

Overview and Plans

Michele Penza

Function in the Action: Action Chair

ENEA - Brindisi, Italy

COST is supported by the EU Framework Programme

ESF provides the COST Office through a European Commission contract

WORKING GROUPS MEETING

Air Quality Monitoring and Calibration: Horizons in Sensing Technologies, Methods and Modelling

2nd EuNetAir Air Quality Joint-Exercise Intercomparison

Belgrade (Serbia), 13 - 14 October 2015

organized by VINCA Institute and Public Health Institute of Belgrade
hosted by Faculty of Mechanical Engineering, University of Belgrade
16 Kraljice Marije, 11120 Belgrade 35, Serbia

Meeting AGENDA	
12 October 2015 - Monday	
09:00 - 14:00	Arrival to Belgrade
15:00 - 17:00	Installation of Sensors in AQ Monitoring Station - Part 1
20:30	*Free Dinner*
13 October 2014 - Tuesday	
09:00 - 18:00	*REGISTRATION*
09:00 - 13:00	Installation of Sensors in AQ Monitoring Station - Part 2
13:00 - 14:00	*Light Lunch offered by COST Action organization*
14.00 - 15.00	*REGISTRATION*
15.00 - 15.30	Session 1: Welcome Address
15.30 - 16.30	Session 2: Oral Presentations
16:30 - 17:00	*Coffee Break*
17.00 - 18.00	Session 3: Oral Presentations
20:00	*Social Dinner*
14 October 2015 - Wednesday	
09:00 - 17:00	*REGISTRATION*
09:00 - 10:30	Session 4: Oral Presentations
10:30 - 11:00	*Coffee-break*
11:00 - 13:00	Session 5: Oral Presentations
13:00 - 14:30	*Light Lunch offered by COST Action organization*
14:30 - 16:50	Session 6: Oral Presentations
16:50 - 17:00	Session 7: Conclusions
17:00	*End of the WG1-WG4 Meeting and Farewell*

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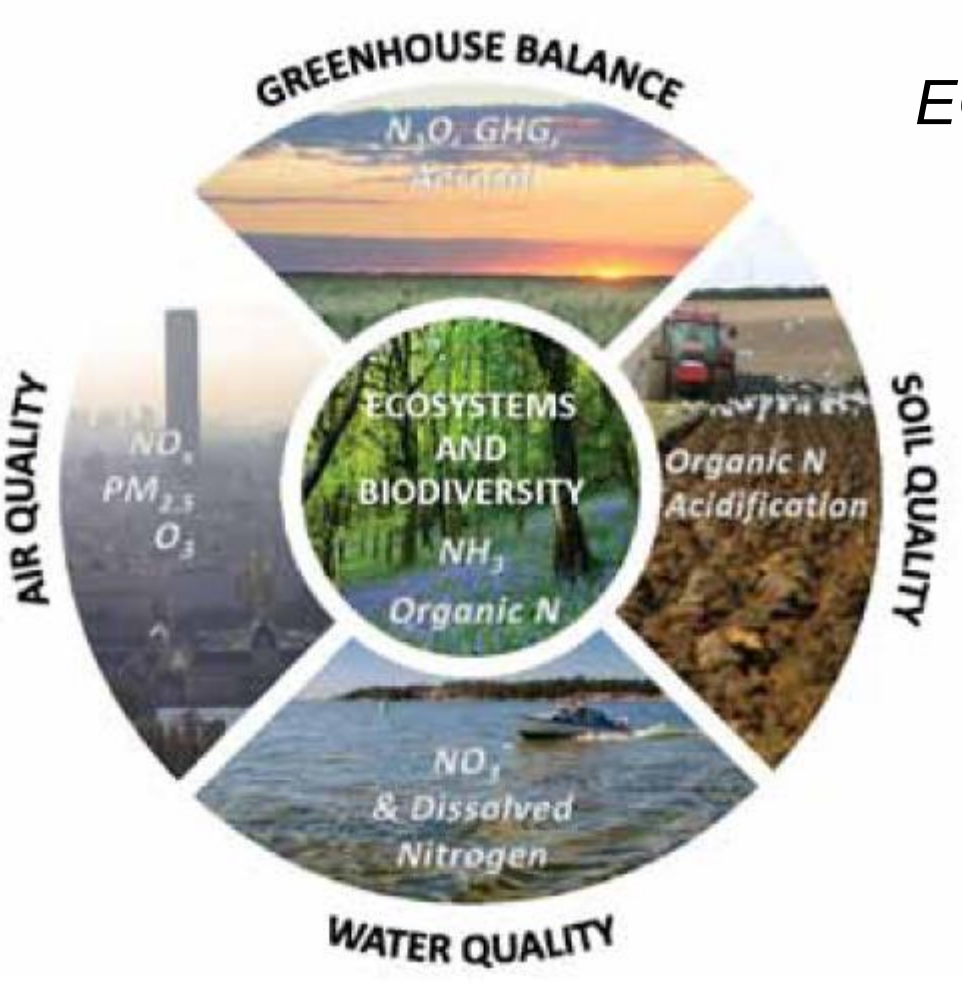
Outline

- **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**
- **Results versus Objectives:** *Significant Highlights*
- **Future Plans and Challenges:** *Expected Impact*
- **Concluding Remarks**

Scientific context: Environmental Sustainability (1/3)

Nitrogen Pollution and the European Environment
Implications for Air Quality Policy

EC In-Depth Report, September 2013



Source: Sutton and Billen, 2010

Excess reactive nitrogen represents a major environmental threat that is only now beginning to be fully appreciated. At a global level, humans have more than doubled the production and cycling of reactive nitrogen, leading to a plethora of impacts that interact across all global spheres: atmosphere, biosphere, hydrosphere and geosphere.

Sutton et al., 2009

Nitrogen Pollution:
NO_x, N_2O, NH_3, NH_4, NO_2^-, NO_3^-, etc.

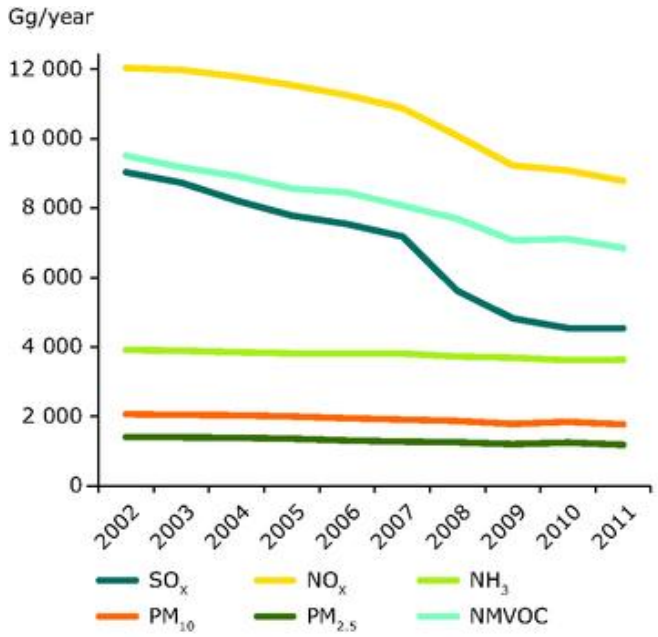
Scientific context: Air Quality Control (2/3)

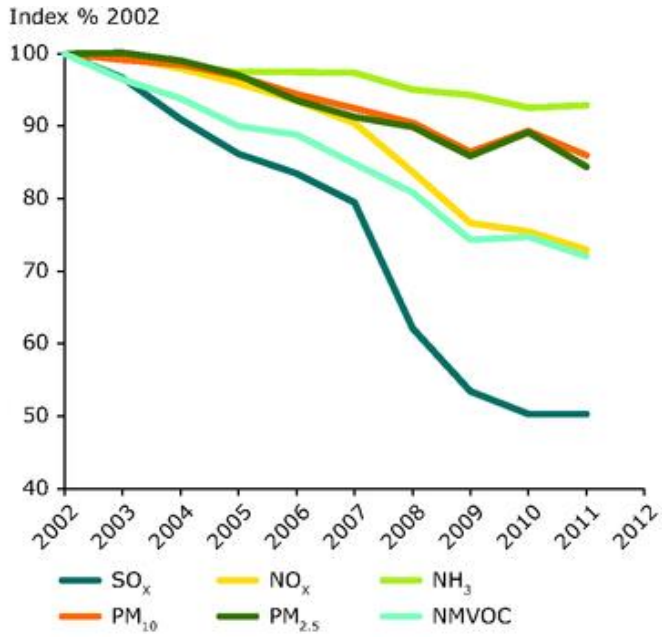
Some Environmental Emergencies:

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)
.....

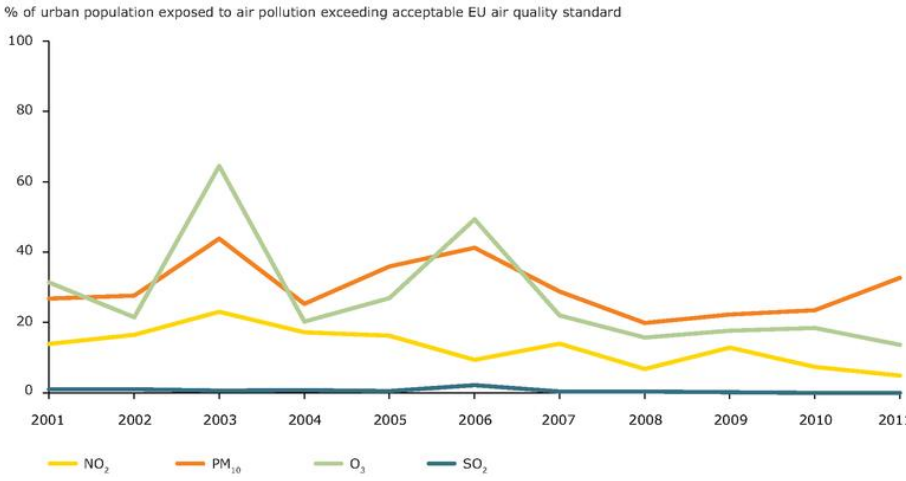
AMBIENT AIR QUALITY EU DIRECTIVE 2008/50/EC and Daughters

European Environment Agency, EEA Report 9/2013





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
$PM_{2.5}$	25 μg/m³



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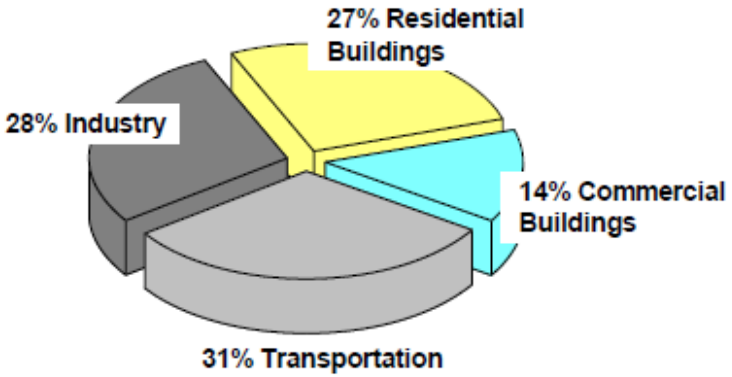
Scientific context: Indoor/Outdoor Energy Efficiency (3/3)



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:

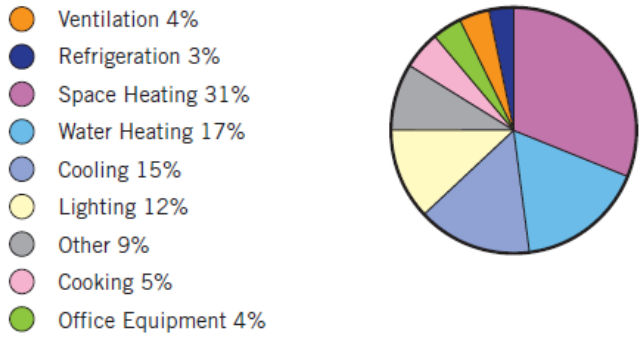
- 2/3 in Residential Buildings
- 1/3 in Commercial Buildings

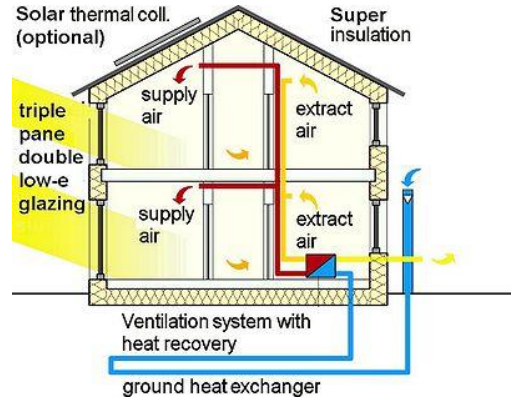
Energy Performance of Buildings EU Directive

EPBD 2010/31/EC

Figure 2 – Total Energy Consumption by End Use

Adapted from E Source, 2006





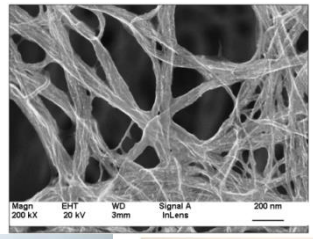
Source: Environmental Protection Agency's National Action Plan for Energy Efficiency Sector Collaborative on Energy Efficiency Hotel Energy Use Profile

IAQ by WORLD HEALTH ORGANIZATION

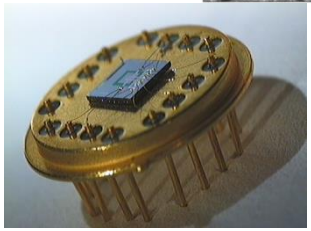
Indoor Air		Typical Substances		Cure
Contamination Source	Emission Source	VOCs	Others	
• Human Being	• Breath	Acetone, Ethanol, Isoprene		demand controlled ventilation
		CO_2		
		Humidity		
	• Skin Respiration & Transpiration	Nonanal, Decanal, α-Pinene		
		Humidity		
	• Flatus	Methane, Hydrogen		
	•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

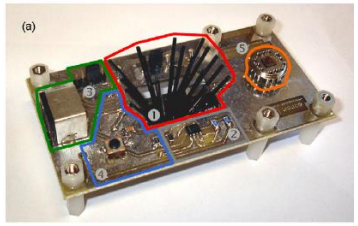
Table 1 – Typical Indoor Air Contaminants (VOCs and others)

Challenges addressed by Action TD1105 (1/1)

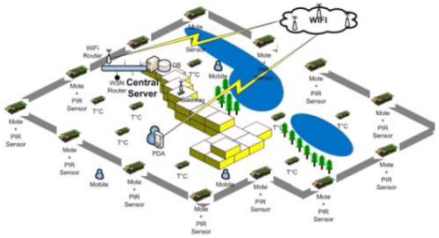


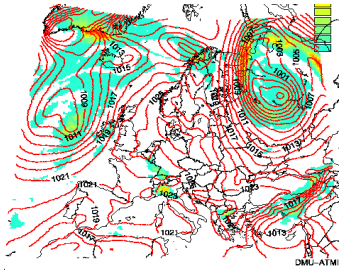
- **Nanomaterials for AQC sensors**
- **Low-cost Gas Sensors**
- **Low-power Sensor-Systems**



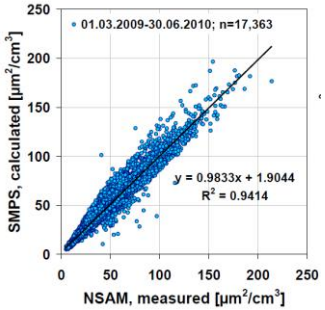


- **Wireless Technology (*Environmental Sensors Network*)**
- **Air Quality Modelling**





- **Environmental Measurements**



- **Standards and Protocols**

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

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.**

Action Research Directions: *Methodology* (1/3)

Cooperative Approach of COST Action TD1105:

The MoU Objectives will be successfully achieved by means of:

- The development of a **multidisciplinary network** of physicists, chemists, physico-chemists, electronics, nanotechnologists, specialists of materials, environment, metrology and management.
- The **relevance, expertise and international renown** of all involved partners.
- **Synergies** leading to work prospects and collective thought focused on the realization of *innovative sensitive materials* and *high-efficient sensing devices*. Such collective work will be *initiated during workshop* and strengthened by early-stage researcher exchanges.
- A **global approach** on sensing microsystems and their applications (*materials, transducers, technology, working conditions, methodologies, models, protocols*) leading to simultaneous and *synergic optimizations* of all the parameters to reach the *best performances*.

Action Research Directions: *Methodology* (2/3)

Partner Opportunities of COST Action TD1105:

MoU Objectives are accomplished to federate human and material resources:

- **To have access to at least 5 new European technological platforms**: *synthesis, characterization, design, development, experiments under gas*.
- To perform **measurement campaigns** in real conditions (indoor or outdoor, occupational and non-occupational context, industrial or urban environment) in various European towns thanks to the strong collaborations with national networks of air quality monitoring and environmental agencies (e.g., *AtMO* in France, *ARPA-PUGLIA* in Italy, *CSIC* in Spain, *NILU* in Norway, *Meteorological Services* in Hungary, etc.).
- **To contribute to a better modelling of pollutant dispersion** at the European scale (and more) by the achievements of a ***large database on pollution*** which will be available to environment protection engineers and researchers.
- **To react** quickly and more efficiently to **economic, social and medical needs related to air quality control**, the networking providing a wide range of technical solutions to suit to each requirement.
- To promote the pooling of scientific knowledge and skills by means of the **manpower mobility** (*Short Term Scientific Missions*) as encouraged by COST Action.

Action Research Directions: *Methodology* (3/3)

DELIVERABLES of COST Action TD1105. MoU areas of S&T cooperation include:

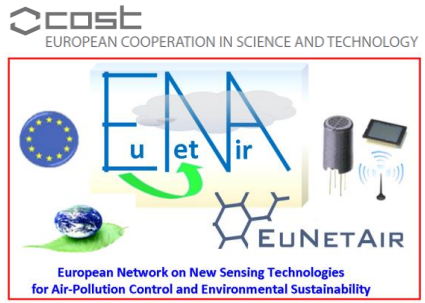
- **Workshops** *on sensor materials and nanotechnologies, sensor-systems for AQC, environmental measurements, air-pollution modelling, chemical weather forecasting, distributed computing, wireless sensor networks, protocols and pre-standardisation*; organization of open conferences to improve knowledge transfer and dissemination.
- **Training Schools** on sensor materials, technologies, processes, methods, modelling, forecasting, applications, environmental certification and validation, project management.
- **International ESRs exchange** and Scientists Mobility (STSMs) between partners involved in Action and Non-COST partnership at incoming/outcoming level.
- **New collaborative research actions** and research projects providing synergies between partners capabilities.
- **Participation** in Conferences, Short Courses, Mutual Publications, Reports, White Papers, Position Papers, etc.
- **Outreach** activities
- Enforcement of the **Gender Balance** agenda
- Coordinated **Dissemination** of the networking activities towards Academia, Industry and General Public.

Action Research Directions: *Innovation* (1/1)

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**



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

www.cost.eunetair.it

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

WG1:
Sensor Materials & Nanotechnologies

WG2:
Sensors, Devices & Systems for AQC

WG3:
Env. Measurements & Air Pollution Modelling

WG4:
Protocols & Standardisation Methods

INTERDISCIPLINARY SPECIAL INTEREST GROUPS

Action (2012-2016) Size:
200 Experts from 120 Teams - 31 Countries

MANAGEMENT COMMITTEE:

CORE-GROUP & STEERING COMMITTEE

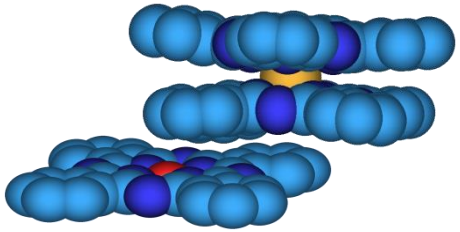
- *Editorial Board*
- *Dissemination*
- *Training Schools*
- *Gender Balance*
- *Early Stage Researchers (ESR)*
- *Short-Term Scientific Mission (STSM)*
- *Intellectual Property Rights (IPR)*
- *Local Organizing Committee (LOC)*

- 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*

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

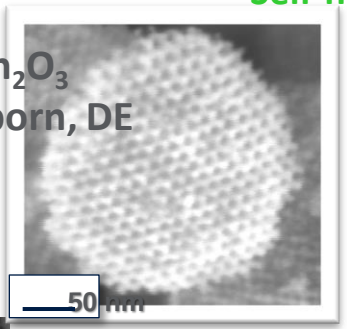
WG1 Chair: Prof. Juan Ramon Morante, IREC, Spain

- **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.).

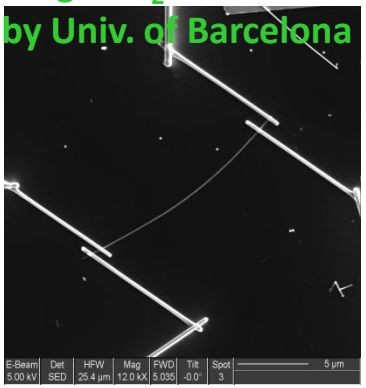


New molecular materials of polymer-macrocycles as transducers for polluting gas sensing by University of Bourgogne

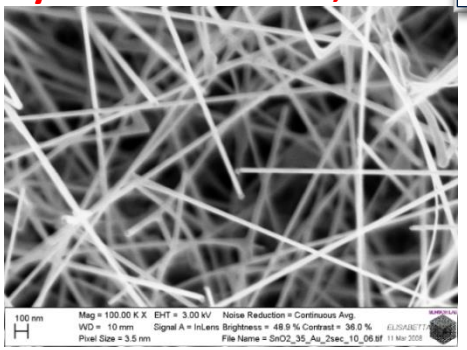
Mesoporous In_2O_3 by Univ. of Paderborn, DE

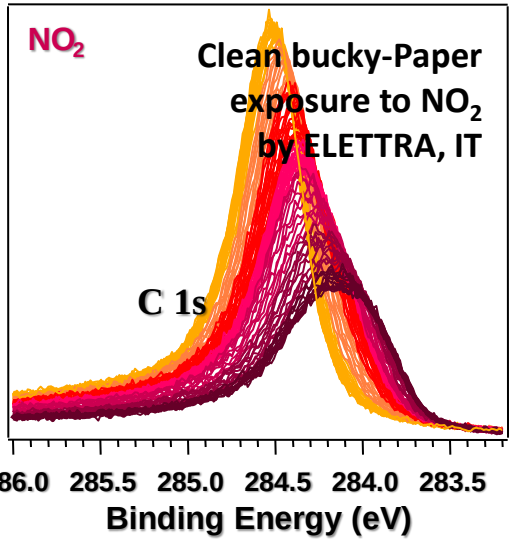


Self-heating SnO_2 Nanowires by Univ. of Barcelona

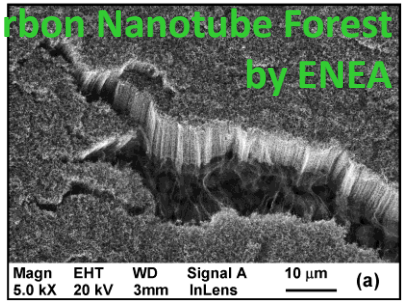


Metal oxide (SnO_2) Nanowires nets by Univ. of Brescia, IT

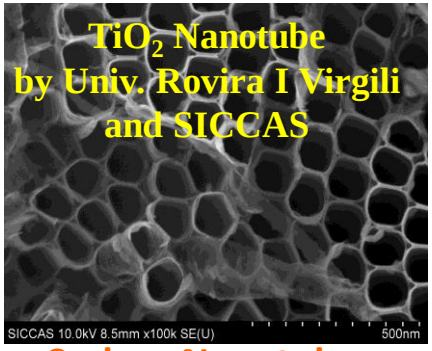




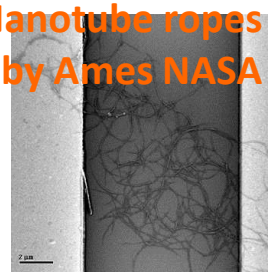
Carbon Nanotube Forest by ENEA



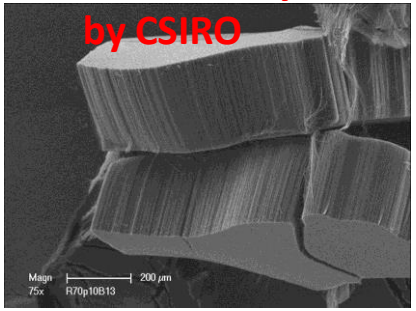
TiO_2 Nanotube by Univ. Rovira I Virgili and SICCAS



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**:

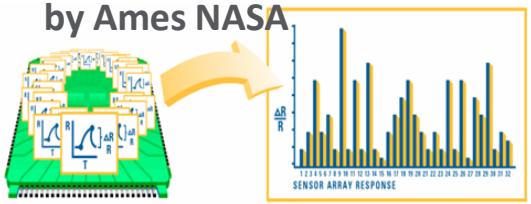
  Intelligence algorithms and distributed computing for networked AQC gas sensors.

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

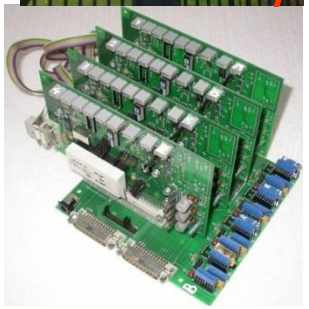
IT PATENT ENEA
Carbon Nanotube Gas Sensors

EnviroWatch mote by Newcastle University

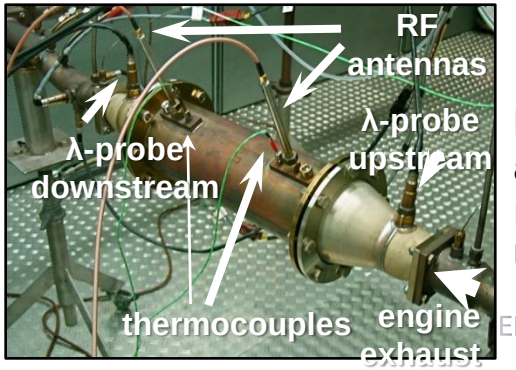
by Ames NASA



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

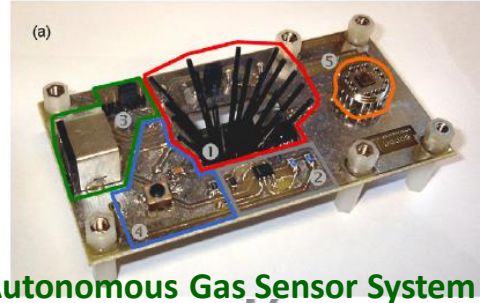


A versatile platform for the efficient development of gas detection systems based on automatic device adaptation by University of Saarland.



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

Environmental Sensor demo by IMEC, NL



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.

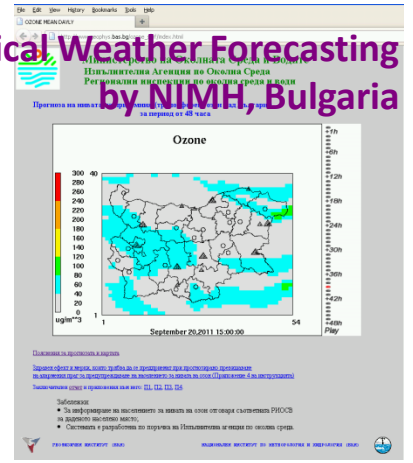
- **Sub-Working Group 3.3**:

  Harmonisation of environmental measurements.

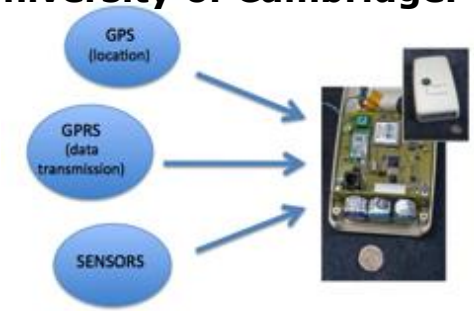
by Aristotle University, EL

AirMerge system for Chemical Weather Models

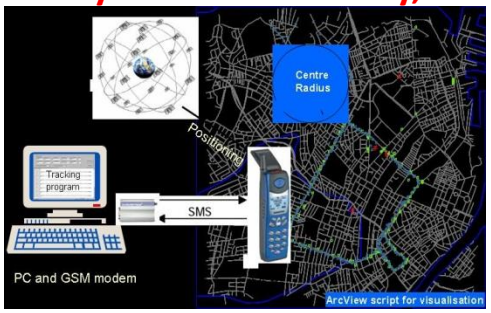
Chemical Weather Forecasting by NIMH, Bulgaria



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

cost
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

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.

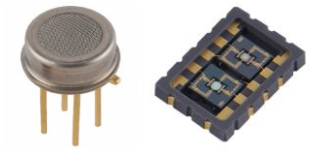
European Directive 2008/50/EC: Ambient Air Quality

EU standard EN 13725/2003: Dynamic Olfactometry

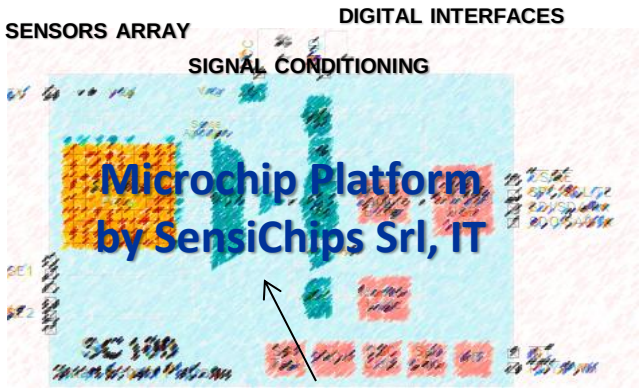
Protocols and Standardised Methods for Gas Sensors

Guidelines of Best Transducers applied to specific gases

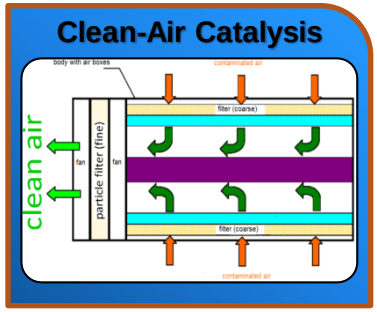
Dynamic olfactometry EN13725 by Univ. of Liege, Odometric SA, Univ. of Bari, Lenviros srl.



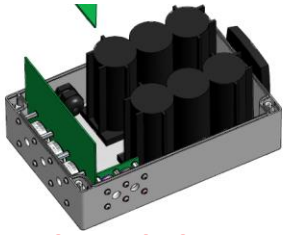
Packaged Sensors by E2V, CH



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 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. Scientific strategies
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***

COST Action *EuNetAir*: ROADMAP 2012-2016 and GANTT

YEARS	Y1	Y1	Y1	Y1	Y2	Y2	Y2	Y2	Y3	Y3	Y3	Y3	Y4	Y4	Y4	Y4
QUARTERS	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
REAL TIME - START (MM.YY)	07.12	10.12	01.13	04.13	07.13	10.13	01.14	04.14	07.14	10.14	01.15	04.15	07.15	10.15	01.16	04.16
REAL TIME - STOP (MM.YY)	09.12	12.12	03.13	06.13	09.13	12.13	03.14	06.14	09.14	12.14	03.15	06.15	09.15	12.15	03.16	06.16
WG1 Activities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG2 Activities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG3 Activities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WG4 Activities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Kick-Off Meeting	X															
Establish Workplan	X															
Action Website Setup/Update		X			X			X			X			X		X
Action Leaflet & Brochure		X						X								X
Newsletter		X		X		X		X		X		X		X		X
Workshop				X			X				X			X		
Training School				X			X				X			X		
Annual/Final Report				X				X				X				X
State-of-Art				X						X						X
Exchange Visits: STSMs			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exchange Visits of ESRs			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Campaigns					-	-	-	-	-	-	-	-	-	-	-	-
Mutual Publications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
International Conference								X								X
WGs Meeting			X		X		X		X		X		X		X	
MC Meeting	X		X		X		X		X		X		X			X

COST Action TD1105 EuNetAir: Action Parties (31)

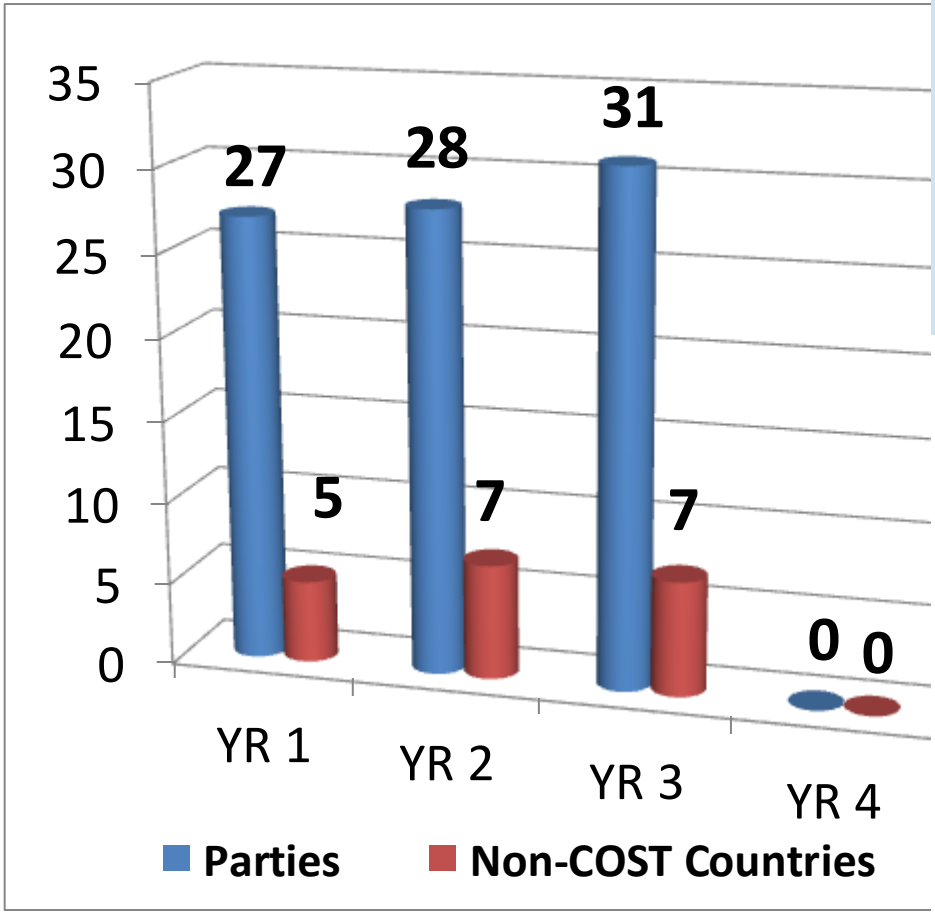
Grant Holder:

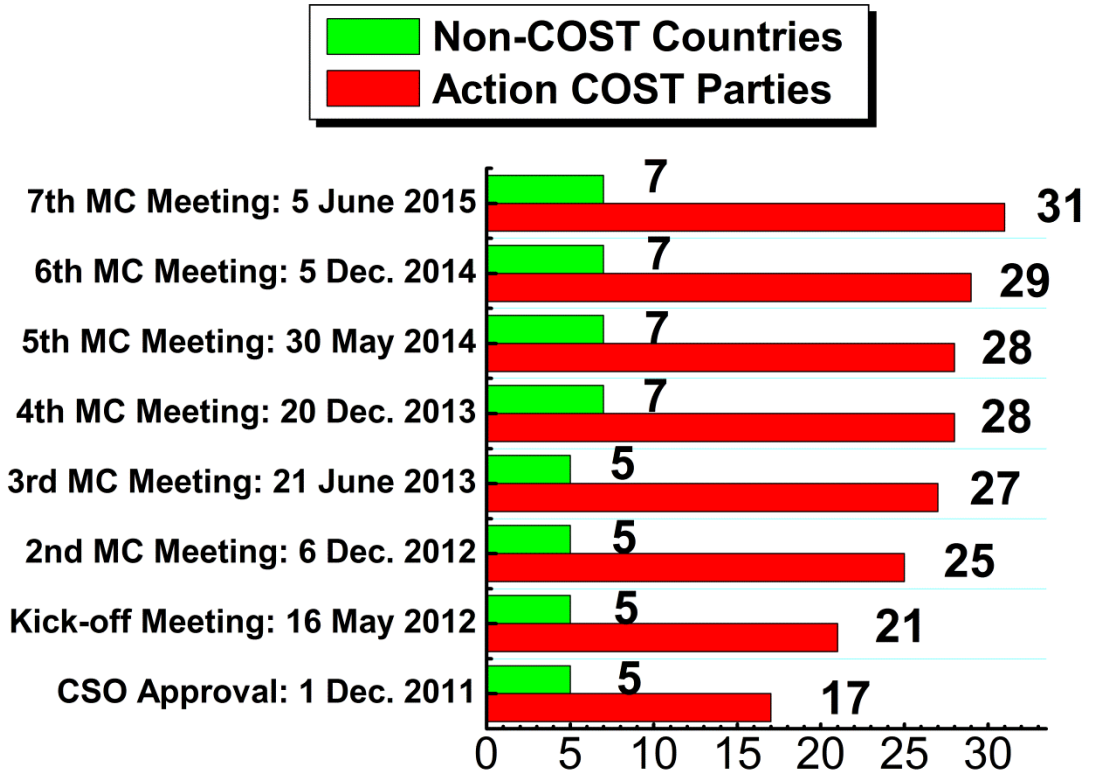
Eurice GmbH, Saarbrucken, Germany

GH Scientific Representatives:

Corinna Hahn, MC Member

Juliane Rossbach, MC Substitute





Non-COST Countries: NNC + IPC

cost
EUROPEAN COOPERATION IN SCIENCE AND TECHN

COST Action TD1105 *EuNetAir*

31 COST Countries (Parties) have already signed Memorandum of Understanding (MoU)

PARTIES: 31

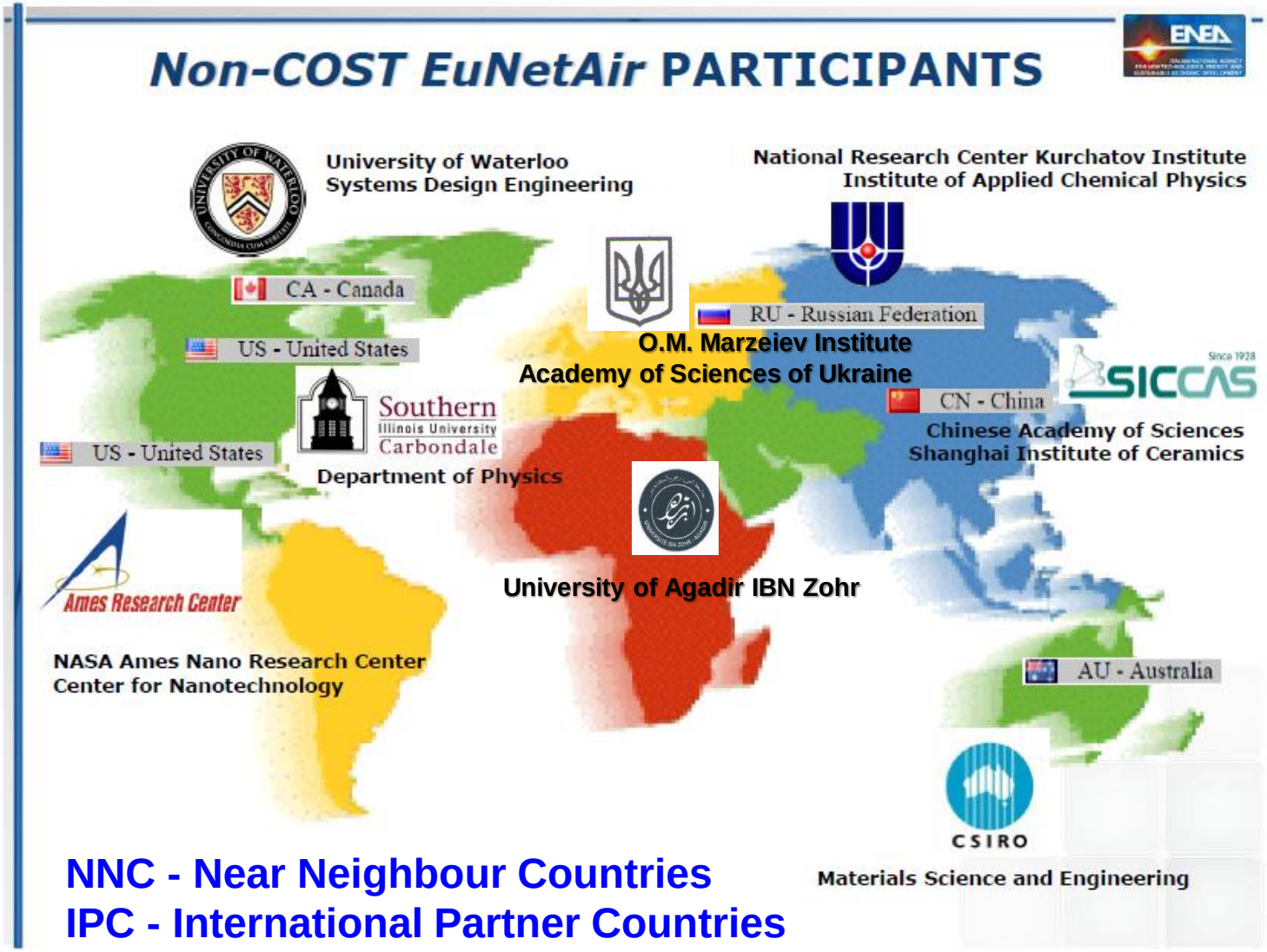
already accepted MoU

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

COST Action TD1105 *EuNetAir*: 7 Non-COST Countries and 8 Non-COST Institutions

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

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



EuNetAir: List of Experts from NNC and IPC

180 EXPERTS from **31** COST Countries and **7** Non-COST Countries

AU - Australia

Dr. Phil MARTIN

CA - Canada

Prof. John YEOW

CN - China

Dr. Yongxiang LI

Dr. Zhifu LIU

RU - Russian Federation

Dr. Alexey VASILIEV

US - United States

Prof. Andrei KOLMAKOV

Dr. Meyya MEYYAPPAN

MA - Morocco

Dr. Radouane LEGHRIB

Dr. Houda LAHLOU

UA - Ukraine

Dr. Olena TUROS

Dr. Arina PETROSIAN

Dr. Oksana ANANYEVA

Dr. Liudmyla MYKHINA

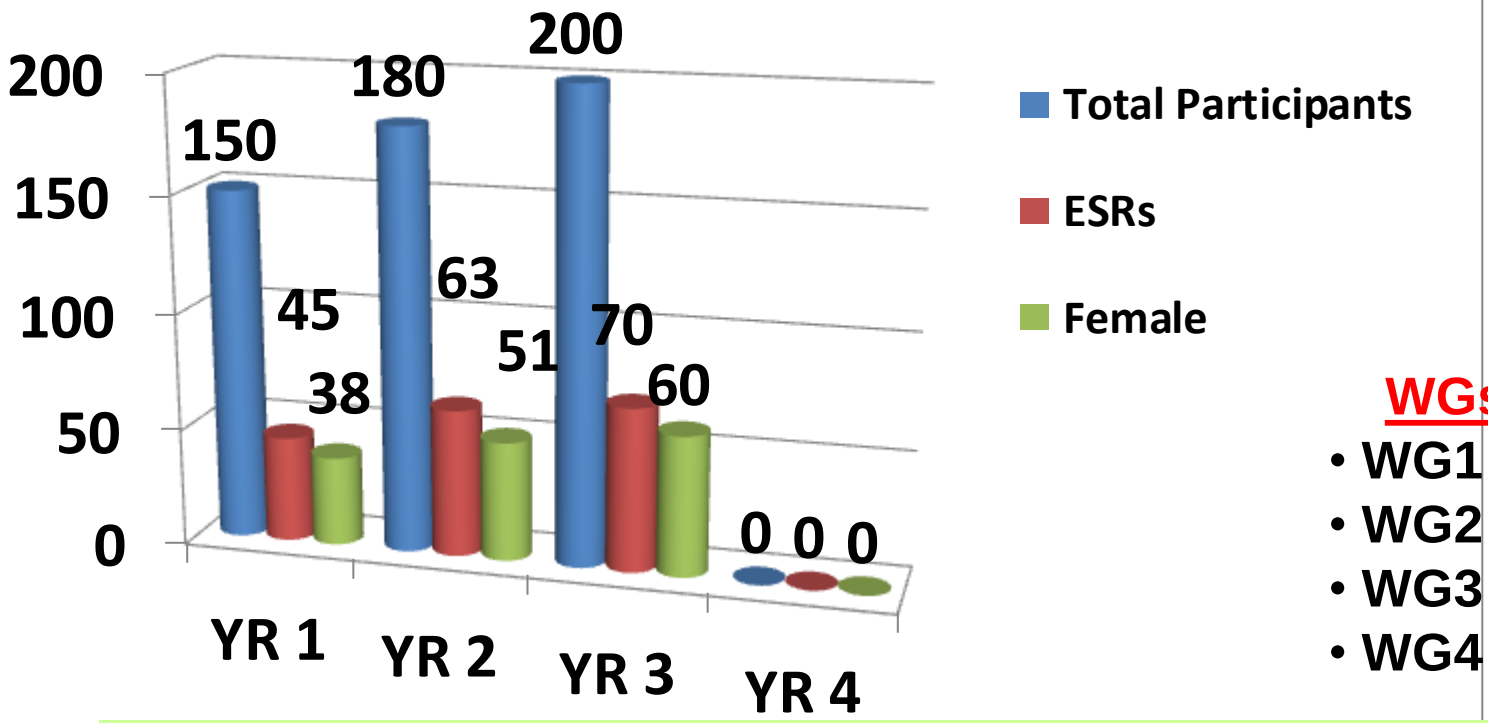
Dr. Liliia PETRUK

Dr. Tetiana MAREMUKHA

NNC - Near Neighbour Countries

IPC - International Partner Countries

COST Action TD1105 EuNetAir: Action participants



WGs Composition:

- WG1: ca. 30 participants
- WG2: ca. 45 participants
- WG3: ca. 40 participants
- WG4: ca. 25 participants

Summary YEAR 3: Updating on June 2015

- Total Number of Participants: 200 (80% active)
- Early Stage Researchers (ESRs): 70 (35%)
- Females: 60 (30%)
- MC Members: 58 - Male: 40 (69%); Female: 18 (31%)
- MC Substitutes: 33 - Male: 26 (79%); Female: 7 (21%)

Action Participating Organizations (1/5)

Pos.	Flag	Country	Action MC Organizations	Action WG Organizations
1		Austria	• Materials Center Leoben Forschung GmbH	
2		Belgium	• VITO • Université de Liége • Odometric SA	• Université Catholique de Louvain
3		Bulgaria	• National Institute of Meteorology and Hydrology - BAS • Institute of Electronics - BAS	• Microsystems LTD
4		Croatia	• Rudjer Boskovic Institute • University of Zagreb	
5		Czech Republic	• Institute of Computer Sciences - Academy of Sciences of the Czech Republic • J. Heyrovský Institute of Physical Chemistry - Academy of Sciences of the Czech Republic	• Institute of Photonics and Electronics AVCR
6		Denmark	• Aarhus University • Technical University of Denmark	• National Research Centre for Working Environment
7		Estonia	• University of Tartu	

Action Participating Organizations (2/5)

Pos.	Flag	Country	Action MC Organizations	Action WG Organizations
8		Finland	• University of Oulu • University of Helsinki • Tampere University of Technology	
9		France	• Université de Bourgogne • Université Blaise Pascal	• Ecoles des Mines de Douai • CEA-CNRS • ETHERA • NanoSense
10		Germany	• Saarland University • Eurice GmbH • University of Bayreuth • IUTA eV	• WHO CC - Federal Environment Agency • Siemens • UST • 3S GmbH • University of Paderborn • Alfred Becker Group • MPI for Biogeochemistry • University of Stuttgart • Heidelberg University • BAM • DLR
11		Greece	• Aristotle University of Thessaloniki • University of Patras • ATHENA/ISI • FORTH	• University of Piraeus • University of West Macedonia
12		Hungary	• Hungary Meteorological Service • Szechenyi Istvan University	
13		Iceland	• Agricultural University of Iceland	

Action Participating Organizations (3/5)

Pos.	Flag	Country	Action MC Organizations	Action WG Organizations
14		Ireland	• Trinity College Dublin • University College Cork	
15		Israel	• Technion Institute of Israel • AirBase Systems	
16		Italy	• ENEA • University of Bari • University of Brescia • Sensichips srl	• ARPA-Puglia • University of Trieste • ELETTRA • Lenviros srl • RED srl • NOVASIS srl • ARIANET srl • CNR, Institute of Atmospheric Science and Climate • CNR, Institute of Methodologies for Environmental Analysis • CNR, Institute of Environmental Pollutant Research
17		Latvia	• University of Latvia • Riga Technical University	
18		Luxembourg	• Luxembourg Institute for Science and Technology - LIST	

Action Participating Organizations (4/5)

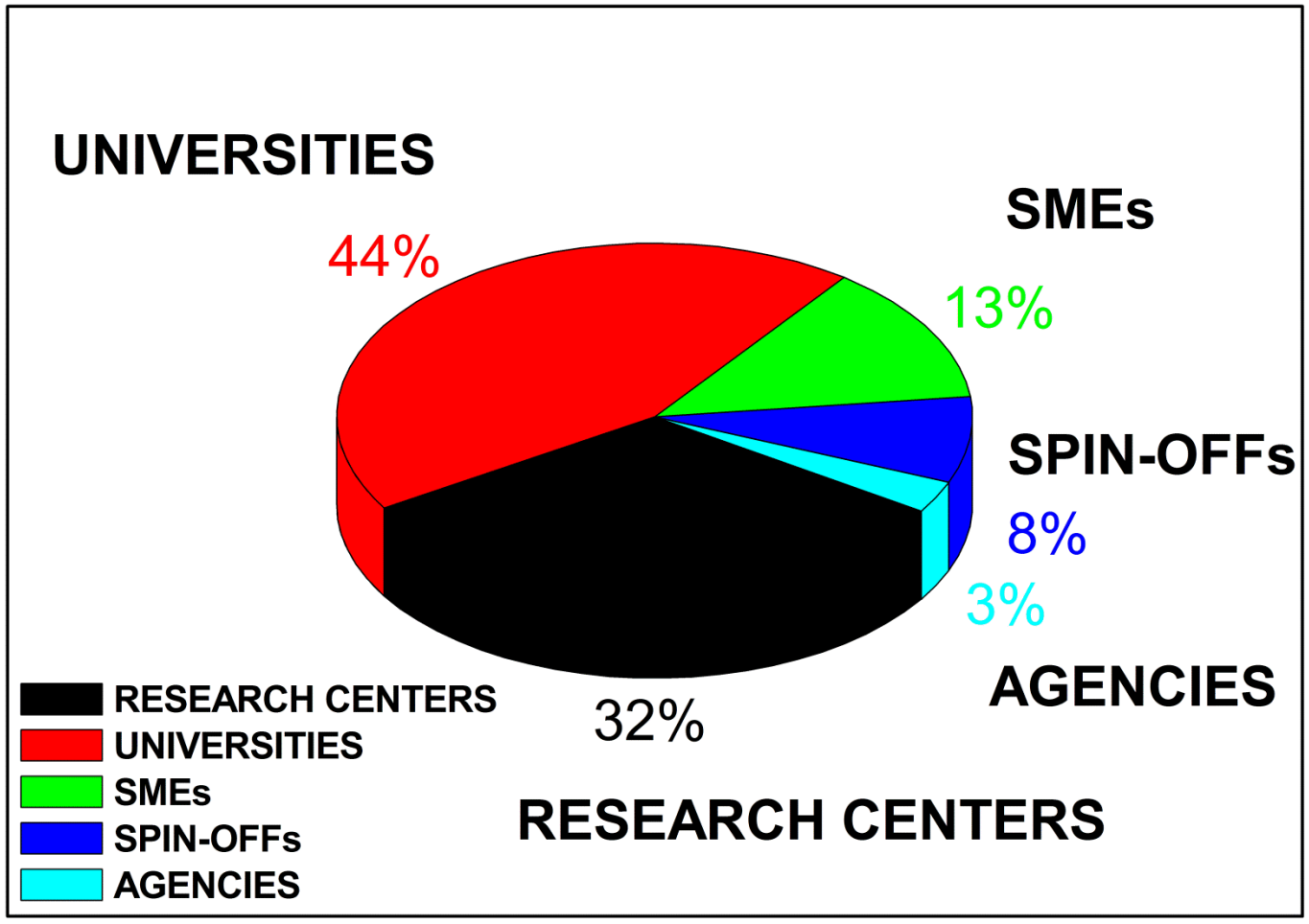
Pos.	Flag	Country	Action MC Organizations	Action WG Organizations
19		FYR of Macedonia	• Ministry of Environment and Physical Planning • University "St. Kliment Ohridski"	
20		Netherlands	• IMEC - Holst Centre • ECN	
21		Norway	• NILU - Norwegian Institute for Air Research	
22		Poland	• Silesian University of Technology • Warsaw University of Life Science	• Czestochowa University of Technology
23		Portugal	• IDAD - Institute of Environment & Development • University of Aveiro • University of Coimbra • National Health Institute	• University of Lisbon • University of Porto • LNEG - Laboratório Nacional de Energia e Geologia
24		Romania	• IMNR - National R&D Institute for Nonferrous and Rare Metals • SC IPA SA	
25		Serbia	• Institute of Public Health of Belgrade • VINCA Institute	
26		Slovenia	• University of Ljubljana • Aerosol doo	

Action Participating Organizations (5/5)

Pos.	Flag	Country	Action MC Organizations	Action WG Organizations
27		Spain	• IREC - Catalonia Institute for Energy Research • URV - Universitat Roviri I Virgili • UB - Universitat de Barcelona • Worldsensing SL	• CSIC - IDAEA • CSIC - INM • Public Universitat de Navarra • Universidade de Santiago de Compostela
28		Sweden	• Linköping University • SenseAir AB • Chalmers University of Technology • SenSiC AB	
29		Switzerland	• EPFL - Ecole Polythechnique Fédérale de Lausanne • SGX Sensortech • EMPA	• ETH • EnvEve SA
30		Turkey	• GEBZE Institute of Technology • Middle East Technical University of Ankara • Nigde University	• Bahcesehir University
31		United Kingdom	• Cambridge University • Alphasense Ltd • Imperial College London • University of Warwick	• Manchester University • Newcastle University • Worcester University • Edinburgh University • Cambridge CMOS Sensors Ltd

Action Participation Statistics

EuNetAir COST PARTNERSHIP June 2015



COST Parties: 31
COST Organizations: 123
UNIVERSITIES: 55
RESEARCH CENTERS: 39
SMEs: 16
SPIN-OFFs: 9
AGENCIES: 4

External Experts involved from International Organizations

International Organization	External Expert	Action Event
JRC - IES, Ispra	*Michele Gerboles*	• Rome, 3-5 Dec. 2012 • Barcelona, 20 June 2013 • Brescia, 10 Sept. 2014 • Linkoping, 3-5 June 2015
AQUILA Network	*Annette Borowiak*	• Duisburg, 4-6 March 2013
European Environment Agency (EEA)	*Valentin Foltescu* *Cristina Guerreiro (NILU)*	• Copenhagen, 3-4 Oct. 2013
US Environment Protection Agency (EPA)	*Tim Watkins*	• Cambridge, 18-20 Dec. 2013
UNECE	*Wenche Aas (NILU)*	• Copenhagen, 3-4 Oct. 2013
WHO Europe	*Michal Krzyzanowski (Former Head WHO Europe Office)*	• Riga, 26-27 March 2015
MIT, USA	*Marguerite Nyhan*	• Istanbul, 3-5 Dec. 2014
NASA Ames Research Center	*Meyya Meyyappan* *Jing Li*	• Rome, 3-5 Dec. 2012 • Lille, 26-30 May 2014
CSIRO, Australia	*Philip J. Martin*	• Barcelona, 20 June 2013
QUT, Australia	*Zorane Ristovski*	• Belgrade, 13-14 Oct. 2015

Country	MC Members (58): *Male (69%) - Female (31%)*
Austria	Dr. Anton KOCK
Belgium	Dr Jan THEUNIS; Dr Anne-Claude ROMAIN
Bulgaria	Dr Dimiter SYRAKOV; Dr Ivan NEDKOV
Croatia	Dr. Irena CIGLENECKI-JUSIC; Prof. Vedran BILAS
Czech Republic	Dr. Vera KURKOVA; Dr. Zdenek ZELINGER
Denmark	Prof. Ole HERTEL
Estonia	Prof. Raivo Jaaniso
Finland	Prof. Kaarle HAMERI; Prof. Jyrki LAPPALAINEN
France	Prof. Marcel BOUVET; Prof. Jerome BRUNET
Germany	Prof. Andreas SCHUETZE; Dr Corinna HAHN
Greece	Prof. George PAPADOPOULOS; Prof. Kostas KARATZAS
Hungary	Ms Krisztina LABANCZ; Dr Zita FERENCZI
Iceland	Dr Arngrimur THORLACIUS
Ireland	Dr. Francesco PILLA; Prof. John WENGER
Israel	Dr. Liad ORTAR; Prof. Hossam HAICK
Italy	Dr. Michele PENZA; Prof. G. SBERVEGLIERI; Dr. G. DE GENNARO
Latvia	Dr. Iveta STEINBERGA; Dr. Gita SAKALE
Luxembourg	Dr. Arno GUTLEB
Macedonia Rep.	Dr. Igor ATASANOV; Dr. Ljupcho GROZDANOVSKI
Netherlands	Dr Sywert BRONGERSMA; Dr. Ernie WEIJERS
Norway	Dr Nuria CASTELL BALAGUER; Dr. Philipp SCHENEIDER
Poland	Dr Monika KWOKA; Prof. Janislaw GAWRONSKI
Portugal	Prof. Bernadete RIBEIRO; Prof. Carlos BORREGO
Romania	Dr Marcel IONICA; Dr Roxana Mioara PITICESCU
Serbia	Dr. Anka CVETKOVIC; Dr. Milena JOVASEVIC-STOJANOVIC
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

Kick-off Meeting
Brussels
16 May 2012

MANAGEMENT COMMITTEE

MC Chair:	Michele Penza, ENEA, IT
MC Vice Chair:	Anita Lloyd Spetz, Linkoping University, SE
Grant Holder:	Eurice GmbH, Saarbrucken, DE

Country	MC Substitutes (33)
Austria	Dr Stefan DEFREGGER
Belgium	Dr Julien DELVA
Czech Republic	Dr. Roman NERUDA
Denmark	Dr. Lise Lotte SORENSEN
Finland	Prof. Jorma KESKINEN
France	Dr Jean SUISSE; Prof. Alain PAULY
Germany	Dr. Daniela SCHONAUER-KAMIN Dr. Thomas KUHLBUSCH Dr. Juliane ROSSBACH
Greece	Prof. George KIRIKIADIS Dr. Christos KOULAMAS
Hungary	Prof. Zoltan HORVATH
Italy	Dr. Roberto SIMMARANO Dr. Marco ALVISI; Dr. Saverio DE VITO
Macedonia Rep.	Dr. Beti ANGELEVSKA
Netherlands	Dr. Rene OTJES
Poland	Prof. Jacek SZUBER
Portugal	Dr. Joao Paulo TEIXEIRA Dr. Ana Margarida COSTA
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
Turkey	Prof. Necmettin KILINC
UK	Prof. Julian GARDNER Dr Robin NORTH; Prof. Florin UDREA

Year 4: Scientific Planning of *EuNetAir* (1/2)

Meetings/Workshops/Training Schools planned **for upcoming year** (**Year 4: 1 July 2015 - 15 May 2016**): ***EXTENSION: 15 Nov. 2016 - tbc!***

- **WG1-WG4 Meeting** on *Air Quality Monitoring and Calibration: Horizons in Sensing Technologies, Methods and Modelling - Start of the 2nd EuNetAir Air Quality Joint-Exercise Intercomparison* organized by the VINCA Institute, Belgrade (**Serbia**), 13 - 14 Oct. 2015. *Local organizer*: Dr. Milena Jovasevic-Stojanovic, VINCA and Anka Cvetkovic, Public Health Institute of Belgrade

- The **4th International Workshop of the COST Action TD1105** on *Innovations and Challenges for Air Quality Control Sensors* at FFG (National AT COST Office), Wien (**Austria**), 25 - 26 February 2016. *Local organizer*: Dr. Anton Kock, MCL

- The **Action 4th International Training School** on *Modelling, Methods and Technologies for Air Quality Control* at Emdrup Campus in Copenhagen, by Aarhus University (**Denmark**), 19 - 22 April 2016. *Local organizer*: Prof. Ole Hertel, Aarhus University. Trainees: 13-15 expected. Trainers: 3-4 expected.

Year 4: Scientific Planning of *EuNetAir* (2/2)

MC/WG Meetings planned **for the upcoming year**

(**Year 4: 1 July 2015 - 15 May 2016**): ***EXTENSION: 15 Nov. 2016 - tbc!***

- **5th SCIENTIFIC MEETING: WGs Meeting and 8th MC Meeting on New Sensing Technologies for Indoor Air Quality Monitoring: Trends & Challenges** at Bulgarian Academy of Sciences, Sofia (**Bulgaria**), 16 - 18 Dec. 2015. *Local organizers*: Prof. Ivan Nedkov and Prof. Dimiter Syrakov, BAS

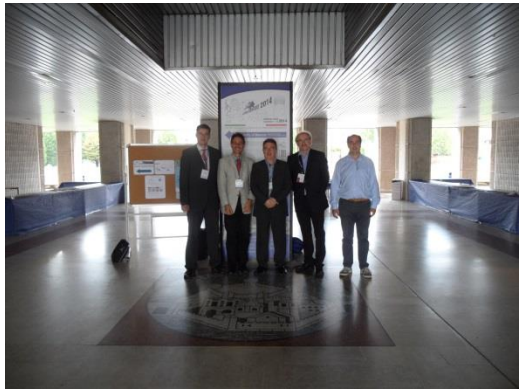
- **6th SCIENTIFIC MEETING: WGs Meeting and 9th MC Meeting on New Sensing Technologies for Outdoor Air Quality Monitoring** at Czech Academy of Sciences, Prague (**Czech Republic**), 5 - 7 October 2016. *Local Organizers*: Prof. Zdenek Zelinger, Dr. Vera Kurkova, Dr. Roman Neruda, CAS

- **Special Session EuNetAir / Core-Group Meeting** to **EUROSENSORS 2015**, Freiburg (**Germany**), 6 - 10 September 2015

COST Session & Core-Group Meeting at *EUROSENSORS 2014*

The 28th European Conference on Solid-State Transducers

Brescia, Italy
September 7-10, 2014



09:30 - 12:30	***Open Session COST: New Sensing Technologies for Air-Quality Monitoring*** *Chairperson: Michele Penza*, ENEA, Brindisi, Italy
09:30 - 10:00	**COST Action TD1105: European Network on New Sensing Technologies for Air-Pollution Control and Environmental Sustainability. Overview of Sensor-Systems for Air Quality Monitoring** *Michele Penza*, Action Chair, ENEA, Brindisi, Italy
10:00 - 10:30	**Performance Analysis of Low-Cost Gas Sensors for Air Quality Control** *Michel Gerboles and Laurent Spinelle*, JRC, EC DG ENV, Institute for Environment and Sustainability, Ispra, Italy
10:30 - 11:00	**Break**
11:00 - 11:20	**Gas and Particle Sensors for Air Quality Monitoring** *Anita Lloyd Spetz*, Action Vice-Chair, Linkoping University, Linkoping, Sweden
11:20 - 11:40	**Nanostructured Metal Oxides Low-Cost Gas Sensors: Trends and Challenges** *Juan Ramon Morante*, Action WG1 Leader, IREC, Barcelona, Spain
11:40 - 12:00	**Highly Sensitive and Selective VOC Detection for Indoor Air Quality Applications** *Andreas Schuetze*, Action WG2 Leader, Saarland University, Saarbrucken, Germany
12:00 - 12:20	**Smart Sensors in Mobile Phones for Environmental Monitoring Applications** *Julian W. Gardner*, Action MC Substitute, University of Warwick, Coventry, UK

Special Session *Smart Cities Sensors* at *IEEE SENSORS 2014*

Session Numbers:
- 5 Speakers
- 150+ Participants
- 700+ Delegates

10:00 - 11:30	***Special Session: Smart Cities Sensors*** *Chairperson: Michele Penza*, ENEA, Brindisi, Italy
10:00 - 10:30	**INVITED TALK: COST Action TD1105 - New Sensing Technologies for Environmental Sustainability in Smart Cities** *Michele Penza*, Action Chair, ENEA, Brindisi, Italy
10:30 - 10:45	**Analysis of Efficient Dense Wireless Sensor Network Deployment in Smart City Environments** *Peio López-Iturri, Erik Aguirre, Leire Azpilicueta, Carlos Fernández-Valdivielso, Ignacio Raúl Matías, Francisco Falcone Universidad Pública de Navarra, Spain*
10:45 - 11:00	**A Maker Friendly Mobile and Social Sensing Approach to Urban Air Quality Monitoring** *Luca Capezzuto2, Luigi Abbamonte2, Saverio De Vito1, Ettore Massera1, Fabrizio Formisano1, Grazia Fattoruso1, Girolamo Di Francia1; 1 Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy; 2 Università degli Studi di Napoli Federico II, Italy*
11:00 - 11:15	**vCity Map: Crowdsensing Towards Visible Cities** *Yoshito Tobe1, Itaru Usami1, Yusuke Kobana1, Junji Takahashi1, Guillaume Lopez1, Niwat Thepvilojanapong2; 1 Aoyama Gakuin University, Japan; 2 Mie University, Japan*
11:15 - 11:30	**Calibration of a Cluster of Low-Cost Sensors for the Measurement of Air Pollution in Ambient Air** *Laurent Spinelle3, Michel Gerboles3, Maria Gabriella Villani2, Manuel Aleixandre1, Fausto Bonavitacola4; 1 Consejo Superior de Investigaciones Científicas, Spain; 2 ENEA, Italy; 3 Joint Research Center, Italy; 4 Phoenix Sistemi & Automazione s.a.g.l., Switzerland*

Aveiro Joint-Exercise Intercomparison & WG Meeting

13 - 27 October 2014: Starting Joint-Exercise (2 weeks duration)

14 - 15 October 2014: EuNetAir WG1-WG4 Meeting

EuNetAir Air Quality Joint-Exercise Intercomparison 2014

Local Organizers: Prof. Carlos Borrego and Dr. Ana Margarida Costa (IDAD)

Air Quality Monitoring campaign at Aveiro (Portugal) city centre 2014

Continuous measurements: CO, benzene, NOx, SO_2, PM_{10}, VOC

Temperature, humidity, wind velocity, wind direction, solar radiation, precipitation

COST partners (15 teams joined from 12 COST Countries) installed their microsensors side-by-side to compare performance with referenced equipment in the Air-Quality Mobile Laboratory

COST Action TD1105 *EuNetAir*: Aveiro INTERCOMPARISON

New Sensing Technologies and Modelling for Air-Pollution Monitoring

THIRD SCIENTIFIC MEETING: WG & 6th MC Meeting

New Sensing Technologies for Indoor Air-Pollution

Bahcesehir University, Istanbul (Turkey), 3 - 5 December 2014

Multidisciplinary Meeting:
International Experts and Coordinators of FP7 and H2020 research projects related to the IEQ Cluster

Local Organizers:
Prof. Zafer Ziya Ozturk,
GEBZE, Istanbul (Turkey)

Prof. Ali Gungor,
Bahcesehir University,
Istanbul (Turkey)

Participation:
- **60+ Participants**
- **21 COST Countries**

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3rd International WORKSHOP *EuNetAir*

New Trends and Challenges for Air Quality Control

hosted by University of Latvia, Riga (Latvia), 26 - 27 March 2015

Local Organizer:
Dr. Iveta Steinberga
University of Latvia
Riga (Latvia)

Local Co-Organizer:
Dr. Gita Sakale
Riga Technical University
Riga (Latvia)

Participation:
- **50+ Participants**
- **18 COST Countries**

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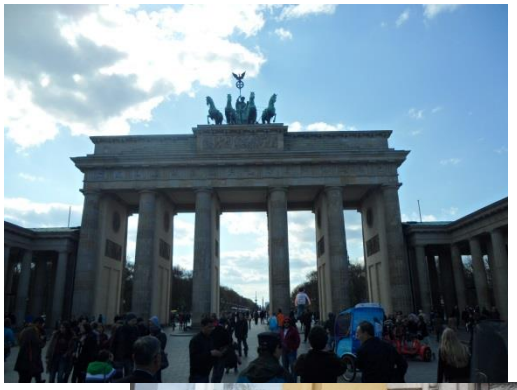
Focus Group Meeting *EuNetAir*

Data Analysis of Aveiro Air Quality Sensors Intercomparison

hosted by WHO CC - Federal Environment Agency, Berlin (Germany), 17 April 2015

Umwelt Bundesamt



Local Organizer:

Dr. Hans-Guido Muecke
WHO CC - FEA
Berlin (Germany)

Participation:

- **9 Participants**
- **8 COST Countries**

Output:
Planned Joint-Publication
on AQ Sensors Aveiro Database

Focus Group Meeting *EuNetAir*

Innovation on Environmental Sensor Technologies

hosted by Siemens, Munich (Germany), 29 April 2015

SIEMENS

Local Organizer:

Dr. Olivier von Sicard
Siemens AG
Munich (Germany)

Participation:

- **15 Participants**
- **10 COST Countries**

Output:

Planned Report on
Innovation on Environmental Sensor Technologies

3rd TRAINING SCHOOL *EuNetAir* at Hyytiala Forestry Field Station

Atmospheric Aerosol Physics, Measurements and Sampling

hosted by University of Helsinki, Hyytiala (Helsinki), 2 - 8 May 2015

Local Organizer:

Prof. Kaarle Hameri,
University of Helsinki,
Helsinki (Finland)

Participation:

- 13 COST Trainees
- 3 Trainers

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FOURTH SCIENTIFIC MEETING: WG & 7th MC Meeting

hosted by Linkoping University, Linkoping (Sweden), 3 - 5 June 2015

Local Organizer:

Prof. Anita Lloyd Spetz,
Linkoping University,
Linkoping (Sweden)

***FOCUS ON*:**

Outdoor Applications

- **4 June 2015: Roundtable on the *European Sensor-Systems Cluster (ESSC)***
- **5 June 2015: *World Environment Day 2015, 5 June* - Global Day by UNEP**
- **22 June 2015: *AMA Science Proceedings* (max 4 pages Templated) with DOI**
- **31 October 2015: *Special Issue JSSS* (Copernicus) - Peer Review Process**

EuNetAir at 2nd Consultation Meeting on the Global Platform on Air Quality and Health

WHO Geneva, 18-20 August 2015, ***Meeting Report - DRAFT 23.09.2015***

World Health Organization

Session 3, cont. Low cost AQ monitoring

- Portable Sensor-Systems for Air Quality Monitoring: The case-study of EuNetAir *(M. Penza – remote presentation)*
- Experiences of USEPA *(T. Watkins – remote presentation)*

Discussion: Perspectives for application of low cost sensors for AQ monitoring

COST Session & Core-Group Meeting at *EUROSENSORS 2015*

The 29th European Conference on Solid-State Transducers

10:30 - 12:30	***Open Session COST: New Sensing Technologies for Air Quality Monitoring*** *Chairperson: Michele Penza*, ENEA, Brindisi, Italy
10:30 - 10:50	**COST Action TD1105: European Network on New Sensing Technologies for Air-Pollution Control and Environmental Sustainability. Overview and Plans** *Michele Penza*, Action Chair, ENEA, Brindisi, Italy
10:50 - 11:10	**Performance Evaluation of Amperometric Sensors for the Monitoring of O_3 and NO_2 in Ambient Air at ppb Level** *Laurent Spinelle, Manuel Aleixandre, Michel Gerboles*, JRC, EC DG ENV, Institute for Environment and Sustainability, Ispra, Italy
11:10 - 11:30	**LTCC, New Packaging Approach for Toxic Gas and Particle Detection** *Anita Lloyd Spetz, M. Sobocinski, N. Halonen, D. Puglisi, J. Juuti, H. Jantunen, M. Andersson,* Action Vice-Chair, Linkoping University, Linkoping, Sweden
11:30 - 11:50	**Low-Cost Fabrication of Zero-Power Metal Oxide Nanowire Gas Sensors: Trends and Challenges** *Jordi Samà[a], Juan Daniel Prades[a], Olga Casals[a], Guillem Domènech-Gil[a], Sven Barth[b], Isabel Gracia[c], Carles Cané[c], Francisco Hernández-Ramírez[a,d], Albert Romano-Rodríguez[a]*, Action MC Substitute, [a]Universitat de Barcelona, Barcelona, Spain; [b]Technical University Vienna (TUW), Institut for Material Chemistry, Vienna, Austria; [c]Consejo Superior de Investigaciones Científicas (CSIC), Institut de Microelectrònica de Barcelona (IMB-CNM), Bellaterra, Spain; [d]Catalonia Institute for Energy Research (IREC), Barcelona, Spain
11:50 - 12:10	**Integrated Sensor Systems for Indoor Applications: Ubiquitous Monitoring for Improved Health, Comfort and Safety** *Andreas Schuetze*, WG2 Leader and MC Member, Saarland University, Saarbrucken, Germany
12:10 - 12:30	**Towards Disposable Sensing Platforms and Analytical Instruments for Air Quality Monitoring** *Danick Briand*, Action MC Member, EPFL, Neuchatel, Switzerland
12:30	**Closure of COST Action TD1105 EuNetAir Open Session**

OUTREACH ACTIVITIES from Action TD1105

Action website:

www.cost.eunetair.it

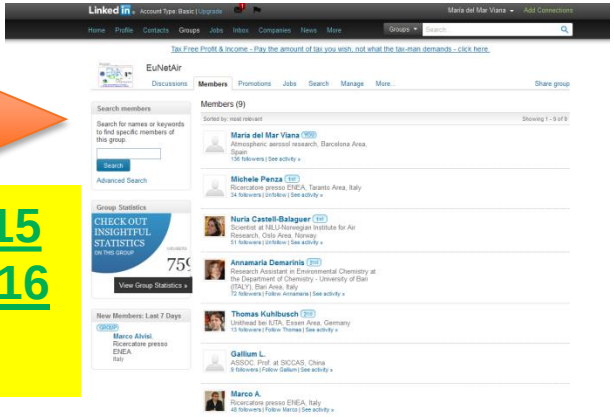
hosted by ENEA

Dr. Marco Alvisi, *Webmaster Coordinator*

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

Social Scientific ESRs Network (SSEN) by LinkedIn

Members: >80 - Moderators: M. Viana, M. Minguillon



4° CALL for Short Exchange Visits launched on September 2015

Short Term Scientific Mission: 9 TO BE FUNDED by 30 April 2016

Dr. Jan Theunis, STSM Coordinator EuNetAir

Issue 1: published on Dec. 2012 ✓
Issue 2: published on June 2013 ✓
Issue 3: published on Dec. 2013 ✓
Issue 4: published on June 2014 ✓
Issue 5: published on Dec. 2014 ✓
Issue 6: published on June 2015 ✓

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

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

Video/Interview: www.cost.eunetair.it - *Section* VIDEO

- **Margurite Nyhan,** The Senseable City Lab, MIT, Boston, USA
- **Hans-Guido Muecke,** Manager at WHO CC and Federal Environment Agency
- **Oliver von Sicard,** Researcher at Siemens AG, Munich
- **Thu-Hoa Tran-Thi,** Research Director on Indoor Sensors, CEA-CNRS, France
- **Tim Watkins,** Deputy Director US EPA Air, Climate & Energy Programme, USA
- **Andrea C. Ferrari,** Chairman of Executive Board of Graphene Flagship, UK
- **Cristina Guerreiro,** Coordinator of EEA AQ Report 2012-2013, Norway
- **Meyya Meyyappan,** Chief Scientist, NASA Ames Research Center, USA
- **Michele Penza,** Action Chair at RAI3 Italian TV Show *GeO&GeO*, Italy

Editorial Activities: WGs MEETING at EEA

New Sensing Technologies for Air-Pollution Control and Environmental Sustainability

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

New Sensing Technologies and Methods for Air-Pollution Monitoring

Proceedings of the Action EEA Meeting open to external contributors.

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

- ***Guest Editors***:

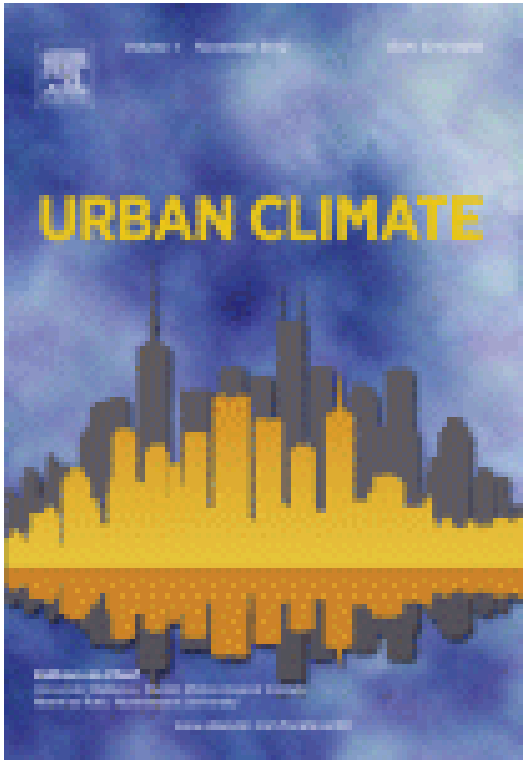
✓ Michele Penza, ENEA, Italy

✓ Anita Lloyd Spetz, Linkoping University, Sweden

✓ Ole Hertel, Aarhus University, Denmark

✓ Ulrich Quass, IUTA eV, Germany

- Deadline for submission: 28 February 2014 (**Close**)
- Number of Submissions: ***22 Manuscripts***
- Expected Publication: ***April 2015 (On line)***



Editorial Activities: Symposium at EMRS

New Sensing Technologies for Air-Pollution Control and Environmental Sustainability

- **Special Issue *Journal of Sensors and Sensor Systems* (*Copernicus Publications*)**

Advanced Functional Materials for Environmental Monitoring and Applications

Proceedings of Symposium-B EMRS Spring Meeting 2014, 26-30 May 2014, Lille (FR)

*Peer-review process (**www.journal-of-sensors-and-sensor-systems.net**)*

- ***Guest Editors***:

✓ Michele Penza, ENEA, Italy

✓ Anita Lloyd Spetz, Linkoping University, Sweden

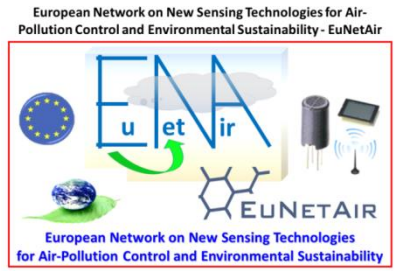
✓ Albert Romano-Rodriguez, Barcelona University, Spain

✓ Yongxiang Li, Chinese Academy of Sciences, China

✓ Meyya Meyyappan, NASA Ames Research Center, USA

- Deadline for submission: **31 July 2014**
- Expected Publication: ***February 2015 (Open Access)***

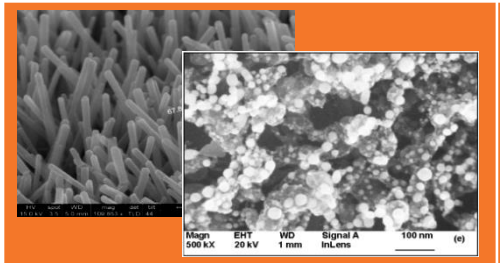
Expected Impact by Action TD1105



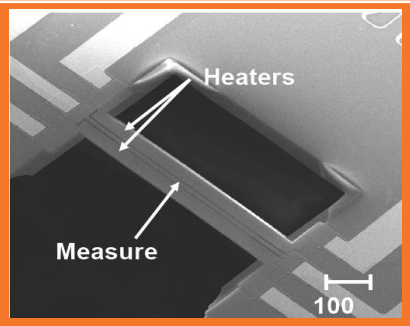
- **European Leadership on AQC Science & Technology**
- **Development of Green-Economy**
- **Support to Sustainable Development**
- **Support to Monitoring System of Clean Air for Europe**
- **Fostering Research & Innovation on New Sensing Technologies for Environmental Monitoring**

COST Action EuNetAir: CHALLENGES

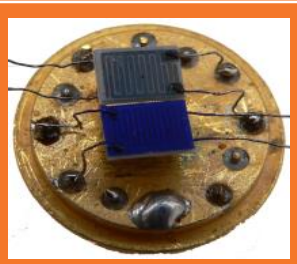
MATERIALS & GAS SENSORS



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

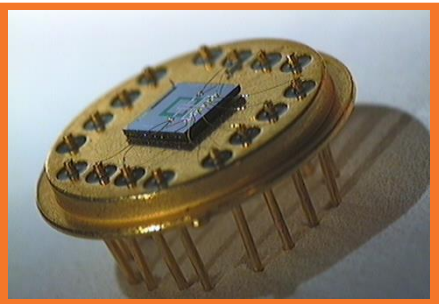


Cantilever Sensor by DTU, DK



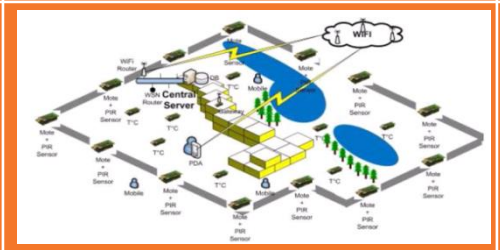
Phtalocyanine Gas Sensors
by CNRS UBP-LASMEA, FR

AQC SENSORS & SYSTEMS



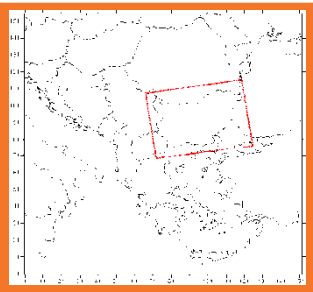
GasFET by EPFL, Switzerland

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

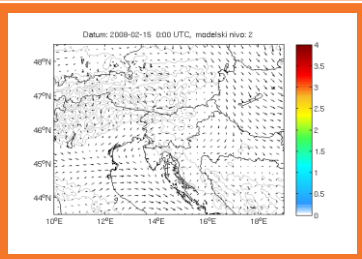


WIRELESS SENSORS NETWORK
by ISI, Greece

AQ MODELLING



CMAQ Calculations
by NIMH, BG

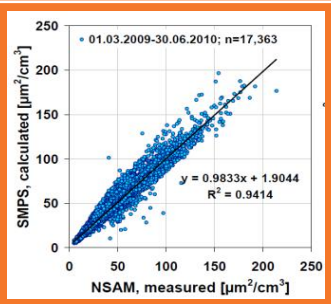


AQ Modelling dispersion in
meteorological mesoscale by
University of Ljubljana, SL

Chemical Weather Forecasting
and Information System
by Hungarian Meteo Service

STANDARDS & PROTOCOLS

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



Particle Surface Area
Measurements by IUTA eV, DE

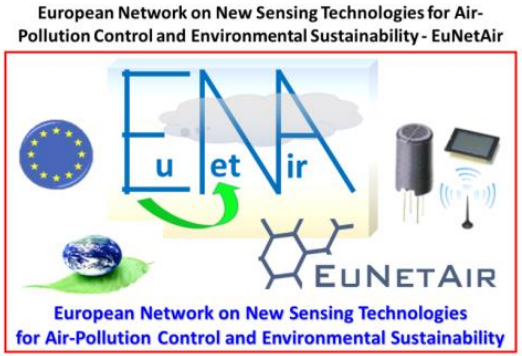
?

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

CONCLUSIONS

The 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**



Contact Details

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EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

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

CSO Approval: 01 Dec. 2011
Kick-off Meeting: 16 May 2012
Start of Grant: 01 July 2012
End of Grant: 30 April 2016

www.cost.eunetair.it

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:	Dr. Corinna Hahn, Dr. Juliane Rossbach Eurice GmbH, DE c.hahn@eurice.eu; j.rossbach@eurice.eu
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Administrative Officer:	Dr. Andrea Tortajada andrea.tortajada@cost.eu

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

Top Story
all stories

TD1105 selected as Top-Story by COST Association

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EUROPEAN COOPERATI

Taking charge of air quality control in Europe's smart, green cities

A COST funded network of European spin-offs, SMEs, agencies, research centres and universities is working on developing cheaper and energy efficient sensors for air quality control in Europe's future smart cities.

full story

ACKNOWLEDGEMENTS

Belgrade, Serbia, 13 - 14 October 2015

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

THANK YOU VERY MUCH FOR YOUR KIND ATTENTION !

VINCA Institute

Public Health Institute of Belgrade

University of Belgrade

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