



The European Sensor Systems Cluster (ESSC)

European Sensor Systems Cluster - *ESSC*

Vision, Objectives, Strategies, Priorities and Challenges of EU Cluster

**Cluster launched at Preparatory Workshop on 27 November 2014 in Brussels
sponsored and observed by EC DG Research and Innovation**

AMA Conference 2015 - SENSOR+TEST Trade Fair

Room Tunis, Session Time: 12:00 - 13:30

Nuremberg/Germany, 19 May 2015

Vision, Objectives and Position Paper

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KICK-OFF MEETING ESSC

The European Sensor-Systems Cluster (ESSC)

KICK-OFF MEETING ESSC

Tuesday 19 May 2015 - Session time: 12.00 - 13.30

Nuremberg Convention Center, NCC West - Room Tunis

SENSOR+TEST Trade Fair

AMA Conference 2015

Nuremberg (Germany), 19-21 May 2015

www.cluster-essc.eu



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AGENDA of the **KICK-OFF MEETING ESSC**

Tuesday 19 May 2015 - Session time: 12.00 - 13.30

Session Chair: *Dr. Thomas Simmons*, AMA Sensorik eV, Germany

12.00 - 12.05	Welcome Address: <i>Dr. Thomas Simmons</i> , Steering Committee Member, AMA Sensorik eV
12.05 - 12.20	Video Chat from Brussels with DG R&I Officer: <i>Dr. Hans-Hartmann Pedersen</i>
12.20 - 12.35	Vision, Objectives and Position Paper: <i>Dr. Michele Penza</i> , Chairman of ESSC, ENEA, Italy
12.35 - 12.50	Membership and Future Plans: <i>Dr. Rudolf Frycek</i> , Coach of ESSC, Amires, Switzerland
12.50 - 13.05	Preliminary Roadmap and WGs Inputs: <i>Prof. Andreas Schuetze</i> , Steering Committee Member, Saarland University, Germany
13.05 - 13.15	Other Notes from ESSC Steering Committee Members
13.15 - 13.30	Discussion: Question and Answer with Audience
13.30	Conclusions

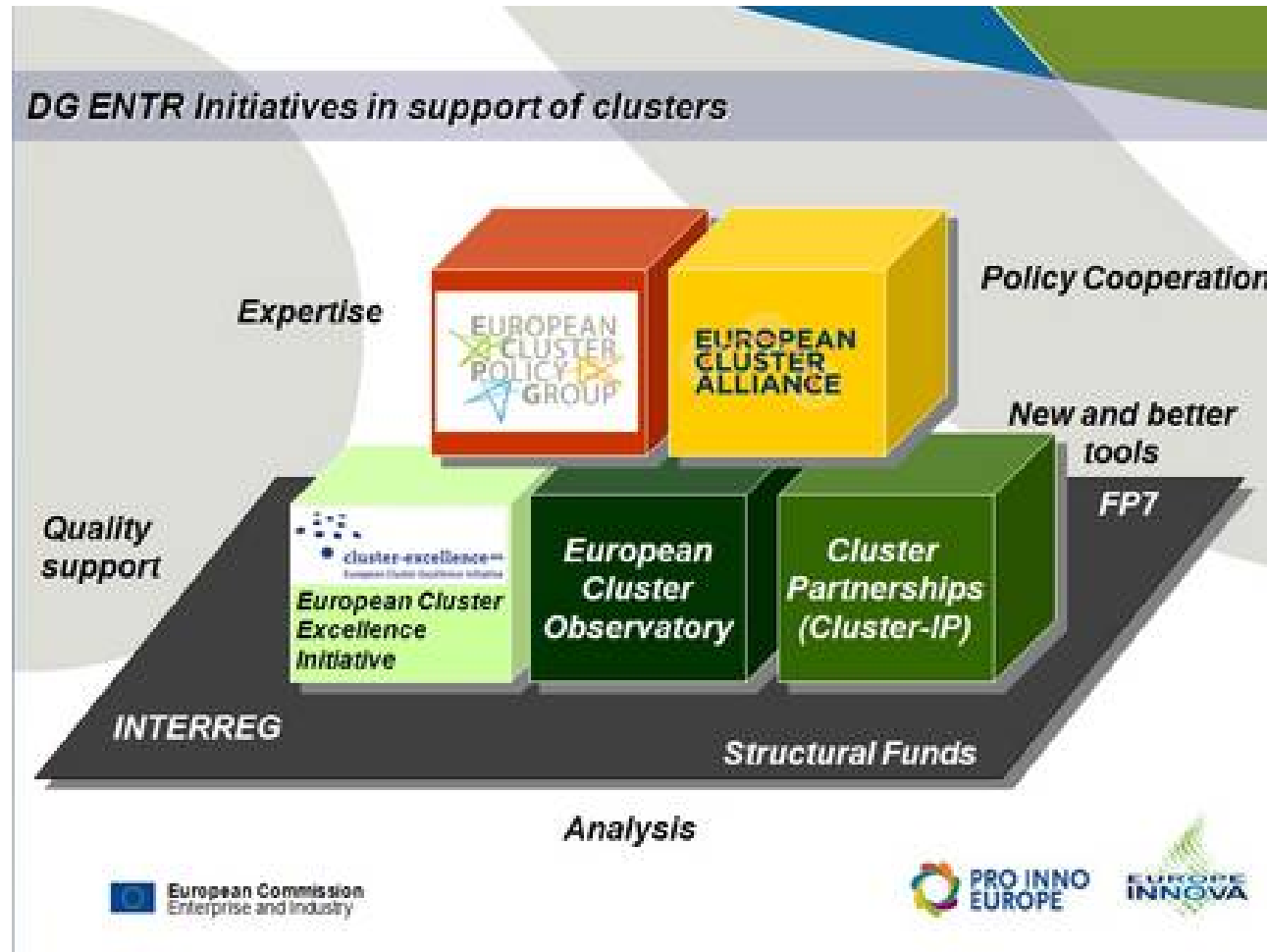
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CONTEXT POLICY OF THE EU CLUSTERS



EC Report on **Innovation Clusters in Europe:**
A statistical analysis and overview of current policy support
by DG Enterprise and Industry

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The EU CLUSTERS: *EC Expectations*

- 1. Increase the Impact of Research funded under the NMBP Programme**
 - ✓ *Scientifically*
 - ✓ *Technically*
 - ✓ *Commercially*
- 2. Facilitate Networking and help projects to benefit from Synergies**
- 3. Obtain better Advice for future Policy and Call Preparations (Roadmaps, Inputs for Call Topics, long-term Research Goals)**
- 4. Improve Impact, Exploitation and Knowledge Management**
- 5. Raise Visibility of Public Funded Research activities and their Impact**



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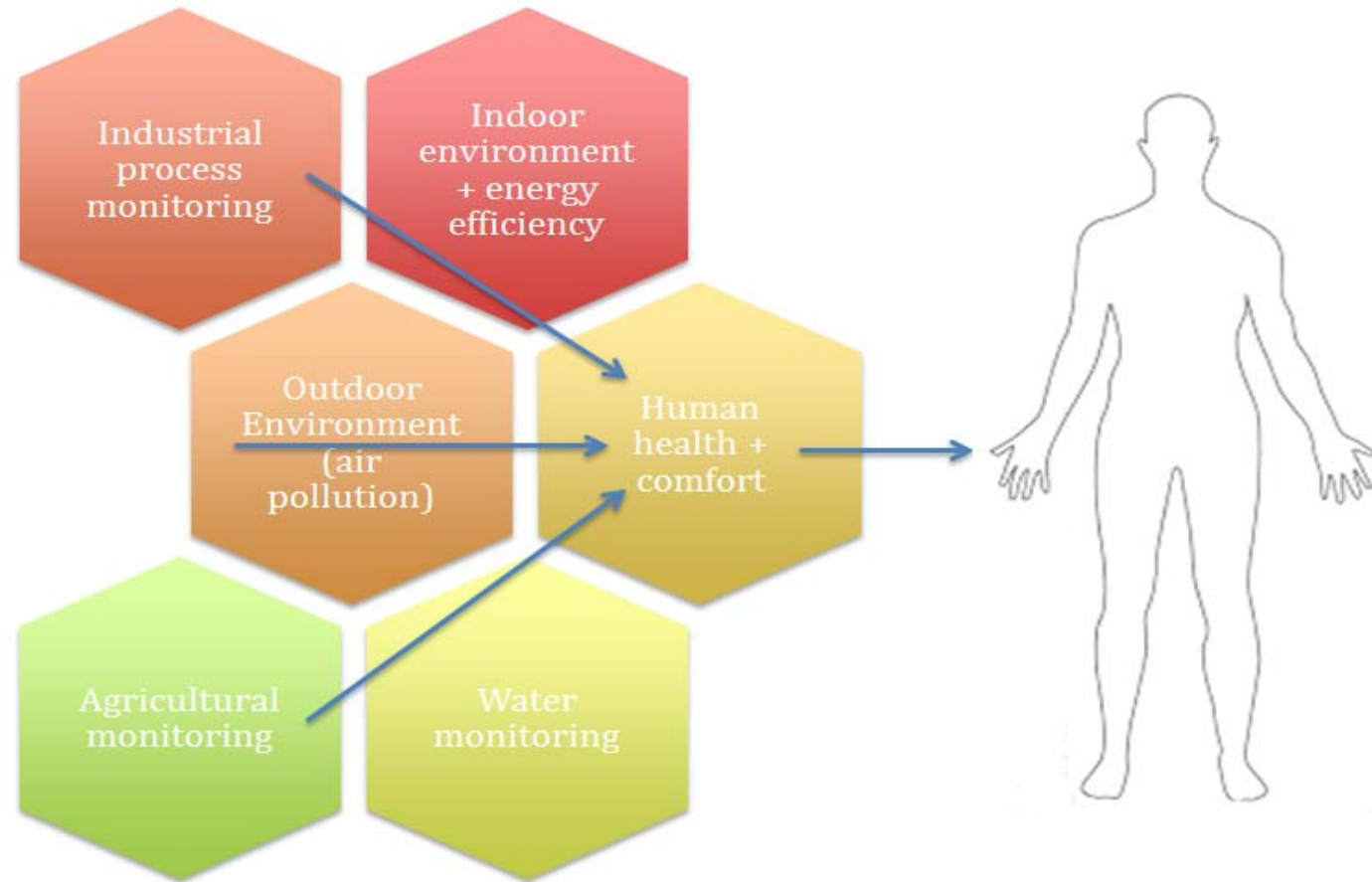
VISION OF ESSC (1/2)

- The **European Sensor System Cluster (ESSC)** will identify the technical or non-technical challenges of (bio)chemical sensing and highlight opportunities resulting from **nanotechnology**, **microsystems integration**, **advanced data evaluation**, their **manufacturing**, **commercialization** and **systemic integration**.
- **ESSC** will mobilize a *pan-European network*, ready to advise, assist and execute the national or international measures leading to **strengthened position of European Research and Innovation** in the field **(bio)chemical sensing** (e.g. analysis, measures proposition, evaluation, reviews).

VISION OF ESSC (2/2)

ESSC Key Areas:

- Environmental Sustainability
- Energy Efficiency
- Health Monitoring
- Comfort
- Industrial Applications



OBJECTIVES OF ESSC

The ESSC is committed to execute objectives, which are defined as follows:

1. Maximize the **cooperation between projects** (avoid duplicating work and improve efficiency)
2. Identify **common interests in on-going research and development** (e.g. open calls, training)
3. Provide a **forum** for discussion, problem solving and analytical planning R&D activities in Europe
4. Establish the **EU-wide meeting platform** for researchers and mainly for involved industries and end-users
5. **Remove commercialization barriers** to ensure the EU leadership in Sensor Technologies
6. **Integrate inputs** and Recommendations from other existing clusters or groups
7. Promote the **connection with external bodies** (EC-RTD, Connect, standardization and regulatory bodies, journals and scientific boards, advisory boards)
8. Disseminate the **sensor-related issues/findings** to informed public (e.g. stimulate awareness for the invisible environmental problems and support *citizen science*)



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TECHNOLOGICAL CHALLENGES OF ESSC (1/5)

Preliminary List:

*(to be completed and prioritized in the further **Roadmap** activities)*

- **Indoor Sensing**
- **Environmental Sensing**
- **Biosensors**
- **Chemo/bio Sensors for Liquids**
- **Modelling and Simulation**
- **Analytical Tools and Metrology**
- **Standardization and Regulation**
- **Business Models and Spin-offs**



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TECHNOLOGICAL CHALLENGES OF ESSC (2/5)

- **Improved 3S of sensor materials and More 3S:**
 - ❑ Sensitivity, Selectivity, Stability
 - ❑ Response/Recovery Time, Repeatability, Resolution
- **Miniaturization and integration:**
 - ✓ Low-powered Sensors
 - ✓ Chemical Filters
 - ✓ Catalysts
 - ✓ Pre-concentrators
 - ✓ Low-cost Modules
 - ✓ Sub-systems
- **Integration to systems:**
 - Energy Consumption/Harvesting
 - Data acquisition and Filtering
 - Data Fusion
 - User Interaction

TECHNOLOGICAL CHALLENGES OF ESSC (3/5)

The particular challenges are identified, where R&D efforts should be invested:

- **Indoor Sensing**

- Cross-sensitivity with *specific gases (fatty acids)*
- Accurate VOC quantification
- Long term exposure quantification
- Stability and life expectancy
- Miniaturization, low consumption, controlling and data processing
- Integration to air treatment systems and HVAC (incl. occupancy)
- Human machine interface for comfort

- **Environmental Sensing**

- Scalable sensing models for building Sensor Networks to track key air/water quality parameters
- Sensors complementary to existing tools (larger devices)
- Integration to *mobile devices*
- Low cost, wireless sensors to form *networks (e.g. sensing cities)*
- Targeted *information to habitants* and mitigation
- *Nanoparticle detection* for dust and aerosols

TECHNOLOGICAL CHALLENGES OF ESSC (4/5)

The particular challenges are identified, where R&D efforts should be invested:

- **Biosensors**

- Disposables vs. *continuous/automatic* monitoring
- High throughput
- *Regulatory framework* not fully adapted to personalization
- Towards *point of care* diagnostics, incl. Telemonitoring
- Data integrate-ability in *health system*

- **Chemo/bio Sensors for Liquids**

- High potential, *but low progress*
- *Multiparametric approach should be investigated*

- **Modeling and Simulation**

- *Multi-physics model*: analyte flow, material layer, transduction, data processing, integration

- **Industrial Process Monitoring**

- Better control of processes by increasing the number chemical parameters to be determined continuously (*robust sensors needed*)

TECHNOLOGICAL CHALLENGES OF ESSC (5/5)

The particular challenges are identified, where R&D efforts should be invested:

- **Analytical Tools and Metrology**
 - Validation
 - Joint-exercises *sensors-versus-analyzers* in real scenario measurements
 - Measurement protocols for benchmarking
- **Standardization and Regulation**
 - Standards and data protocols for Data Benchmarking (open access)
 - Validation and standardization of measurement procedures
 - Advanced study of VOC impact on health/productivity
 - Harmonization/Regulation/Public information of measured sites/households
 - Regulation/Public info on industrial products - e.g., real time styrene monitoring
- **Business Models and Spin-offs**
 - Total cost of ownership vs. savings in comfort environment
 - Food quality monitoring and price adaptation (realtime S/D)
 - Health system rewarding for early testing and monitoring

GOVERNANCE: Steering Committee of ESSC (1/2)

- **Chairman of ESSC:** Michele Penza, ENEA, Italy
- **Coach of ESSC:** Rudolf Frycek, Amires, Switzerland
- **EC Observer:** Hans Hartmann Pedersen (*EC Officer*), DG R&I, Belgium

Environmental Sensors

- D. Diamond

Indoor Air Quality

- A. Schütze (O. Martimort)

Health Monitoring and Comfort Sensors

- P. Galvin (A. Prina Mello)

Monitoring of Industrial Processes

- T. Mayr

Sensor Integration and Commercialization

- O. Martimort

Dissemination and Outreach

- T. Simmons (Eurice)

GOVERNANCE OF ESSC (2/2)

- **Chairman of ESSC:** Michele Penza, ENEA, Italy - michele.penza@enea.it
- **Coach of ESSC:** Rudolf Frycek, Amires, Switzerland - frycek@amires.eu
- **EC Observer:** Hans Hartmann Pedersen (EC Officer)
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Environmental Sensors	D. Diamond	Dublin City Uni	dermot.diamond@dcu.ie
Indoor Air Quality	A. Schütze	Saarland Univ.	schuetze@lmt.uni-saarland.de
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Monitoring of Industrial Processes	T. Mayr	TU Graz	torsten.mayr@tugraz.at
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PARTNERS supporting ESSC



ENEA

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



UNIVERSITÄT
DES
SAARLANDES



DUBLIN CITY
UNIVERSITY



Tyndall
National Institute
INSTITUTO NAZIONALE



TU
Graz



DTU



btu

Brandenburgische
Technische Universität
Cottbus - Senftenberg



NS
NanoSense



EFFICIENCE Marketing



nano analytik



AMTRES



EURICE
EUROPEAN RESEARCH AND
PROJECT OFFICE GMBH



AMA
Association for Sensors + Measurement



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FP7/H2020 PROJECTS & Actions supporting ESSC



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FUNDING and NETWORKING of ESSC

- **No specific funding yet**
- Use resources within *running EU projects*
- Use resources of your environment (e.g. associations, institutions)
- Continue **defining which specific funding** is urgently in need and use Cluster to build **critical mass and to communicate it**
- **Any Interlink with the other European Societies, Bodies, Associations, Platforms and ESSC ???**
For instance: EMRS, IMCS, EuroSensors,



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ESSC CONTACT PERSONS:

- **Chairman of the ESSC: Dr. Michele Penza (ENEA, Brindisi, Italy)**
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- **Coach of the ESSC: Dr. Rudolf Frycek (Amires, Neuchatel, Switzerland)** - frycek@amires.eu
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THANK YOU VERY MUCH FOR YOUR KIND ATTENTION!

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**European Commission - DG Research & Innovation
Directorate Key Enabling Technologies
Unit Advanced Materials and Nanotechnologies**



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