The European Sensor Systems Cluster (ESSC)

European Sensor Systems Cluster - *ESSC*

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

Cluster launched at Kick-off Workshop on 27 November 2014 in Brussels

sponsored and observed by EC DG Research and Innovation

EMRS - Board of Delegates, Lille/France, 14 May 2015

Vision, Objectives and Position Paper

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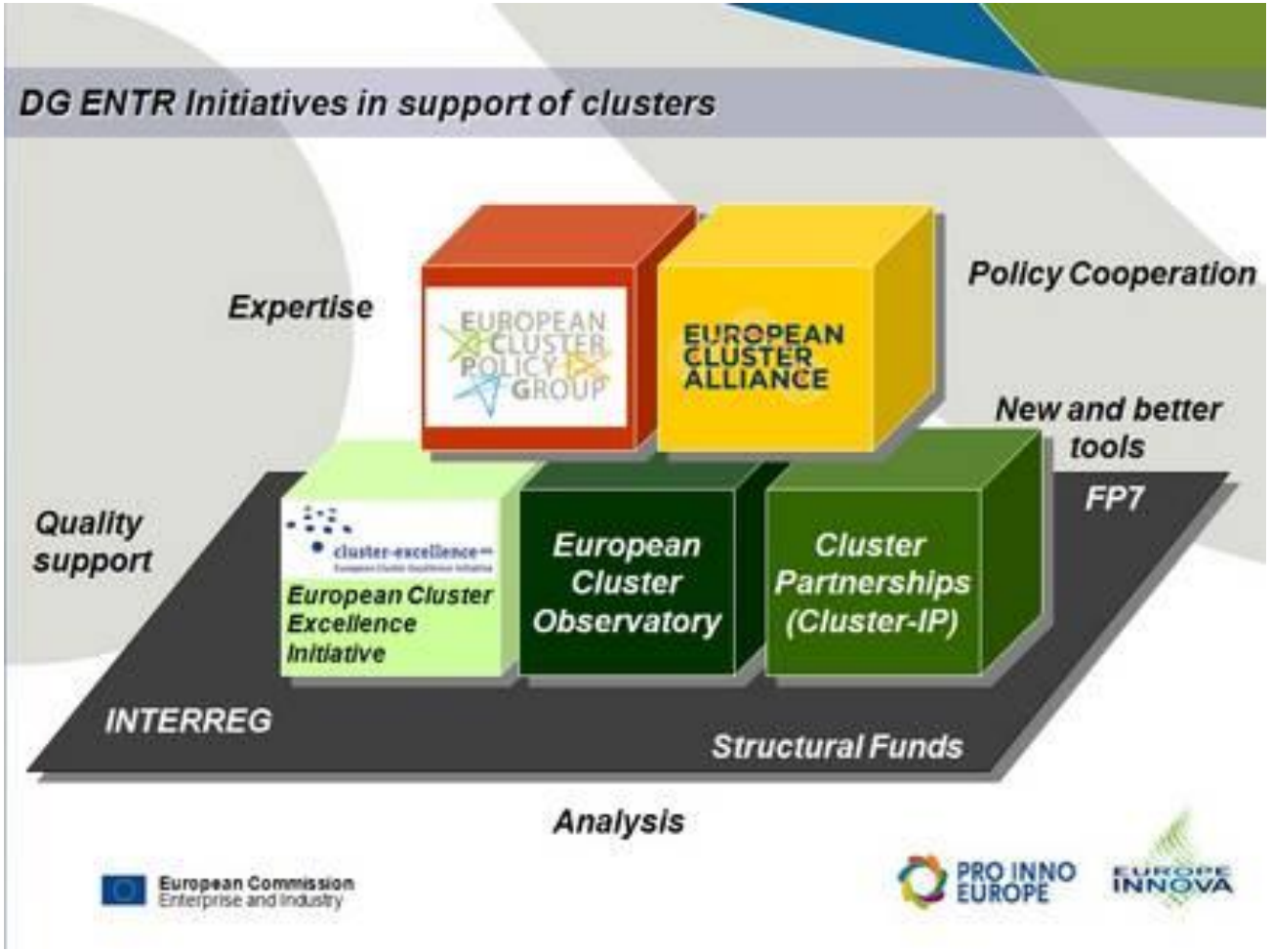
European Commission

AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE

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

The European Sensor Systems Cluster (ESSC)

European Commission

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**

VISION OF ESSC (1/2)

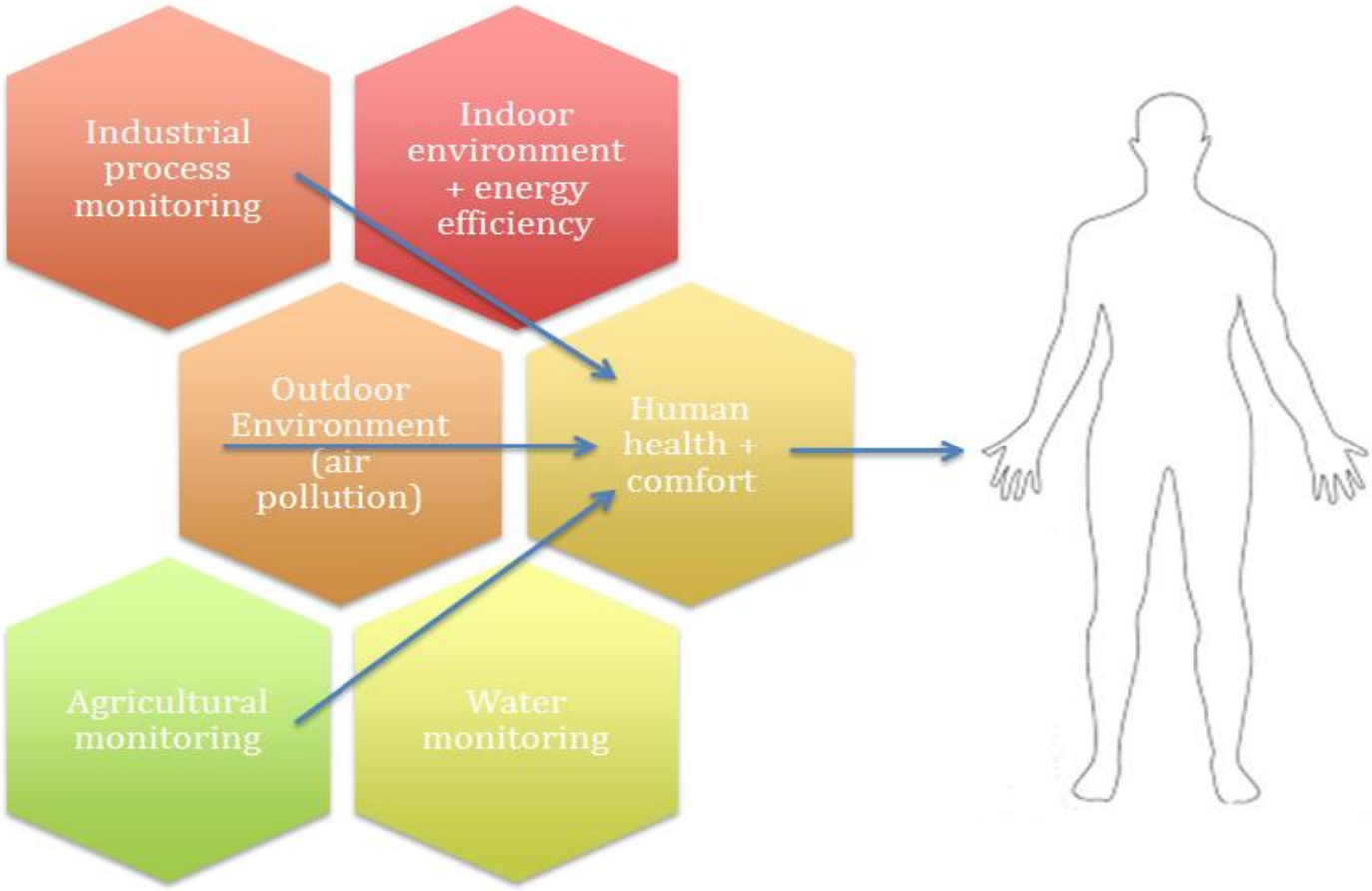
- The **European Sensor System Cluster (ESSC)** will identify the technical or non-technical challenges of (bio)chemical sensing and highlight opportunities resulting from **nanotechnology**, **microsystems integration**, **advanced data evaluation**, their **manufacturing**, **commercialization** and **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*)

TECHNOLOGICAL CHALLENGES OF ESSC (1/5)

- 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

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**
  - 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

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 Sensors	• 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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Monitoring of Industrial Processes	T. Mayr	TU Graz	torsten.mayr@tugraz.at
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Dissemination and Outreach	T. Simmons	AMA Sensorik	simmons@ama-sensorik.de

PARTNERS supporting ESSC

FP7/H2020 PROJECTS & Actions supporting ESSC

cost
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

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

nanomedicine
EUROPEAN TECHNOLOGY PLATFORM

NAPES
NEXT GENERATION ANALYTICAL PLATFORMS
FOR ENVIRONMENTAL SENSING

SENSIndoor

AquaVir

IAQSense
Air Quality in Closed Environments

NANOdetector

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 potential Interlink with the European Materials Research Society (EMRS) and ESSC ?**

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

ESSC CONTACT PERSONS:

- **Chairman of the ESSC: Dr. Michele Penza (ENEA, Brindisi, Italy) - michele.penza@enea.it**
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European Commission - DG Research & Innovation
Directorate Key Enabling Technologies
Unit Advanced Materials and Nanotechnologies