The European Sensor Systems Cluster (ESSC)

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European Sensor Systems Cluster - *ESSC*

Vision, Objectives, Strategies, Priorities, Challenges and Roadmap

Cluster 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

Preliminary Roadmap – WG Inputs

Andreas Schütze – WG2 Indoor Air Quality

schuetze@LMT.uni-saarland.de

LMT, Saarland University, Saarbrücken - Germany

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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**: *Dr. Thomas Simmons*, Steering Committee Member, AMA Sensorik eV
12.05 - 12.20	**Video Chat from Brussels with DG R&I Officer**: *Dr. Hans-Hartmann Pedersen*
12.20 - 12.35	**Vision, Objectives and Position Paper**: *Dr. Michele Penza*, Chairman of ESSC, ENEA, Italy
12.35 - 12.50	**Membership and Future Plans**: *Dr. Rudolf Frycek*, Coach of ESSC, Amires, Switzerland
12.50 - 13.05	**Preliminary Roadmap and WGs Inputs**: *Prof. Andreas Schuetze*, 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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GOVERNANCE: ESSC Steering Committee

- **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)

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VISION OF ESSC

ESSC Key Areas:

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

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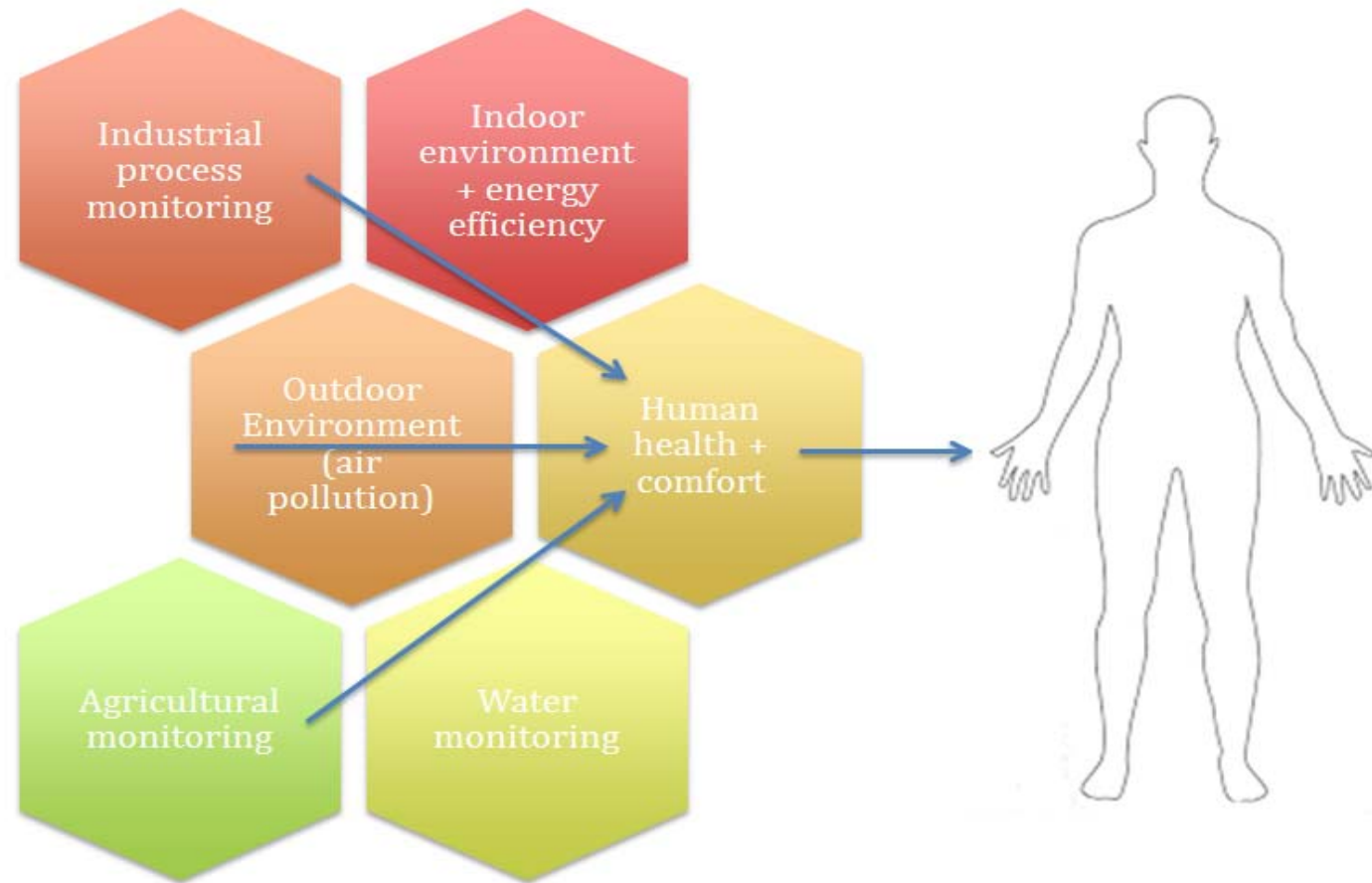
Roadmap approach – example WG2

Background: define scope and goals relating to sensor systems

- Scope of Indoor Air Quality
  - Health
  - Comfort
  - Productivity
  - Building integrity and value

- Indoor air quality covers a great variety of application scenarios

- Indoor air quality in buildings is closely connected to energy consumption

- Sensor systems measuring IAQ can have several purposes
  - Purely informative, i.e. indoor weather station
  - Prove compliance with regulations on long term average exposure
  - Give active feedback and advise to people ("open the window to ventilate")
  - Actively control IAQ as part of a complex system to control dilution with outdoor air and possibly also active air treatment

→ **Define priority topics and R&D requirements**

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R&D topics – WG1 Environmental Sensors – prelim.

Cross Cutting Topics

• Driving Down Costs of Analysis

• Understanding and Controlling Biofouling

• Harnessing the Power of Cloud Informatics

• Air Quality Joint-Exercises

→ Sensors Performance Compared to Reference Analyzers

• Material-based Solutions for Living Sensors Eco-Innovation

→ combining natural species (e.g., lichens, moss, higher species) with traditional transducers (e.g., optical, electrical, capacitive, gravimetric, etc.)

WG Specific Topics

• Studying Gases in the Environment

• Improved platforms for Characterizing the Marine Environment

• Autonomous Analyzers for Freshwater/Waste Water Analysis

• Migrating Analytical Instruments from the Lab to the Field

• Improved Sensing Platforms for Urban Air Quality Monitoring

• Chemical Weather Forecasting and Environmental Sensors Informatics

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R&D topics – WG2 Indoor Air Quality – prelim.

Cross Cutting Topics

• Development of a Comprehensive Air Quality Index – WG1

• Odor Nuisance Monitoring for Comprehensive (I)AQ Assessment

• Integrate Mobile Sensor Systems into (I)AQ Networks – cf. WG1
→ primarily smartphones and wearables

WG Specific Topics

• IAQ User Interface allowing easy understanding and individual tailoring

• Connect Outdoor and Indoor Air Quality for Demand Controlled Ventilation – WG1

• Bio-chemical Sensor Systems for Mold Detection – WG1

• Detection & quantification of volatile organic compounds
→ benzene, formaldehyde, naphthalene at ppb levels (WHO limits!)

R&D topics – WG3 Health Monitoring & Comfort – prelim.

Cross Cutting Topics

- Multiparameter sensing
- Internet of things / Internet of everything – cf. WG1/2
- Energy management / Energy harvesting
- Sensor system design

WG Specific Topics

- Data management and integration into EMRs (Electronic Medical Records)
- Biocompatibility (wearable and implantable sensor systems)
- Detection & quantification of volatile organic compounds (breath analysis)
- Detection of single cells in complex media
- Sensors for tissue identification and characterization
- Non-contact sensing platforms for physiological monitoring
- Integration of sensors into organ-on-chip systems
- Development of disposable imaging system

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R&D topics – WG4 Industrial Process Monitoring – prelim.

Integration

•Driving Down Costs of Analysis – cf. WG1

•Robust and selective sensor materials

•Understanding and Controlling Biofouling – cf. WG1

•Harnessing the Power of Cloud Informatics – cf. WG1

WG Specific Topics

•On- or inline control of process parameters complementary to physical sensors: enable measurement of additional chemical parameters beyond pH and oxygen

•Sensors showing compatibility with GMP and PAT

•Miniaturized and cheap measurement systems for widespread deployment in industrial processes

•Smart and intelligent process control system based on chemical sensor data

•Process intensification and optimization using new sensors and data

•Facilitating and accelerating upscaling and downscaling using sensor data

•Capability of cleaning in place (CIP) and sterilization (steam, γ-rays, e-beam, …)

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R&D topics − WG5 Integration & Commercialization – prelim.

Integration

- Sensor SMD package standardization
→ pin-to-pin compatibility

- Generic sensor and sensor system ASIC
→ data acquisition and processing, store sensor specific calibration data and further information (cf. IEEE 1451, TEDS: transducer electronic data sheet)
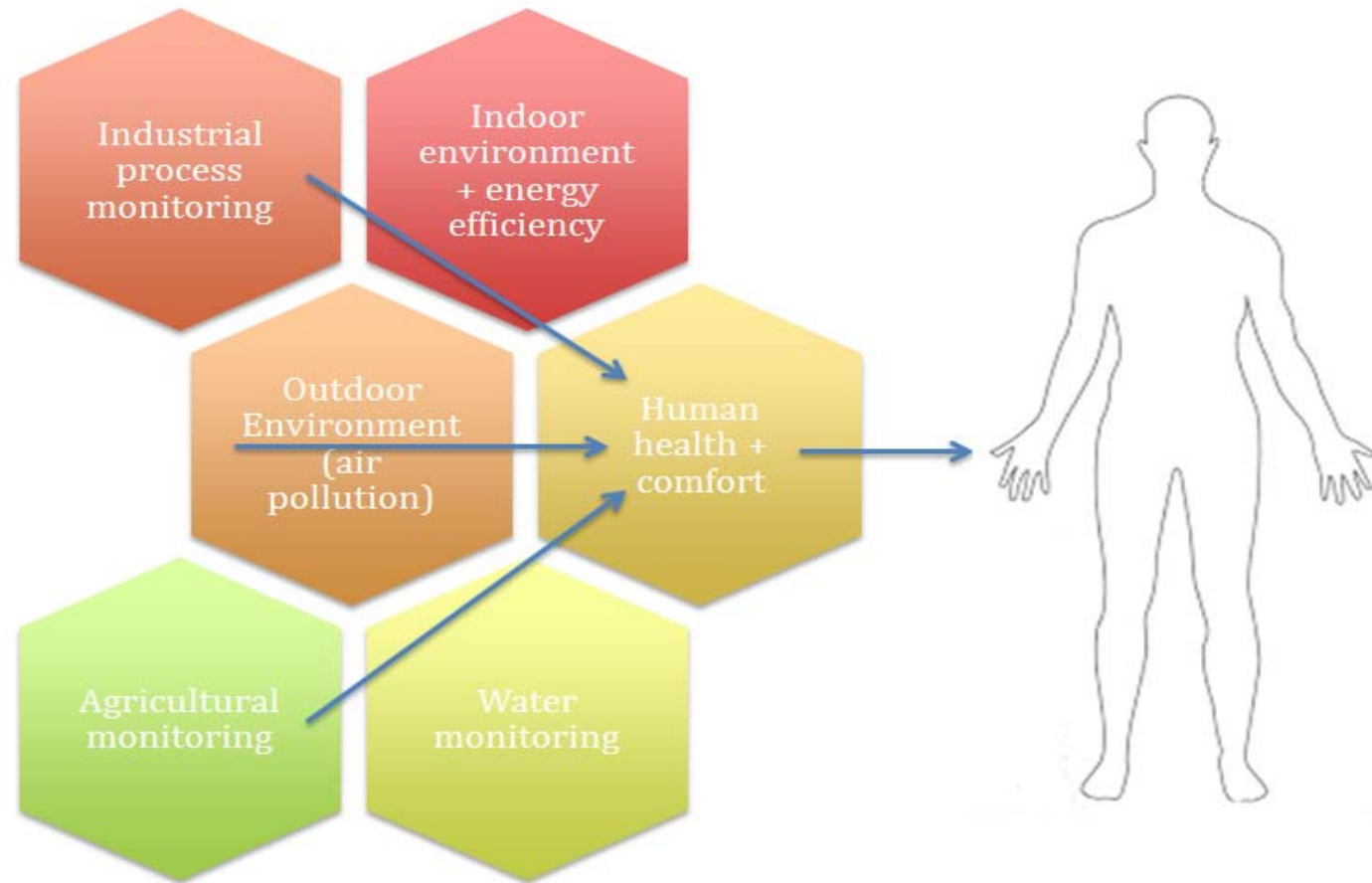
Commercialization

- Upscaling calibration from laboratory to mass production

- Cost and size reduction

- Modularity and flexibility
→ also see integration topics

- Quality of measures
→ allowing users to understand and compare sensor system performance

- Interoperability

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- **Energy Efficiency**
- **Health Monitoring**
- **Comfort**
- **Industrial Applications**

Industrial process monitoring · Indoor environment + energy efficiency · Outdoor Environment (air pollution) · Human health + comfort · Agricultural monitoring · Water monitoring

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Register with ESSC & provide your input!

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➡ **ESSC roadmap to be presented**
at EUROSENSORS 2015 (Sept. 6-9, Freiburg)

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