Information and Communication Technologies (ICT) in the Seventh Framework Programme

NCP Information day – ICT Call 8

13th May 2011

3.2 Smart components and smart systems integration, part b) Micro-nano-Bio systems

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European Commission
Information Society and Media

Objective ICT-2011.3.2.
Smart Systems components and Smart Systems Integration

CALL 7

- a) Future Smart components and smart systems
- c) Coordination and Support Actions

CALL 8

- b) Micro-nano-bio systems (MNBS)

3.2 Smart components and smart systems integration, part b) Micro-nano-Bio systems

- **Call 8**
- **Objective: ICT - 3.2.b**
- **Instruments: IP, STREP**
- **Budget: 39 MEUR**

(a min. 50% to IPs and a min. of 30% to STREPs)

Outline

What are we looking for?

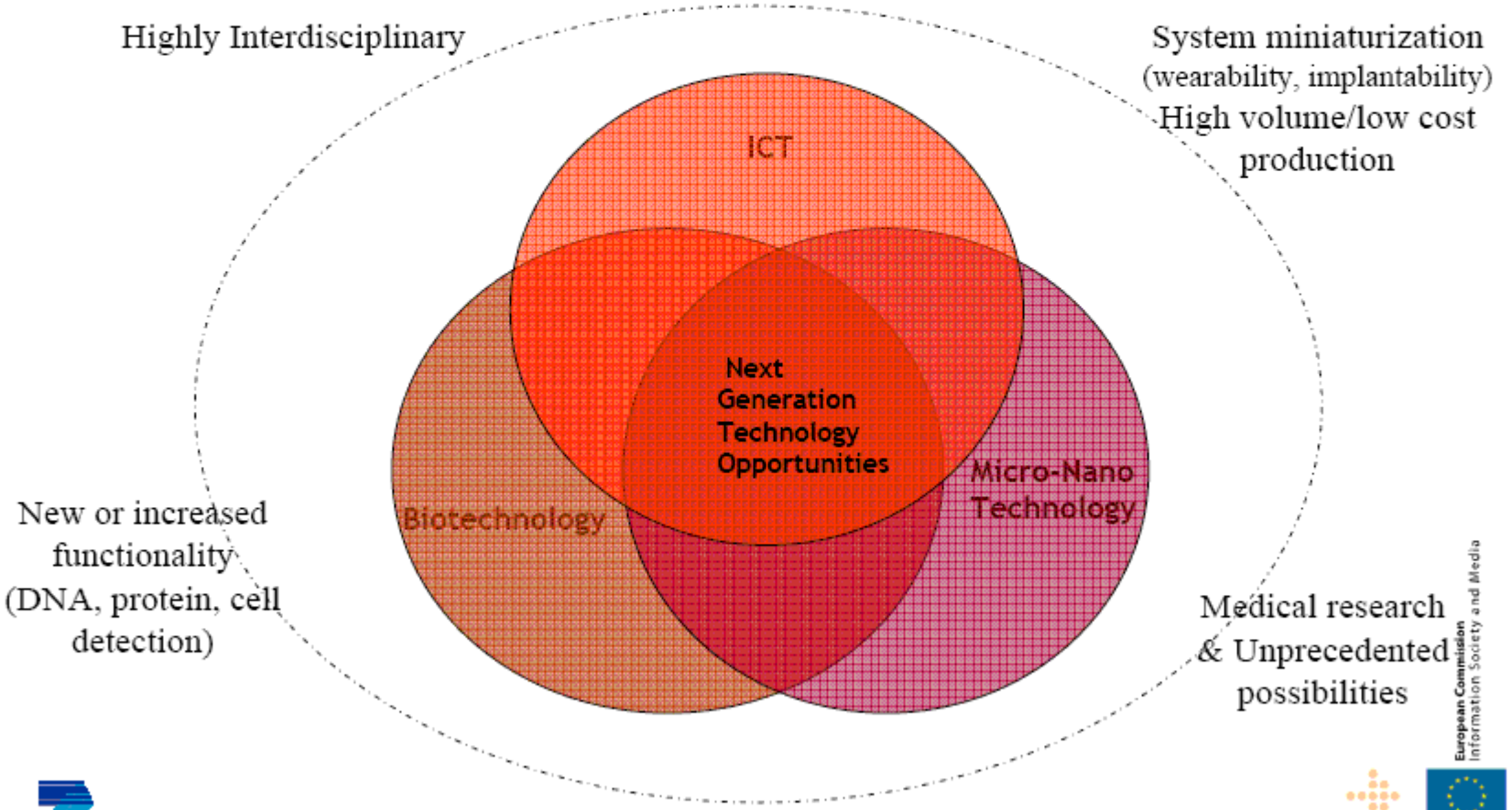
Is this new?

What we don't want?

Who are driving/supporting this?

Additional/background documents

MNBS: interfacing technologies & integrated systems



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MNBS in Call 8 (1)

- Increased intelligence of devices
- Enhanced miniaturisation and integration
- Increased integration of bioactive components

New generation of MNBS: Smaller, perform better, be faster and cheaper, delivering enhanced sensitivity & specificity and highly reproducible & reliable results.

Research be driven by application requirements:

- Health and biomedical applications:
  - highly integrated, safe, active and autonomous "smart" implants;
  - integrated systems for rapid, sensitive, specific and multi-parametric in vitro molecular analysis/detection and cellular manipulation based on biodegradable materials.
  - autonomous body sensor and actuator based systems for non- or minimally-invasive targeted early detection, diagnosis and therapy.

MNBS in Call 8 (2)

- Environment protection, food/beverage safety, quality control :
  - integrated multisensing micro-nano systems able to analyse environment, food and beverage samples for the simultaneous and rapid identification of potentially dangerous species e.g. pathogens, allergens, chemicals, etc.;
  - integrated sensor and actuator systems for safety and security that are able to support the individuals operating in harsh environments through contextual monitoring, feedback and networking capabilities.

Expected Impact

- Closer **business relationships** between materials, equipment and component suppliers, integrators, manufacturing plants and institutes. **Strong involvement of industry** participants interacting closely with R&D organisations and users.
- **Increased European knowledge and skills** at the frontier of smart component and smart systems integration, increased efficiency and effectiveness of smart components and smart systems engineering **contributing to the competitiveness of the European industry** involved, increased attractiveness to investments and putting European research organisations in leading positions.
- **Substantial market shares gained** in high end markets requiring very high performance smart products and new electronic applications.
- Contributing to environment protection through smart solutions for energy management and distribution, smart control of electrical drives, smart logistics or energy-efficient facility management.

Overcome current limitations and meet the real challenges

- ✓ Low rate and speed of industrialization; many projects are either never completed or do not survive real word testing.
- ✓ More patents should have been filed and more commercial partners and end-users involved.
- ✓ Inexperience in dealing with regulatory affairs (key factor for successful transition from research to innovation).
- ✓ Expected and unexpected technical key challenges for smart autonomous MNBS, e.g. sample pre-treatment, microfluidics and standardization; lack of adequate sample materials, poor sensitivity, reliability and repeatability. Power management, biocompatibility and interfacing ICT with the human body remain

Drivers of future R&D
(MNBS Workshops outcome)

- ***Computerisation, e.g.*** integration of bioinformatics and medical data management with high data rates and storage power
- ***Miniaturisation, e.g.*** ability to deliver the given function, integration into the fabrication phase and integration with other devices to make a system
- ***Molecularisation, e.g.*** new surface chemistry, biomarkers, immobolisation of molecules on surfaces, biocompatibility and multiplexing techniques to ensure powerful and accurate signal output.
- ***Achieve Integration, e.g.*** Fast and multianalyte performance; validated prototypes with real samples; disposability and low fabrication cost

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MNBS is an existing strong European Cluster

41 (FP6 & FP7) Projects, 171 M€ funding (19 currently running)

A. Biomedical
   A1. Miniaturised & Lab-on-chip systems for biological (in vitro), chemical &biochemical analysis
   A2. Systems for in vivo interaction with the human body
   A3. Other

B. Environment

C. Food and Beverage

Annual Workshops 2007-2011

http://cordis.europa.eu/ist/mnd/events.htm

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MNBS: Technological and Application Areas Focus

Biosensors & Lab on Chip Components and Systems, e.g.:

DNA & protein arrays, LoC (e.g. MNT, surface chemistry, biomarkers, microfluidics, modelling, instrumentation, sample preparation, detection, integration/packaging and cost reduction)

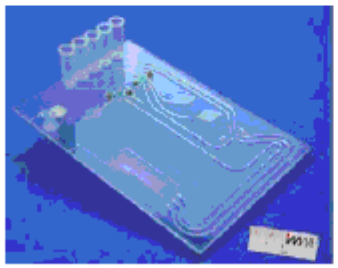
Smart Micro Nano Systems on & inside the body, e.g.:

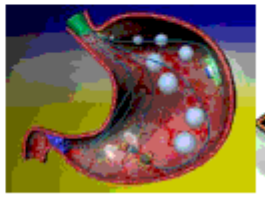
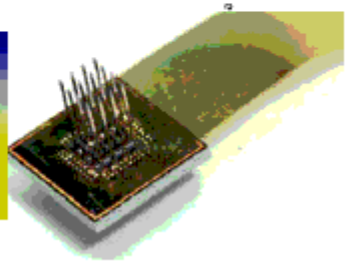
BioMEMS, BioRobots, Actuator-Sensor ("closed loop" systems), Drug delivery systems, Biochemical Wearable Sensing and Active low power implants

Business and driving forces, e.g.:

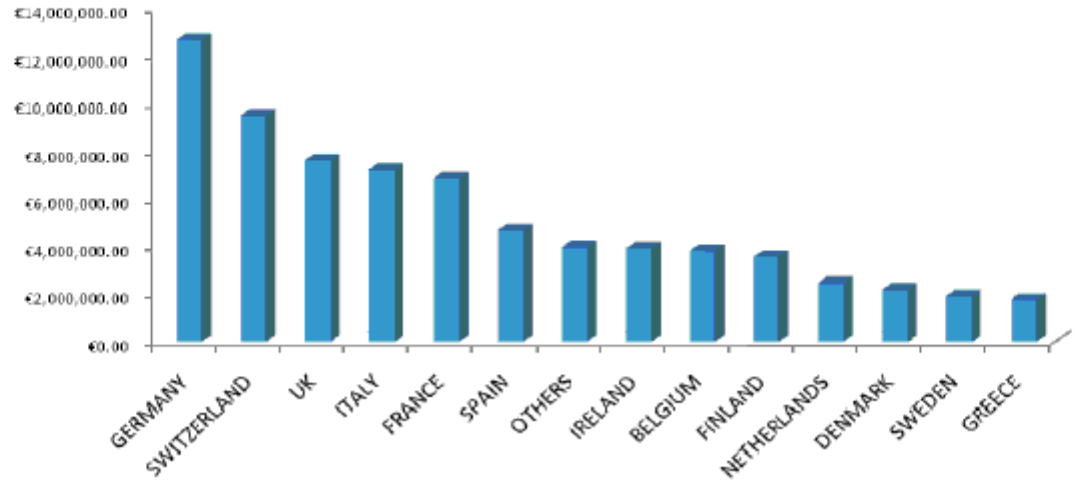
Driving applications: Healthcare/biomedicine, food, environment, security, leisure

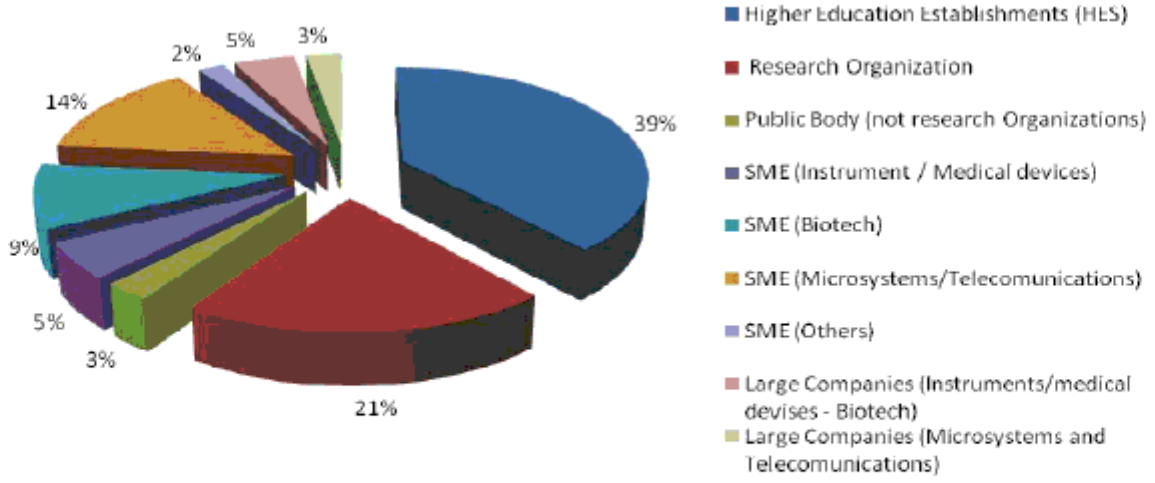
Mass production (cost), user needs, ethical and societal issues.

MNBS FP7 Participation (incl. call 5)





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Additional/background documents

What we don't want

Duplication of R&D

Proposals which are not driven by application requirements

Low innovation

Academic proposals (low exploitation, impact)

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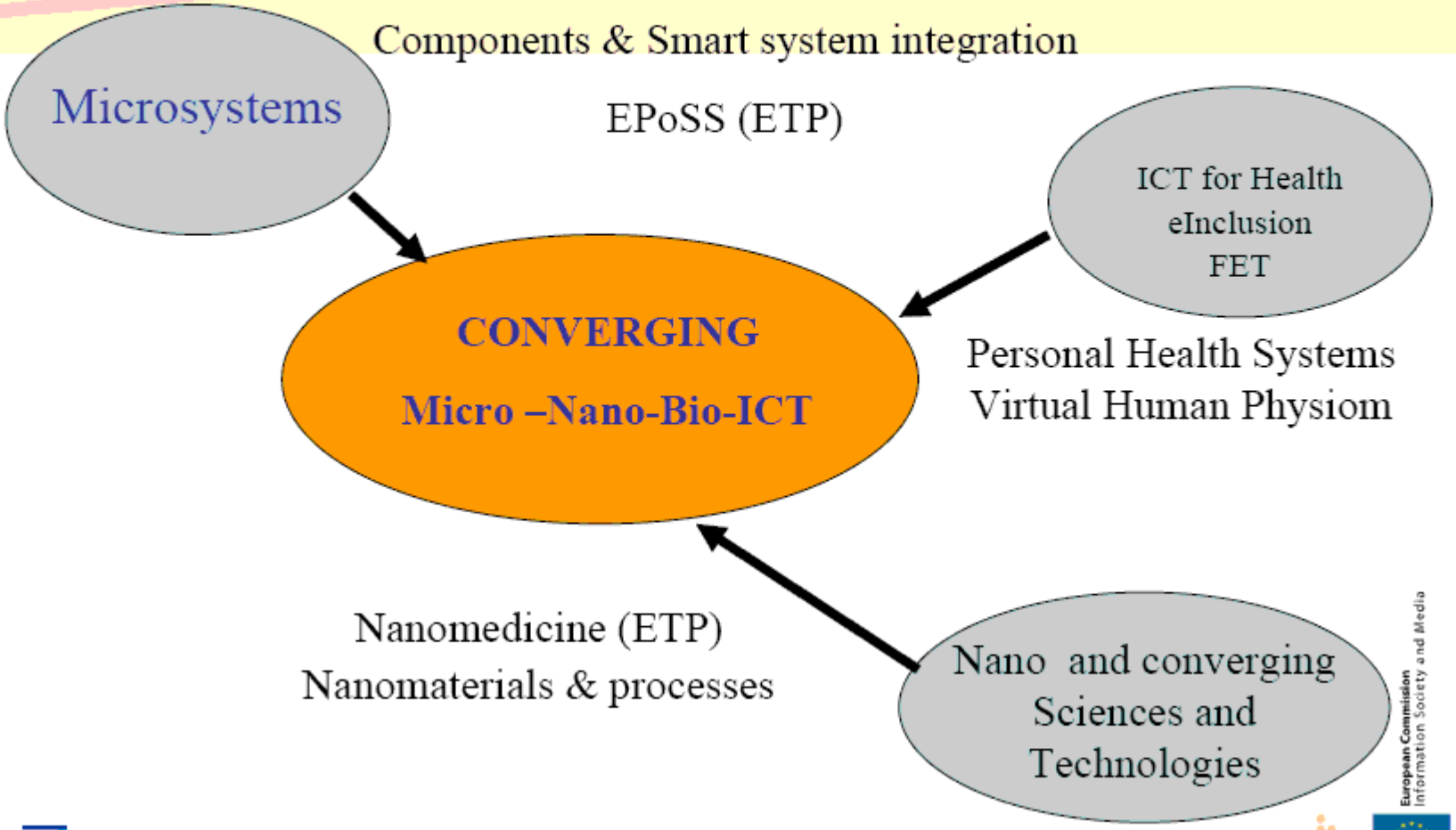
MNBS bring a system approach to the EC complementary activity



Who Drives MNBS?

EU Research e.g. MNBS Cluster
http://cordis.europa.eu/fp7/ict/micro-nanosystems/projects-mnbs_en.html

EPoSS ETP: www.smart-systems-integration.org/public

Nanomedicine ETP: www.etp-nanomedicine.eu/public

Industry: microsystems, telecom, biotechnology, instrumentation and medical devices

Users: Associations, professionals, citizens, patients

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Additional Background / documentation

MNBS:

cordis.europa.eu/fp7/ict/micro-nanosystems/projects-mnbs_en.html

cordis.europa.eu/fp7/ict/micro-nanosystems/docs/mnbs-projects-portfolio-april-2011_en.pdf

MNBS Workshop, April 2010, Neuchatel, CH: Presentations & report:

cordis.europa.eu/fp7/ict/micro-nanosystems/events-20100215-16-4thmnbs_en.html

MNBS WS, April 2011, Mondragon, ES:

cordis.europa.eu/fp7/ict/micro-nanosystems/events-2011-5thmnbs_en.html

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