Components & Systems in FP7 ICT Workprogramme 2007-08

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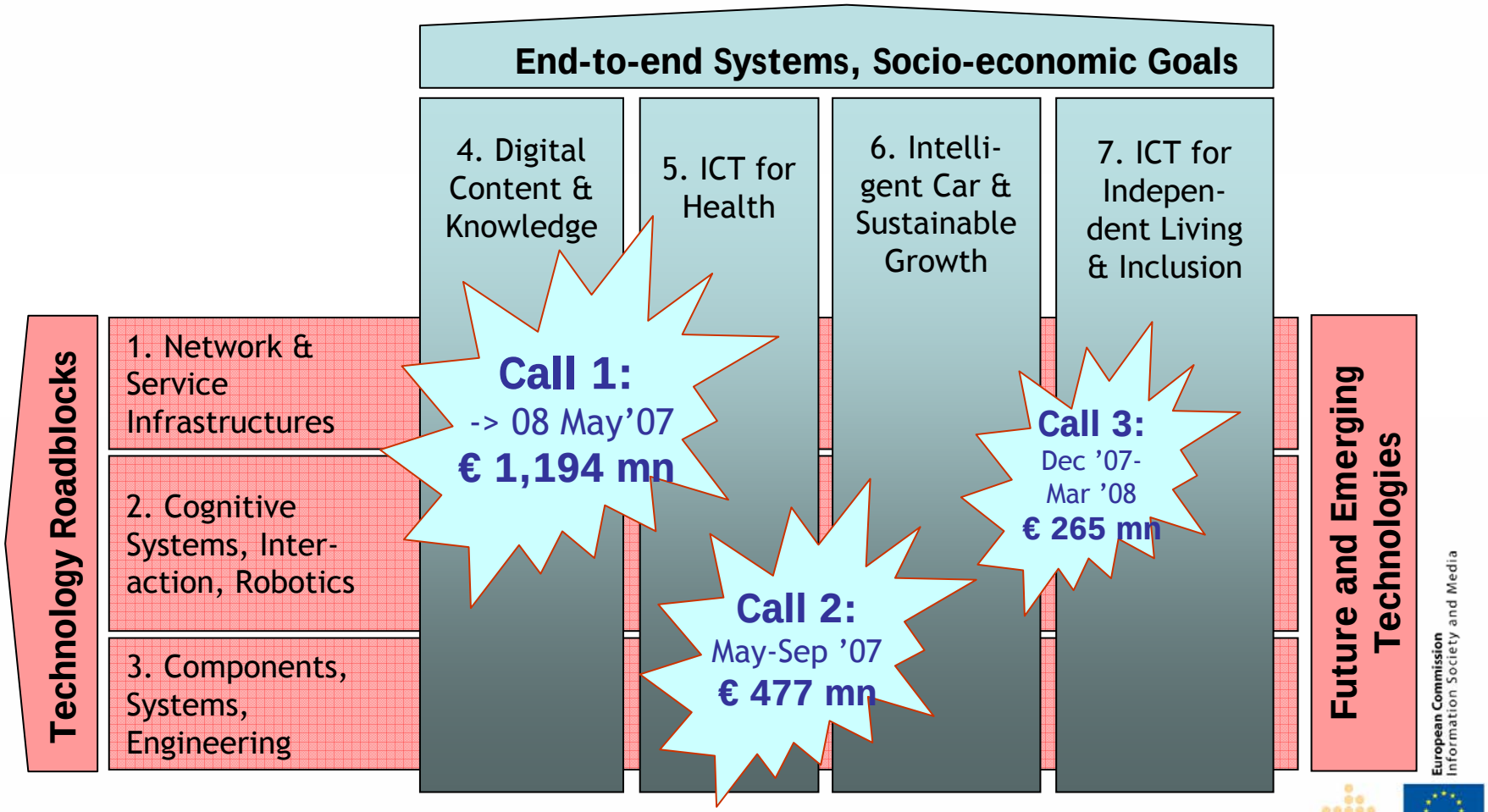
European Commission, Brussels

Presentation Outline

- FP7 ICT Workprogramme 2007-08
- Nano-electronics, Photonics, etc.
- Calls for Proposals
- Info & Contacts

ICT Work **Programme** 2007-08



Objectives addressing Challenge 1

Pervasive & trusted network & service infrastructures

Call 1

- The network of the future (€ 200 mn)
  - Mobile, broadband … spectrum-efficient, high-speed
- Service & software architectures, infrastructures & engineering (€ 120 mn)
  - Tools for service development, software design, virtualisation
- ICT in support of the networked enterprise (€ 30 mn)
  - Enterprise interoperability, RFID applications
- Secure, dependable and trusted infrastructures (€ 90 mn)
  - Resilience in networks, trust in services, identity, privacy
- Networked media (€ 85 mn)
  - Multimedia networks, platforms, services

Budget:
€ 585 mn
(+ € 20 mn Security)

Call 2

- New paradigms & experimental facilities (€ 40 mn)
  - Advanced networking architectures, interconnected testbeds
- Critical infrastructure protection (€ 20 + 20 mn from Security)
  - Secure, resilient, always available information infrastructures …

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Objective addressing Challenge 2
Cognitive systems, Interaction, Robotics

Call 1 + Call 3

- engineering principles for intelligent, integrated systems
- robots/agents that operate autonomously
- human-machine interaction based on sensor data & human language

Budget:
€ 193 mn

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Objectives addressing Challenge 3 Components, Systems, Engineering

Call 1

- Next-generation nanoelectronics components & electronics integration (€ 86 mn)
  - More Moore, More than Moore: SoC/SiP, beyond CMOS, …
- Organic & large-area electronics & display systems (€ 63 mn)
  - For logic, memory & light-emitting functions, visualisation systems
- Embedded systems design (€ 40 mn)
  - Design methods, integrated tool chains
- Computing systems (€ 25 mn)
  - Architectures for multi-core computing system, for embedded platforms

Budget:
€ 434 mn

Call 2

- Photonic components & subsystems (€ 90 mn)
  - Core & application-specific components/subsystems
- Micro/nanosystems (€ 83 mn)
  - Smart systems, nano/bio/ICT, smart fabrics, memory systems
- Networked embedded and control systems (€ 47 mn)
  - Middleware platforms, cooperating objects, advanced control

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Objectives addressing Challenge 4
Digital libraries & Content

Call 1 + Call 3

- Digital libraries & technology-enhanced learning
  - large-scale libraries, preservation, adaptive & intuitive learning …
- Intelligent content & semantics
  - authoring, workflow, personalisation, semantics, knowledge …

Budget:
€ 203 mn

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Objectives addressing Challenge 5 Sustainable & Personalised healthcare

Call 1

- Personal health systems for monitoring & point-of-care diagnostics (€ 72 mn)
  - Personalised monitoring/diagnostics, chronic disease management, preventive monitoring for people at risk
- Advanced ICT for risk assessment & patient safety (€ 30 mn)
  - Computerised adverse event systems, risk prediction for large-scale events

Budget: € 174 mn

Call 2

- Virtual physiological human (€ 72 mn)
  - Patient-specific computational modelling & simulation, data integration, knowledge extraction, clinical applications/demos

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Objectives addressing Challenge 6 ICT for mobility, environmental sustainability & energy efficiency

Call 1

- ICT for the intelligent vehicles & mobility services (€ 57 mn)
  - Accident prevention,
  - Mobility services for people & goods

Budget: € 159 mn

Call 2

- ICT for cooperative systems (€ 48 mn)
  - Vehicle-to-vehicle, vehicle-to-infrastructure, field operational tests
- ICT for environmental management & energy efficiency (€ 54 mn)
  - Collaborative systems for environmental management, ICT for energy efficiency & energy neutral environments

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Objectives addressing Challenge 7
ICT for Independent living & Inclusion

Call 1

- ICT and ageing (€ 30 mn)
  - Systemic solutions for independent living & active ageing; personal autonomy, participation in society

Call 2

- Accessible & inclusive ICT (€ 43 mn)
  - Embedded generalised accessibility support, user interaction, assistive systems

Budget:
€ 73 mn

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Future and Emerging Technologies (FET) Structure & Content

- FET Open scheme (65 M€)
  - Open to any foundational ICT-related research
  - High-risk/high-potential impact
  - To shape emerging research communities & agendae
  - Coordination & international cooperation
  - Continuous submission, CP (STREP only), CSA (CA only)

- FET Pro-active initiatives (120M€)
  - Fundamental cross-cutting long-term challenges in ICT:
    1. Nano-scale ICT devices & systems (20 M€, call 1)
    2. Pervasive adaptation (20 M€, call 1)
    3. Bio-ICT convergence (20 M€, call 1)
    4. Science of complex systems for socially intelligent ICT (20 M€, call 3)
    5. Embodied intelligence (20 M€, call 3)
    6. ICT forever yours (20 M€, call 3)

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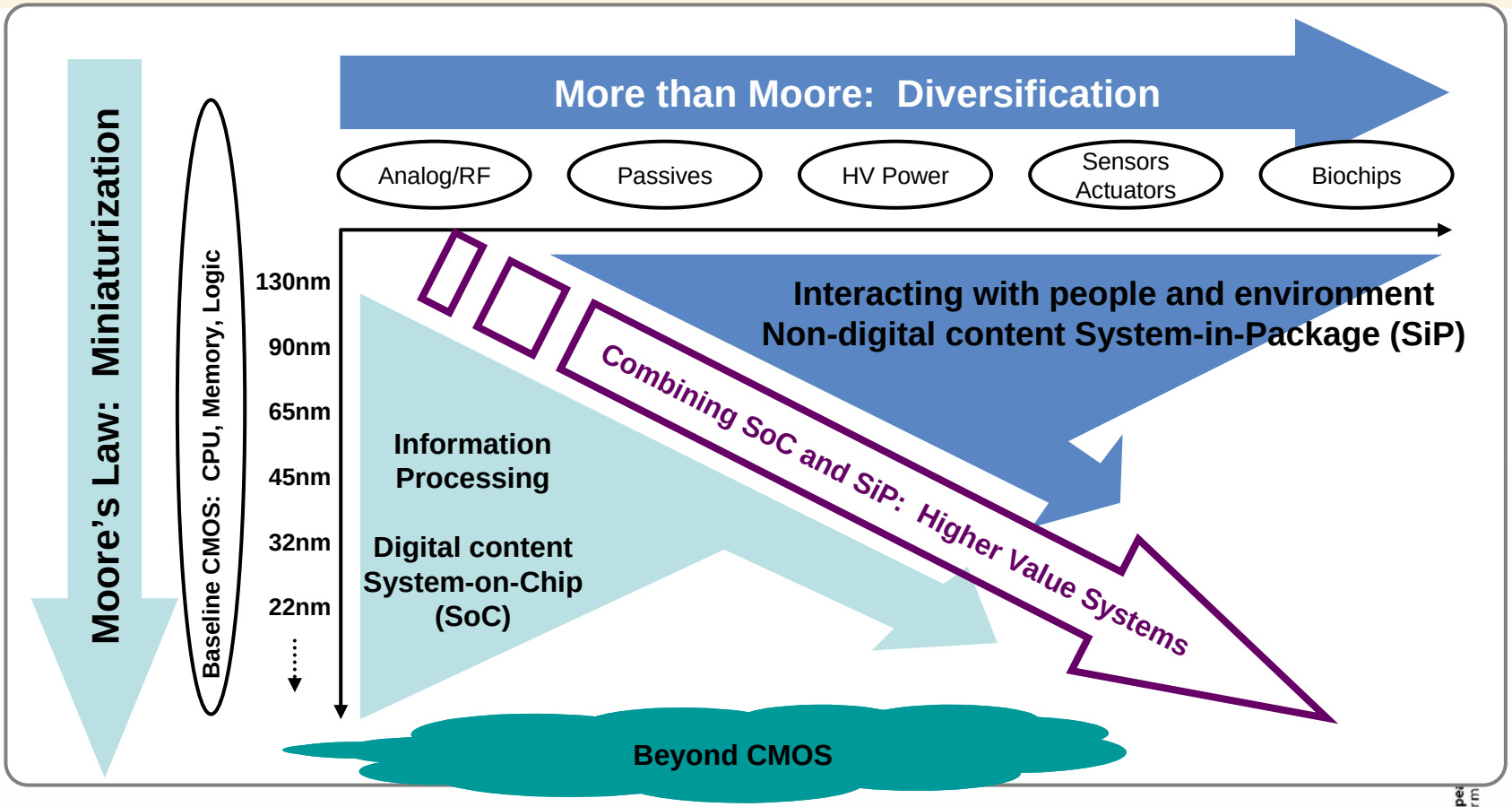
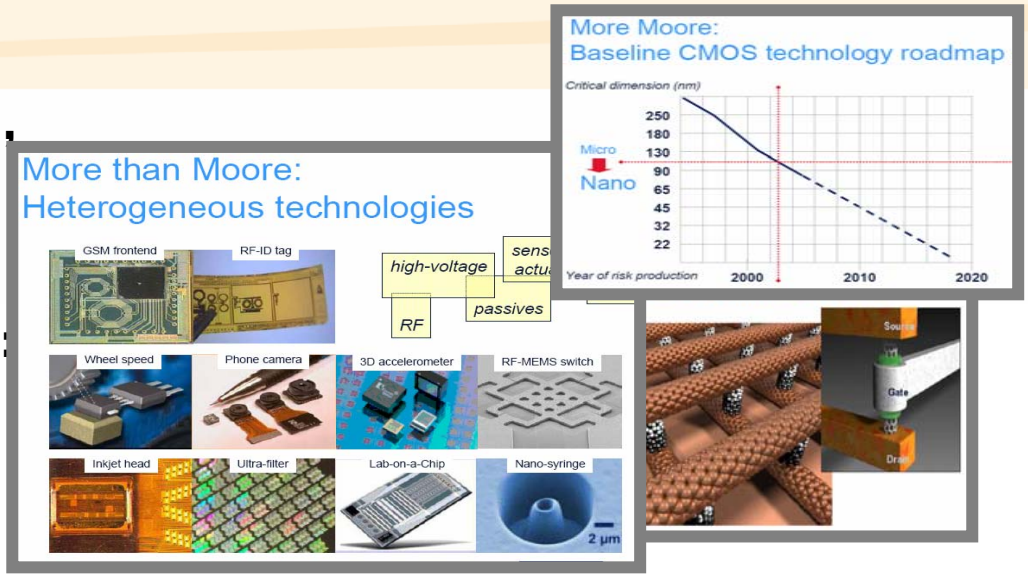
Challenge 3
European Roadmap for Nanoelectronics



Challenge 3
Nanoelectronics Components & EI. Integration

- **Smaller, higher performance, lower cost:**
  - **"More Moore"**
  - **Beyond CMOS**
- **Integration & diversification:**
  - **"More than Moore" (SoC & SiP)**



Technology

materials, processes, metrology, interconnects, modelling, packaging, architectures

Design

increased complexity, changed performance, heterogeneity in SiP & SoC, productivity & "Design for Manufacturing"

Manufacturing

Cost-efficient, flexible production for silicon < 45 nm; for SoC & SiP; 450 mm wafer size; small batch/fast cycle time; equipment assessment

Challenge 3
Nano-electronics - More Moore

- **Main issues at stake:**
  - **increasing process variability**
  - **physical and reliability limitations of devices and interconnects**
  - **new circuit architectures**
  - **characterisation methods and techniques**

Main issues to be addressed:

- **Nano-electronics process technology, materials, basic devices, interconnect structures and metrology (< 32 nm node)**
- **Tools for modelling and simulation for CMOS** (Electrical, thermal and mechanical behaviour, reliability, testability, manufacturability and power consumption of the components)
- **Support for design of chip complexity of billions of transistors**
- **Account for the increased process variability & reliability, DfM**
- **Increase in design productivity (IP reuse, programmable chip architectures,…)**

Challenge 3
Nano-electronics - More than Moore

Issues at stake:

- **SoC: Integration of RF, high power, high voltage, high speed and interface technologies**
- **SiP: integration of different types of chips and devices in a single package or compact subsystem**

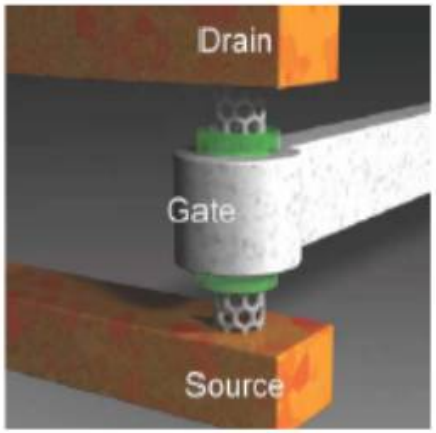
Main issues to be addressed:

- **Process technology, materials, devices, interconnect structures**
- **Tools for modelling and simulation for SoC and SiP**
- **Electrical, thermal and mechanical behaviour, reliability, testability, manufacturability, power consumption of the components**
- **Wafer level packaging, assembly technology, integration of passives and 3D packaging.**

- **Increase in design productivity: IP reuse; chip architectures**
- **Platforms for *SoC* and *SiP* supporting a heterogeneous, global, comprehensive performance simulation**
- **SoC and SiP system design solutions from formal application specification down to physical implementation**

Challenge 3
Nano-electronics - Beyond CMOS

- **Only a few technology generations left for devices based on FET principle?**
- **Advanced technologies and functional devices beyond the traditional ITRS shrink path**
- **New non-FET based logic and memories, and their possible integration with CMOS**
- **Demo of system and integration capability, manufacturability**



Challenge 3
Photonics

Expected Outcome:

a) Core photonic components and subsystems

(Certain kinds of lasers, solid state light sources, optical fibres, image sensors and other sensors)

b) Application-specific photonic components and subsystems

(for certain kinds of applications in broadband networks, medical diagnosis and prevention, and sensing)

Work on components covers also related materials, fabrication technologies and system concepts

Challenge 3
Photonics

Expected Outcome:

c) Underlying Technologies:

- Integration and manufacturing technologies
  (holistic approaches for producing photonic components and subsystems)
- Design methodologies and tools
  (holistic approaches for designing photonic components)

d) Complementary measures

- Assessment actions to promote European suppliers
- Networking, integration and structuring of R&D

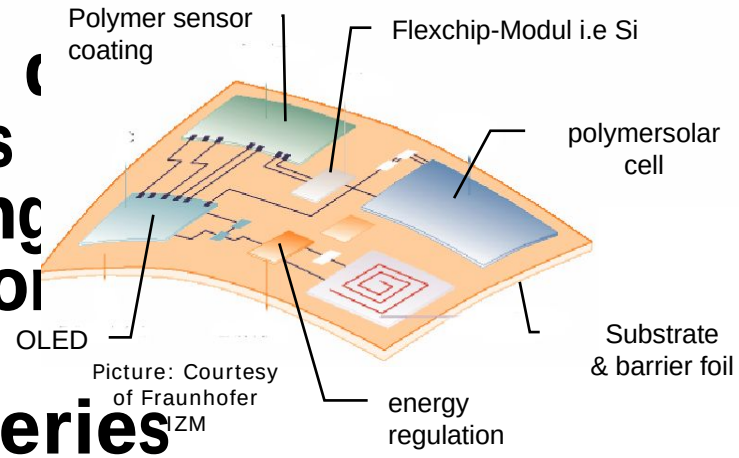
e) Support measures

- To give access to advanced technologies
- To stimulate photonics education
- To support the development of R&D strategies

Challenge 3:
Organic and Large Area Electronics

Expected applications

- e-paper, flexible d
- smart tags, RFIDs
- Intelligent lighting
- Bio-sensors, lab o
- System in foil
- Sheet PVs & batteries



Picture: Courtesy of Fraunhofer IZM

Picture: Courtesy of Plastic Logic Ltd

Support measures

- Access to competence & infrastructures
- Training & education
- Joint user assessment of prototype equipment
- Develop synergies between the electronic equipment, material & printing industries

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Challenge 3:
Visualisation & Display Systems

Expected Outcome

- 3-D: **Unrestricted visualisation, & representation**
- **User interaction**
- **Extended performance**
- **Display systems for new portable applications**

Areas of activity

- **Multi-viewer, pseudo-holographic 3D displays,**
  3D signal acquisition and processing
- **Extended colour & brightness**
- **Zero-power µ-projectors, foldable/transparent, virtual displays,**

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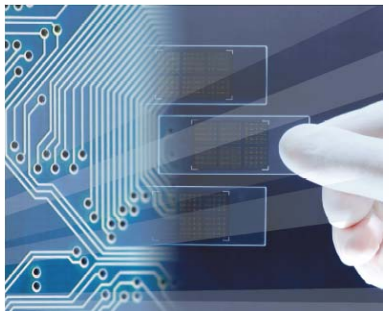
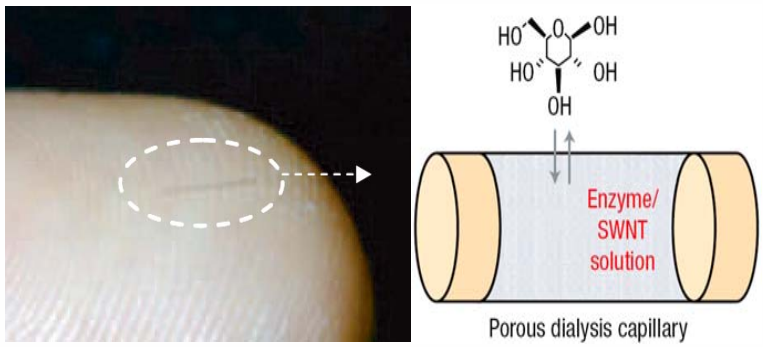
Challenge 3:
Micro-/Nano-Systems

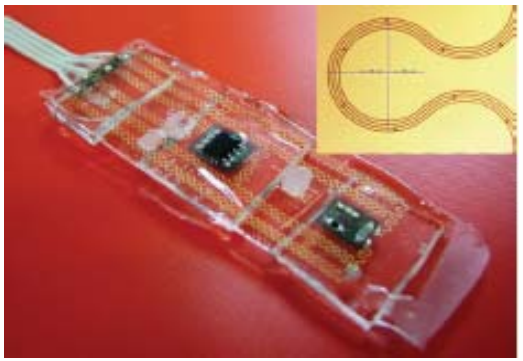
Expected Outcome

- **Next generation smart systems**
  Sensor- & actuator-based systems, high density mass storage
- **Micro/Nano-Bio-ICT convergence**
  Biosensors, lab-on-a-chip, bioMEMS, autonomous implants
- **Integration of smart materials**
  Integration of micro-nano technologies and smart systems into new & traditional materials, e.g. textiles, glass, paper



Courtesy INTELLIDRUG





Courtesy STELLA

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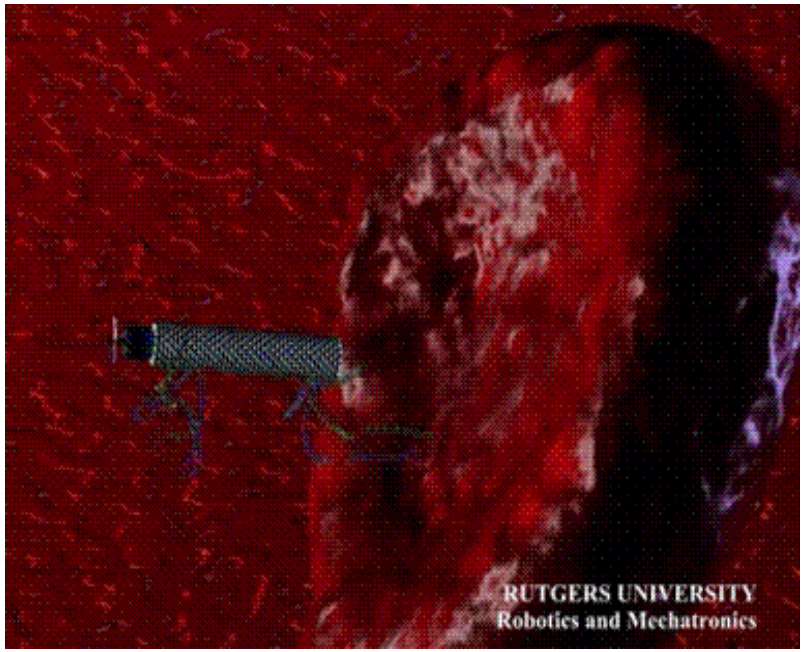
Challenge 3
Micro-/Nano-Systems

A VISION:
communication of **nanodevices**
with each other $\Rightarrow$ **nanorobots**

I_{max} ~ 10^9 bits/sec bandwidth requirement

Anticipated 1-1000 pW power budget of typical in vivo medical nanodevices.

Nanorobots: still far away



Animation showing how a nano-robot could travel inside the body and destroy harmful cells.
http://www.coasttocoastam.com/shows/2004/12/04.html

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Overview of Calls: ICT Call 1

Call 1:
-> 08 May '07
€ 1,194 mn
+ FET Open

Challenge **1**	**Budget [mn €]**
The network of the future	200
Service & software architectures, infrastructures & engineering	120
ICT in support of the networked enterprise	30
Secure, dependable & trusted infrastructures	90
Networked media	85
Challenge **2**	
Cognitive systems, interaction, robotics	96
Challenge **3**	
Next generation nanoelectronics components & electronics integr.	86
Organic & large-area electronics & display systems	63
Embedded systems design	40
Computing systems	25

Challenge **4**	**Budget [mn €]**
Digital libraries & technology-enhanced learning	52
Intelligent content & semantics	51
Challenge **5**	
Personal health systems for monitoring & point-of-care diagnostics	72
Advanced ICT for risk assessment & patient safety	30
Challenge **6**	
ICT for intelligent vehicles & mobility services	57
Challenge **7**	
ICT & ageing	30
FET Pro-active (nano-scale ICT devices & systems; pervasive adaptation; bio-ICT convergence)	**60**
Horizontal support actions	**7**
FET-Open	**65**

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Overview of Calls: ICT Calls 2 + 3

Challenge **1**	**Budget [mn €]**
New paradigms & experimental facilities	40
Challenge **3**	
Photonic components & subsystems	90
Micro/nanosystems	83
Networked embedded & control systems	47
Challenge **5**	
Virtual physiological human	72
Challenge **6**	
ICT for cooperative systems	48
ICT for environmental management & energy efficiency	54
Challenge **7**	
Accessible & inclusive ICT	43

Call 2:
May-Sep '07
€ 477 mn

Challenge **2**	**Budget [mn €]**
Cognitive systems, interaction, robotics	97
Challenge **4**	
Digital libraries & technology-enhanced learning	50
Intelligent content & semantics	50
FET Pro-active (Science of complex systems for socially intelligent ICT; embodied intelligence; ICT forever yours)	60
Horizontal support actions	8

Call 3:
Dec '07-
Mar '08
€ 265 mn

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Thank you

Information & Contacts

European research on the web:

http://cordis.europa.eu
http://cordis.europa.eu/fp7
http://ec.europa.eu/comm/research/future/
http://ec.europa.eu/ims

Information Society and Media:

http://ec.europa.eu/information_society/
http://cordis.europa.eu/fp7/ict

Calls:

http://cordis.europa.eu/fp7/dc

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