• Smart Systems: Activities under FP6 (2003-2006)
• Lisbon agenda and European Technology Platforms
• The 7th Framework Programme (2007-2013)
  ▪ ICT Work Programme 2007-08 - Challenge 3
Smart Systems

Miniaturised systems able to sense, diagnose, describe and qualify a given situation. Able to interact with their environment and other smart systems.

Interdisciplinarity
Convergence (nano, ICT, bio)
Heterogeneity
Multifunctionality
Integration
Microsystems in FP6 (2003-2006):
Thematic areas covered

- **Micro/Nano-bio ICT.**
  Biosensors, lab-on-chip, DNA & protein analysis chips, food safety & quality monitoring, implants, drug delivery, medical imaging

- **Sensor-based systems and Storage.**
  Integrated sensor systems, MEMS, handling of nano-objects, mass storage

- **Organic/Large area electronics and Displays.**
  Organic electronics, flexible electronic systems, flexible displays, large-area applications

- **Systems for Ambient Intelligence (AmI).**
  Mobile phone based platforms, networked multisensors system for elderly people, smart textiles, biosensing textiles

- **Manufacturing and Process integration.**
  Microsystems manufacturing technologies from design to packaging testing and reliability

- **Smart fabrics and interactive textile.**
  Integration of advanced fibres and materials at the fibre core. E-textiles

- **Support and coordination actions.**
  Networking, roadmaps
Projects per thematic area (FP6 2003-2006)

- **Micro/Nano-bio ICT**
  - 24 projects (6 IPs)
  - € 101 mn

- **Sensor-based Systems • Storage**
  - 10+4 projects (2+1 IPs, 2 NoEs)
  - € 55 mn

- **Organic Electronics • Displays**
  - 11 projects (4 IPs)
  - € 54 mn

- **Aml**
  - 5 projects (3 IPs, 1 NoE)
  - € 35 mn

- **Mfg./Process integr.**
  - 10 projects (3 IPs, 1 NoE)
  - € 31 mn

- **Smart textiles**
  - 8 projects (4 IPs)
  - € 47 mn

- **Support & Coordination**
  - 11 projects
  - € 6 mn

In total € 301 mn
Presentation outline

- Smart Systems: Activities under FP6 (2003-2006)
- The renewed Lisbon Agenda and the ETPs
- The 7th Framework Programme (2007-2013)
  - ICT Work Programme 2007-08 - Challenge 3
The renewed Lisbon agenda

- **Markets & Competition**: Europe - A more attractive place to invest & work
  - Extend & deepen the internal market
  - Improve European and national regulation
  - Ensure open & competitive markets inside & outside Europe
  - Expand & improve European infrastructure

- **Knowledge & innovation** for growth
  - Increase & improve investment in R&D
  - Facilitate innovation & uptake of ICT & the sustainable use of resources
  - Contribute to a strong European industrial base

- **Employment & Skills**: Creating more & better jobs
  - Attract more people into employment & modernise social protection systems
  - Improve the adaptability of workers & enterprises & the flexibility of labour markets
  - Invest more in human capital through better education & skills
European Strategy for RTD and Innovation
The implementation mechanisms

• European Research Area
  “Internal market in research, restructure of research fabric, research policy”

• Framework Programme - IP, NoE, STREP, JTI, …..
  “Master and shape RTD in ICT and related applications”

• Technology Platforms as a gateway to Strategic Research Agendas and Joint European Technology Initiatives
  “Industry led Forum involving main public and private stakeholders (industry, research, finance, public bodies) to address technological and related challenges”

• CIP: Competitity and Innovation Programme
  “ICT policy support programme to ensure uptake and best use”

• National Programs, Regional Policies,

• EUREKA
A spiral model of innovation capitalising on the multiple reciprocal relationships between public & private stakeholders at various knowledge stages

European Technology Platforms

• Addressing major technological challenges in specific domains
• Aiming to leverage public & private investment for R&D & innovation
• Involving key R&D stakeholders
  – eg industry, the research community & public authorities
• Bundling fragmented R&D efforts towards agreed goals
  – Vision 2020 document & Strategic Research Agenda

31 European Technology Platforms launched so far (9 in ICT):

cordis.europa.eu/technology-platforms
European Technology Platforms.
A staged approach

Stakeholders, led by industry, come together to agree a common vision for the technology.

- Bottom-up process with key stakeholders in a specific domain
- Key deliverable: Strategic vision document

Stakeholders, define a Strategic Research Agenda setting out the necessary medium to long-term objectives for the technology.

- Co-ordinated by an Advisory Council
- Consensus-based
- Deployment strategy

Stakeholders, implement the Strategic Research Agenda with the mobilisation of significant human and financial resources.

- Through collaborative research in FP7 & with other resources, or
- Through a Joint Technology Initiative which integrates funding sources
Nanoelectronics:
addressing the needs of silicon-based technologies & beyond
- shrinking of CMOS logic & memory devices
- development of value-added functions for system-on-chip or system-in-package solutions
- equipment & materials
- design automation

Embedded Computing Systems:
ubiquitous, interoperable & cost-effective embedded systems
- reference designs and architectures
- middleware for interoperability and seamless connectivity
- integrated design software tools for rapid development & prototyping

eniac.eu

PARADES
artemis-office.org
A multi-disciplinary endeavour:
Combining optics, mechanics, electronics, fluidics, thermodynamics, chemistry, biology

Converging scientific disciplines:
Looking at the overlapping areas between nano-, bio-, information & cognitive sciences

Multi-material integration:
Semiconductors, polymers (plastics), ceramics, glass, ...

Multi-technology integration:
Monolithic, hybrid, multichip, large-area, ... miniaturisation techniques

Multi-functional integration:
Combining sensing, processing, actuating

Technology Platform of Systems Integration: EPoSS

smart-systems-integration.org
Other ICT Technology Platforms

To boost the development of robotics business & bring robotics services to Europe’s citizens

New software & services architecture based on open standards

To reinforce Europe’s world leadership in mobile & wireless communications & services

To explore the almost limitless applications of light for ICT, lighting, manufacturing and health applications

Convergence of existing and new media technologies creating advanced personalised services

An integral Satcom initiative covering all aspects of satellite communications
Presentation outline

- Smart Systems: Activities under FP6 (2003-2006)
- Lisbon agenda and European Technology Platforms
- The 7th Framework Programme (2007-2013)
  - ICT Work Programme 2007-08 - Challenge 3
FP7 Specific Programmes
budget agreement (Nov 2006)

“Cooperation”
Collaborative R&D, pre-defined themes, JTIs

“Ideas”
Frontier research, competition, individual grants

“People”
Human potential, mobility

“Capacities”
Infrastructure, SMEs, science and society

Joint Research Centre (non-nuclear)

EURATOM
EURATOM Programme

Total 50521 EUR million
2007-2013

32413 EUR million
7510
4750
4097
1751
2751

65 %
15 %
9 %
8 %

European Commission
Information Society and Media
## FP7 Cooperation: Themes

**Budget [EUR million], Council’s compromise, Nov 2006**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Budget</th>
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<tbody>
<tr>
<td>1. Health</td>
<td>6100</td>
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<tr>
<td>2. Food, Agriculture &amp; Biotechnology</td>
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<tr>
<td>3. Information &amp; Communication Technologies</td>
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<td>4. Nanosciences, Nanotechnologies, Materials &amp; new Production Technologies</td>
<td>3475</td>
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<td>5. Energy</td>
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<td>6. Environment (including Climate Change)</td>
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<td>7. Transport (including Aeronautics)</td>
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<tr>
<td>8. Socio-Economic Sciences &amp; the Humanities</td>
<td>623</td>
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<tr>
<td>9. Space</td>
<td>1430</td>
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<tr>
<td>10. Security</td>
<td>1400</td>
</tr>
</tbody>
</table>

Total: **32413**

- **Joint Technology Initiatives**
- **ERA-Nets**
- **International Co-operation**
ICT Theme: Main Objectives and Structure

• Work Programme structured around a limited set of “Challenges”
  - Europe to be among the world leaders in next generation ICT and their applications.

• A Challenge in the Work Programme is
  - Focused on concrete goals that require effort at Community level and where collaboration is needed
  - Ambitious and strategic proposing a European vision on ICT for the next 10 to 15 years
  - Described in terms of achievements to reach and not in terms of means to realise achievements
ICT Work Programme 2007-08

Chal-2 Network & Service Infrastructures
Chal-3 Cognitive Systems, Interaction, Robotics
Chal-4 Components, Systems, Engineering

End-to-end Systems, Socio-economic Goals
Chal-4 Digital Content & Knowledge
Chal-5 ICT for Health
Chal-6 Intelligent Car & Sustainable Growth
Chal-7 ICT for Independent Living & Inclusion

Call 1: Jan-May ’07 1194 M€
Call 2: May-Sep ’07 477 M€
Call 3: Dec ’07-Mar ’08 265 M€
Challenge 3: Components, Systems, Engineering

To enable Europe’s industry to stay at the forefront of electronics developments & applications through chip making, integration & embedded systems capabilities

www.eniac.eu
www.artemis-office.org
www.smart-systems-integration.org
www.photonics21.de

R&D objectives are in line with Strategic Research Agendas of European Technology Platforms & support international co-operation under the Intelligent Manufacturing Systems initiative

cordis.europa.eu/ims
Objectives

- **IST-2007.3.1**: Next generation nanoelectronics components and electronics integration
- **IST-2007.3.2**: Organic and large area electronics and displays
- **IST-2007.3.3**: Embedded systems design
- **IST-2007.3.4**: Computing systems
- **IST-2007.3.5**: Photonic components and subsystems
- **IST-2007.3.6**: Micro/Nanosystems
- **IST-2007.3.7**: Networked embedded and control systems

**Call 1**
(closing 8 May 07)

**Call 2**
(closing Sept 07)
Smaller, higher performance, lower cost:
- “More Moore”
- Beyond CMOS
Integration & diversification:
- SoC: Systems-on-Chip
- SiP: Systems-in-Package

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

Call 1  86 M€(*)
70 M€ CP (min 27 MC IPs and 21 MC STREPs)
8 M€ NoE
8 M€ CSA

(*) Total amounts to be confirmed after a new financing decision for the 2008 budget
IST-2007.3.2: Organic & Large-Area Electronics & Display Systems

- **Organic & large-area electronics focus:**
  New manufacturing paradigms & very low cost applications
  Enabling functions: logic, memory, RFIDs, sensing, lighting, signage, energy scavenging/storage & power management

- **Display systems focus:**
  Innovative technological approaches for:
  High performance & 3D visualisation
  Key components for new applications

Areas of activity
- Extended performance: colour space, contrast, resolution
- Unrestricted 3D viewing, user interaction
- 3D image processing for 3D rendering & display
- 3D natural scene acquisition & representation
- New technologies for low power, high information content & portable display solutions

**Call 1**
63 M€(*)
57 M€ CP (min 14 M€ IPs and 22 M€ STREPs)
3 M€ NoE
3 M€ CSA

(*) Total amounts to be confirmed after a new financing decision for the 2008 budget
**IST-2007.3.3: Embedded Systems Design**

- **Target outcomes**
  - Theory & methods for system design
    - Key issues: heterogeneity, composability, predictability & adaptivity
    - International cooperation is encouraged
  - Suites of interoperable design tools for rapid design & prototyping
    - Research will contribute to interoperability of tools from SMEs, consolidating tool developers’ joint R&D work; pen tool frameworks
  - Coordination of national, regional and EU-wide R&D programmes

- **Expected impact**
  - Increase system development productivity (at least 1 order of magnitude)
  - Stimulate growth of European high-tech companies in the field
  - Reinforce S&T leadership in complex systems engineering

**Call 1**  
40 M€(*)  
34 M€ CP (min 5 M€ IPs and 19 M€ STREPs)  
4.5 M€ NoE  
1.5 M€ CSA

(*) Total amounts to be confirmed after a new financing decision for the 2008 budget
IST-2007.3.4: Computing systems

• **Target outcomes**
  - Novel architectures for multi-core computing systems
    - Architectures & system software for scalable & customisable on-chip computing systems incorporating multiple networked, symmetric or heterogeneous, fixed or reconfigurable processing elements
    - Key issues: power & performance versatility; reliability & availability
  - Reference architectures for generic embedded platforms
    - Key issues: composability, networking, robustness/security, diagnosis/maintainability, resource management, evolvability & self-organisation

• **Expected impact**
  - Inexpensive generic platforms with high European added value enabling European supplier companies to increase market share
  - Develop European competences in the use of high-end computing for the development of new applications
  - European excellence in computing architectures, system software & platforms

**Call 1** 25 M€(*)
20 M€ CP (only STREPs)
5 M€ NoE

(*) Total amounts to be confirmed after a new financing decision for the 2008 budget
**IST-2007.3.5: Photonic Components & Subsystems**

**Components & Subsystems**
- Lasers & solid-state sources
- Image sensors
- New sensors

**Application specific**
- Broadband core networks
- Broadband access & LAN
- Medical diagnosis & prevention
- Sensors for environment, safety & security applications

**Underlying technologies**

**Integration**

**Manufacturing**

**Design methodology & tools**

**Complementary Measures**
- Assessment of prototypes
- Networking, integration & structuring

**Support measures**
- **Call 2** 90 M€(*)
- 76 M€ CP (min 26 M€ IPs and 30 M€ STREPs)
- 9 M€ NoE
- 5 M€ CSA

(*) Total amounts to be confirmed after a new financing decision for the 2008 budget
**IST-2007.3.6: Micro/Nanosystems**

- **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

- **From smart systems to viable products**
  - Microsystems manufacturing technologies

- **Smart systems for communications & data management**
  - Smart micro/nanosystems enabling wireless access & facilitating intelligent networking

- **Support actions**
  - Technology access, education & training, coordination & dissemination at EU level

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**Call 2**

83 M€(*)

75 M€ CP (min 20 M€ IPs and 32 M€ STREPs)

4 M€ NoE

4 M€ CSA

(*) Total amounts to be confirmed after a new financing decision for the 2008 budget
**IST-2007.3.7: Networked Embedded & Control Systems**

- **Target outcomes**
  - Middleware platforms for embedded systems
    - Key issues: composability, minimum power consumption, openness
    - Emphasis: programmability, reconfiguration, privacy & trust
  - Cooperating objects and Wireless Sensor Networks
    - Spontaneous cooperation of objects in spatial proximity
    - Emphasis on new methods & algorithms, hardware/software platforms for distributed execution & programming & tools for self-organising systems
  - Control of large-scale complex distributed systems
    - Key issues: efficiency, robustness, safety, security
    - Applications: manufacturing plants, infrastructures

- **Expected impact**
  - Enable entirely new services & applications
  - Make large infrastructures more efficient, flexible & productive
  - 100% plant availability, reduce maintenance & accidents

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**Call 2**  
47 M€(*)  
41 M€ CP (only STREPs)  
4 MC NoE  
2 MC CSA  

(*) Total amounts to be confirmed after a new financing decision for the 2008 budget
Thank you! ...

- European research on the web:
  - http://cordis.europa.eu

- Information Society and Media:
  - http://ec.europa.eu/information_society/

- Contact:
  - Rosalie.zobel@ec.europa.eu