



Perspectives In the 6th Framework Programme



Embedded Systems

Rolf.Riemenschneider@cec.eu.int

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Outline

- IST innovation 2010
 - Challenges and Drivers
 - Co-operating Objects

- Preparing for the future
 - Workprogramme 2005/2006
 - Framework Programme 7





IST Innovation

Intelligent products



Mobile communications



Consumer goods



Cars



Industrial production



Airplanes

Integrated devices

Implantable health monitoring device



Microarray printhead



Lab-on-chip

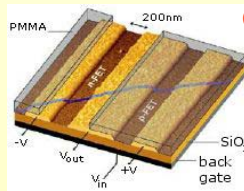


Micro/Nano building blocks

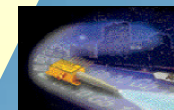
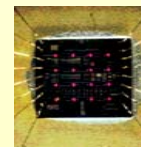
Nano-MOS



new semiconductor devices



photonic devices





IST Framework Programme FP6

- **Contribute to the Ambient Intelligence vision.**
 - Bring the “people” to the foreground, and
 - Build technologies for the background which are trustful and embedded in every day objects, systems
 - Services with context-awareness
 - Multi-sensorial interfaces supported by computing and networking
- Concept of **person-centric** spaces & networks.





Smarts spaces & networks

Environment

The shell

Instant Partners

Person centric





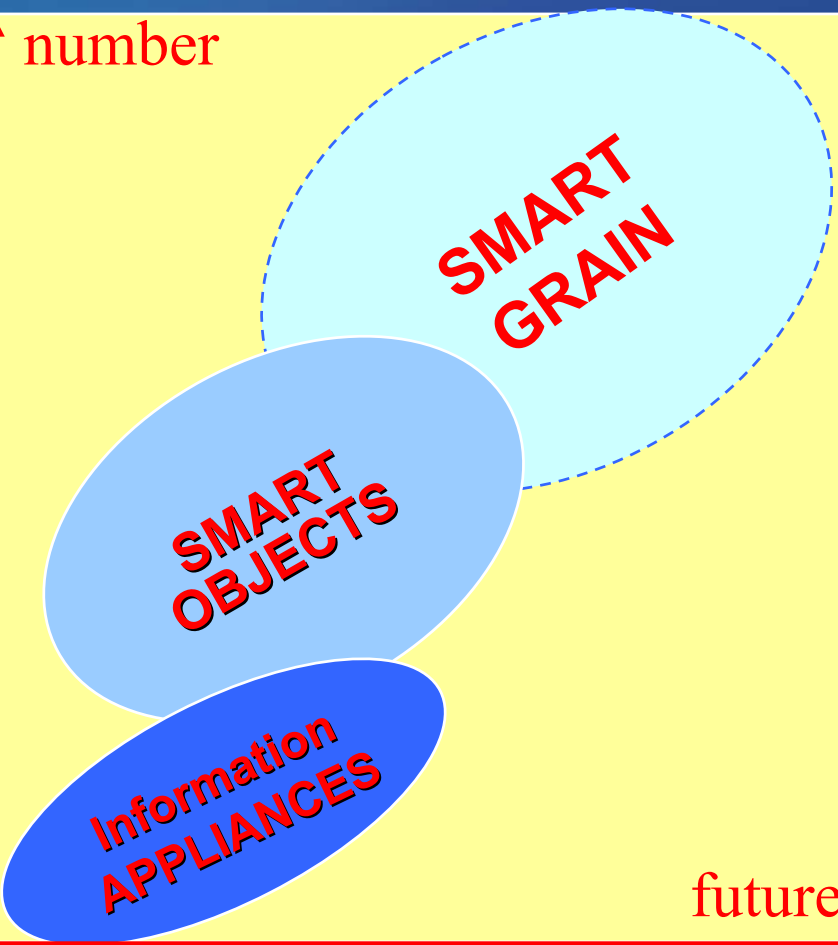
Technology Trends

Programmability

COMPLEXITY

DATA RATE

number



future

● Trends

- towards miniaturized, networked systems
- seamless integration
- *Anywhere/anything:* 8bn controller, 3-5bn sensors, 0,6 bn DSPs

● COMPLEXITY

- Increasing in number
- Decreasing in size
- Pervasive penetration in nearly every area

⇒ towards **COOPERATING OBJECTS**





Cooperating Objects

So What??

You wanna see something really cool ?



- **WSN Approach**

- measuring, monitoring a variety of physical parameters
- gathering, aggregating, interpreting, distributing data
- communicating to a legacy network
- reliable, user-friendly end-to-end services

⇒ *towards* **a device-centric** *approach*





Co-operating Objects

- **Systems of cooperating objects:**
 - **Platforms** that can “glue” together diverse (physical) objects to enable seamless environments for computing, communication and service delivery
 - **Objects:** encapsulating entities, mixing HW and SW in any proportion and at any level of complexity: an object may be as simple as a sensor or as complex as a car or plane
- **Wireless Sensor Networks**
 - **Wireless Sensing Networks** are a subset of these systems
 - vast number of distributed, embedded devices
 - *Networks* that coordinate to perform higher-task level with very limited resources
 - *Services* in terms of sensing, location, alarming, etc..





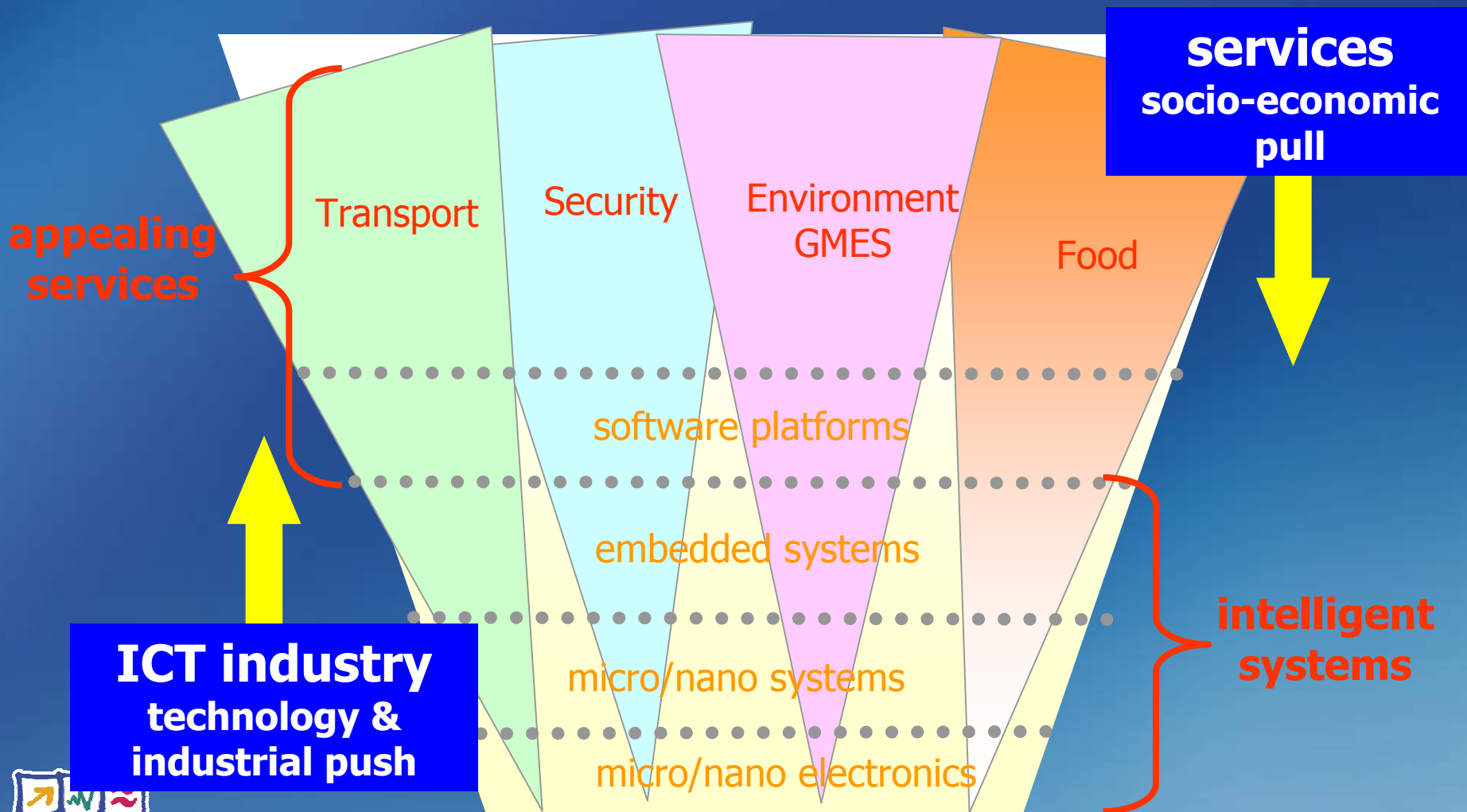
Applications of WSNs

- Applications that are
 - time-consuming, dangerous, expensive on a wide scale, difficult to perform, frequently changing, ...
 - *Niche markets* as early adopters ?!?
- Applications for environments with many physical processes :
 - Personal health & fitness, home security, assisted living
 - Climate / light control, building automation & maintenance, factory floor automation, facility management
 - Transport safety, environment monitoring, security
 - **GMES** – *Global Monitoring Environment Security*





IST Innovation 2010





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Research in IST -- Today

- **5th Framework programme (FP5) projects in the area *Information, Communication & Computing***
 - very few on WSN, low industry participation
 - **6th Framework programme (FP6) projects in the area **Networked Embedded Systems****
 - a few IPs and Streps related to WSN
 - fragmented, distributed over Strategic Objectives
 - **FP6 2nd call (SO Embedded Systems)**
 - oversubscribed (111 proposals requesting ~ 400 M€, budget 57 M€)
 - probably 4-6 Integrated Projects and Networks of Excellence and ~ 8 -10 other projects
 - ~ 4 proposals in the wider area of WSN
- *emerging domain*





Embedded Systems in IST: WP2005/06

- **Ambient Intelligence & Embedded Systems**
- **Two key areas (tentative)**
 - Embedded system design
 - **Co-operating objects**
 - *What long-term objectives ? What killer application ? Who should be involved ? How to leverage funding ? Are key players committed ?*
- **ERA & technology platforms**
- **International co-operation**





Co-operating Objects

- 1st consultation meeting with experts on 12/09/03
- Brainstorming meeting on IST 2003 conference in Milan 02/10/03
- Workprogramme 2005-2006
 - Consultation Workshop - Co-operating Objects
 - 24 March 2004, Brussels
 - Wireless Sensor Networks as a building block
- Publication of call 4 (*tentative*) in Dec. 2004





tentative Budget and Call Planning

| Year | 2003 | 2004 | 2005 | 2006 |
|-------------------|---|--|------------|------------|
| Indicative Budget | 835 M Euro | 891 M Euro | 935 M Euro | 964 M Euro |
| Calls | Calls 1 & 2 drawing on 2003 and 2004 budgets | Call 3 drawing on 2005 budget | TBD | TBD |

WP 2003-4

- Call 1 open 17/12 '02, deadline 24/4 '03
- Call 2 open 15/6 '03, deadline 17/10 '03
- Call 3 open April '2004, deadline Sep'04
- Call 4 open 12/2004, deadline ???

WP 2005-6





Research in Embedded Systems

Future (long-term)

- **7th Framework programme**

- Initial discussion started with Industry and Member states, IST internal
 - key issue: **European Research Area**

- **Embedded Systems Technology Platform**

- Collaboration initiative at technical, non technical and governance level
 - Led by industry, started by Commissioner E. Liikanen Jan. 2004
 - core issue: **public -- private -- partnership**

- **Collaborative R&D funding scheme**

- Known procedure for R&D proposal call, evaluation, funding

 **Top-down** // **bottom-up** *approach* 





AOB - sources of information

- Sources of information

- **IST on Cordis**

- <http://www.cordis.lu/IST/>

- **Embedded System's URL :**

- http://www.cordis.lu/IST/Directorate_C/EMS

- **Special SME Tool** vendor questionnaire

- **Continuous web based consultation**

- *ITERATIVE APPROACH* for WP2005/06

- **Any Questions:**

- Rolf.Riemenschneider@CEC.EU.INT



IST helpdesk

Fax : +32 2 296 83 88

E-Mail : ist@cec.eu.int

