

ICT in Framework Programme 7 (2007-2013) and International Cooperation



EU-US Workshop on Wirelessly Networked Embedded Systems
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Unit INFSO G3: Embedded Systems and Control

Disclaimer

This note expresses the views of the author and does not necessarily represent any official position of the European Commission

APPLICATION(S)

(domain specific knowledge and models)

Real-world Systems

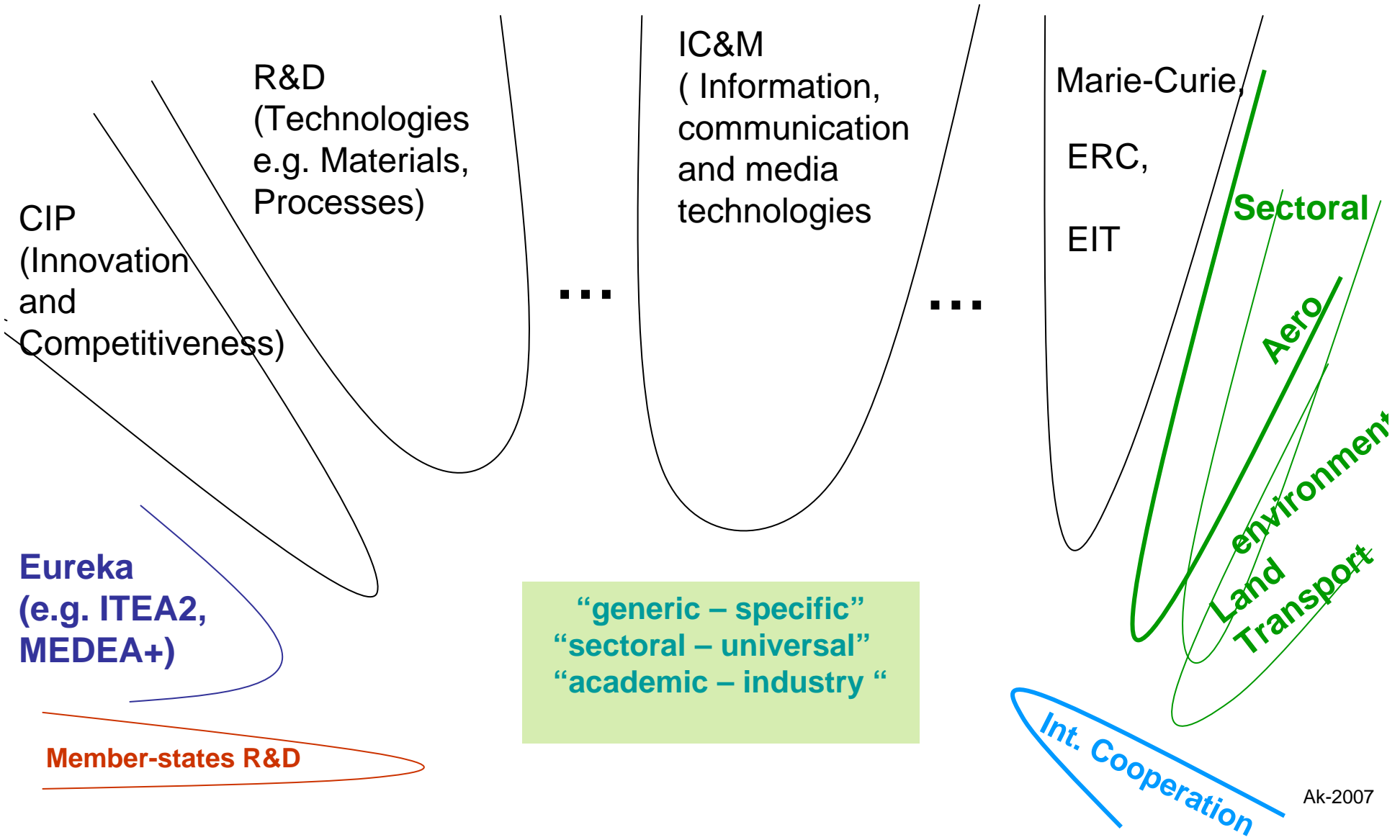
Implementation :

- Chip sets, IPs
- H/w platforms, architectures
- Real time systems, s/w
- Timing aspects
- Communications,
- Protocols,
- Algorithms
- Design methods, ,models
- Tools
- Integration
- V&V&T

Concepts, analysis, synthesis and solution specifications

- Control, AI, and other theories,
- ALGORITHMS,
- DESIGN METHODS,
- MODELING
- STRATEGIES
- Technologies
- INTEGRATION
- V&V&T

Multi-layered R&D scene : EC examples



Example 1
Automatic Braking

1978 ABS on the market
~1986 TCS
~1995 Electronic Stability Control
~2000 Production level ESC
2007 Mandatory ESC in all cars ?

Audi: Electronic Stability Program (ESP).
BMW: Dynamic Stability Control (DSC).
Jaguar: Dynamic Stability Management (DSM).
Lexus: Vehicle Skid Control (VSC)
Porsche: Porsche Stability Management (PSM).
Volkswagen: Electronic Stability Program (ESP).
Volvo: Dynamic Stability Traction Control (DTSC).

- Practically no further EC research support for ESC
- Industry does improvements on their own and the EC strongly supports e-safety related policies

Example 2 : Fast trains in Europe

574 km/h Test
France, April 2007

Communications

Drives

Control

several innovations

Challenges from
communication
points of view :
*Internet access for
passengers
at 500Km/h*

Examples of European R&D Roadmaps

Road-mapping

Embedded systems roadmap, 2005
Springer Verlag
Bruno Bouysounouse, J.Sifakis

Wireless sensor networks roadmap, 2006
<http://www.cobis-online.de/>

Embedded wireless sensors roadmap, 2006
www.embedded-wisenets.org

Roadmap for complex systems, March 2006,
P.Bourgine, J Johnson, www.once-cs.net

High performance computing roadmap
www.HipEAC.net/roadmap, 2007

Link US, EU
and other
Roadmaps ?

Can the EU and US match with the *Japanese Roadmaps for 2050* ?

Reminder : FP7 (2007-2013) Structure & budget

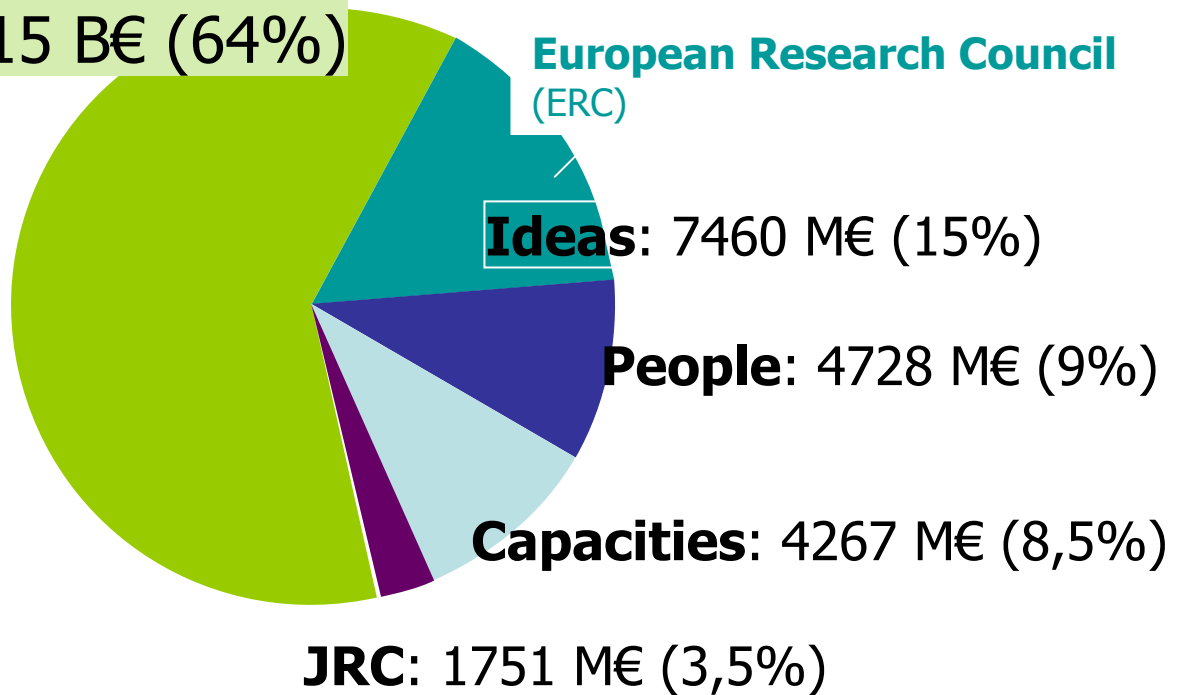
Total FP7 Budget: 50,521 B€

Cooperation: 32,315 B€ (64%)

ICT: 9,120 B€ (28%)
~1.3 B€/year

including

JTIs(Joint Undertakings)
and Technology
Platforms support



1st call received 9200 proposals
Results in Sept. 2007

- ERC : European Research Council <http://erc.europa.eu/>
- ETPs : European Technology Platforms (*total 31 in 2007*)
http://cordis.europa.eu/technology-platforms/home_en.html

Also : European Lead Markets Initiative (2007)

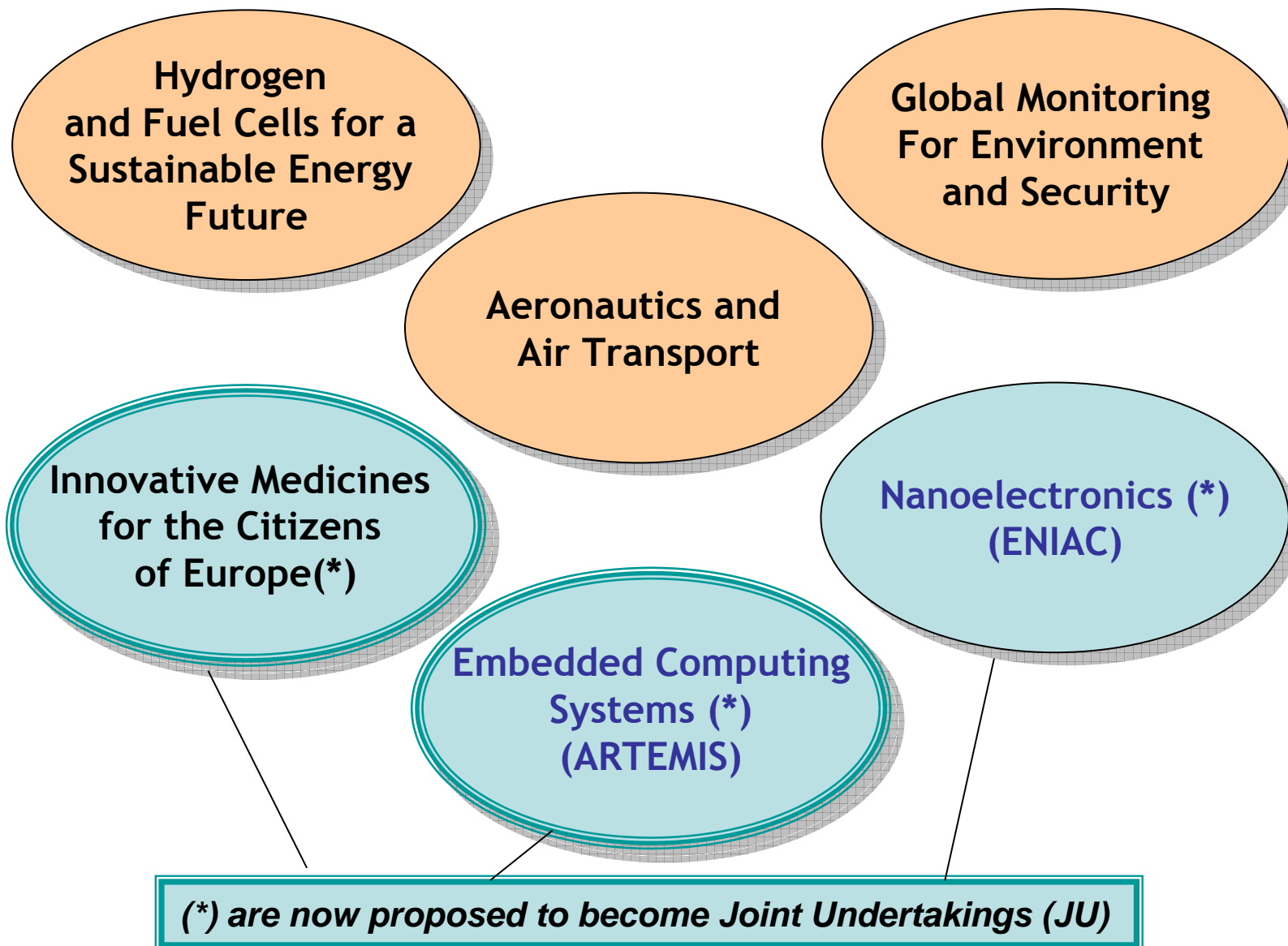
- EIT : European Institute of Technology http://ec.europa.eu/education/policies/educ/eit/index_en.htm



- www.artemis-office.org : applications for membership for ARTEMISIA



Out of 31 platforms, 6 Joint Technology Initiatives (JTIs) are proposed by the Commission (June 2007)

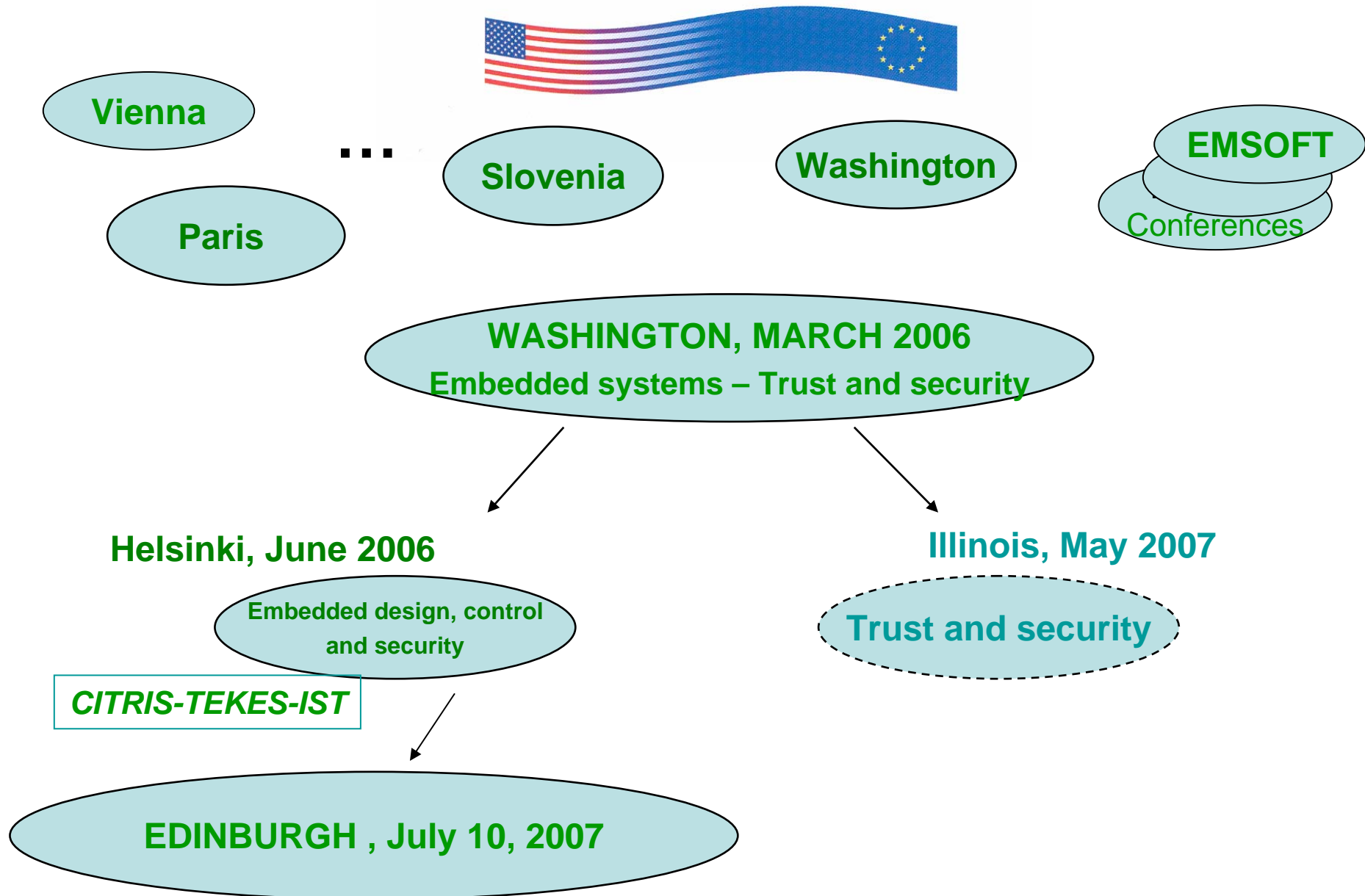


On-going Cooperation with the USA

- **Cooperation between EU (IST) ICT and NSF/CISE since late 90's (also DARPA at times and NIST*)**
- **In embedded systems and software, networked control, sensor networks, trust and security.** (Also in Nano-technologies)
- Regular joint events, reports and some linked projects.
- Significant role of UCB and CITRIS together with EU member states
- **Impact on both programmes (US, EU)**
- **We are exploring next cooperation models**

* within IMS (Intelligent Manufacturing Systems)

IST-NSF workshops (1999-2007)



EU-US : Possible next steps

- *Depending on the interest of the research communities (and industry) and the degree of support and agreement by the funding agencies :*
- Continue joint workshops and R&D recommendations
- Continue ad hoc / light project associations on a case by case basis
- Cross-participation in US / EU projects / initiatives
- Consider coordinated calls in 2009 - 2011
 - need to define **topics (or areas)** and
 - **time-synchronisation mechanisms**
- Other ideas ?

Examples of Systems related topics in FP7

- **ICT (2007-2008) (Mi Euro)**

Objectives

1. Cognitive systems/robotics (96+97) **
2. Security / trust / dependability (90) *
3. Health (72) **
4. Energy / Environment (54) **
5. Transport (Cooperative systems) (48) **
- 6. **Networked embedded & control (47)****
7. Critical Infrastructure protection (20) Jc
8. Embedded design (40) *
9. Computing (25, multi-core) *
9. Pervasive adaptation (FET) (20) *
10. Science of complex systems (20) ***

* call-1 completed

** call-2 Oct 9 2007

*** call-3 March 2008

Jc : joint call ICT-RTD

- **Outside ICT (2007-2008)**

1. Material properties (nano scale)
2. Adaptive production
3. Aeronautics, autonomy, automation
4. Networked production
5. Surface transport (rail, road, water)
6. Molecular level control systems
7. Control of fuel cycle facilities
8. Systems biology
9. FP7 People's part (Marie Curie)
10. FP7 Ideas' part (ERC, European Research Council)

WATCH OUT : EIT (European Institute of Technology)

Dilemma : Where to apply? $P_s = f(\text{area budget}, 1/N, \|\Delta\|, \text{call-time}, \text{quality}, \text{etc.})$

ICT Proposals need to :

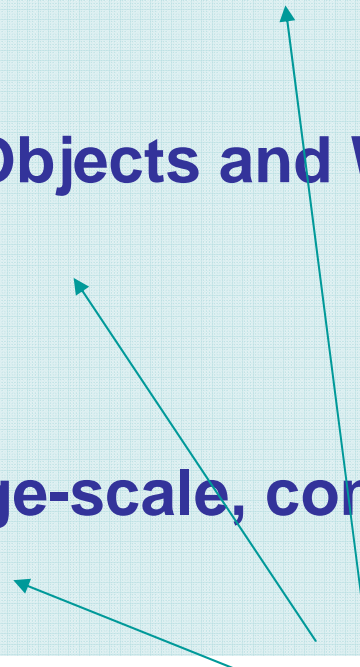
- address a **topic** from an ICT objective
- contribute to **impact(s)** stated in the call

See example from ICT call-2 in the next foils



Objective 3.7 : NETWORKED EMBEDDED AND CONTROL SYSTEMS

TOPICS

- 1) Middleware for seamless connectivity**
 - 2) Cooperating Objects and Wireless Sensor Networks**
 - 3) Control of large-scale, complex distributed systems**
- 

Total : 47 Mi Euro

Contribution to impacts

- **Control of 10 times more complex systems with less effort**
- **100% available plants whilst reducing maintenance cost and reducing accidents**
- **Seize new markets by providing new services**
- **Easy and low cost deployment for monitoring of the environment and natural resources**

Note : see detailed text of the call , objective 3.7 in cordis :
<http://cordis.europa.eu/fp7/ict/>

Budget

DEADLINE
09 October 07
17:00
Electronic
submission

- **Total for this objective in call 2 : 47* M€**
- **STREPS: 41 M€ - (one) NoE: 4 M€**
 - **CSAs: 2 M€**

**amount to be confirmed by the Commission decision on 2008 budget proposal*

Topic 1 : Middleware (*)

- Development of new **Middleware platforms** that
 - support composability, scalability, minimal power consumption
 - provide open interfaces to third parties for application development
 - [Private/home/building, Nomadic, Manufacturing]
- **Research should aim at**
 - programmability, dynamic reconfiguration
 - Services enabling privacy, security and trust
 - Predictable connectivity and QoS

(*) **Proposers are advised to consult the full text of the WP 2007-2008**
<http://cordis.europa.eu/fp7/ict/>

Topic 2 : Cooperating Objects and Wireless Sensor Networks (*)

- **Broad definition : “Objects” are entities that**
 - cooperate spontaneously / jointly execute a given task
 - Frequently operate under severe resource constraints
- **Research should aim at:**
 - **New methods and algorithms to support cooperation schemes**
 - **HW/SW platforms , including OS**
 - **Programming abstractions to facilitate application development**
- **Type of research**
 - generic, BUT driven by an entire class of real-world applications.
Projects should ‘*prove*’ feasibility and scaling
- **International cooperation** with USA and other countries is encouraged
(via STREPS)

(*) Proposers are advised to consult the full text of the WP 2007-2008
<http://cordis.europa.eu/fp7/ict/>

Topic 3 : Control of large-scale complex distributed systems (1/2) (*)

- **“Large-scale systems” like**
 - Electrical grids, airports, seaports
 - Infrastructures for energy supply
 - Manufacturing plants (incl. processing)
- **Known but difficult issues to be addressed**
 - Performance, robustness, availability. safe, secure and predictable behavior
 - E.g. Integration of energy generation, transport and consumption
- **International cooperation with the USA, Russia, Western Balkans**

(*) Proposers are advised to consult the full text of the WP 2007-2008

<http://cordis.europa.eu/fp7/ict/>

Topic 3 :Control of large-scale complex distributed systems (2/2)

Research should aim at:

- Modeling and design methods, reconfigurable architectures,
- Mastering complexity and uncertainty
- Closing the control loop over (wireless) sensor networks

Interdisciplinary consortia required

- Applying computer, systems, control and communications science and engineering to *large-scale complex systems*

Support for

- **International cooperation with the USA, Russia, Western Balkan countries (via CSAs, or STREPs)**

Coordination/support actions

Standard R&D projects

**“Networked Embedded and Control Systems”
Information days, Brussels,
May 22 and 23 , 2007**

All presentations in :

http://cordis.europa.eu/fp7/ict/programme/events3-20070522_en.html

Timing for FP7 (2007-2013)

- WP 2007-2008 running
(call-1 closed May 8th, call-2 Oct. 9, 2007, call-3 in 2008)
- WP 2009-2010 to be designed / revised by March 2008
- WP 2011-2013 to follow

*We are
looking
for inputs
by mid
Nov. 2007*



WP : Work programme (booklet, or electronic form) in
<http://cordis.europa.eu/fp7/ict/>

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- *Panos Tsarchopoulos*
- *Javid Khan*
- *Kostas Glinos , Head of Unit*

- **General info on FP7:**
<http://ec.europa.eu/research/fp7/>
- **ICT:**
<http://cordis.europa.eu/fp7/ict/>

3.7 coordinator
For call-2, 2007

