

**Väzby technologického a materiálového  
výskumu na tematickú oblasť  
7.RP: "Information and Communication  
Technologies"**

Informačný deň NMP

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Work Programme 2009 – 2010  
schválený v októbri 2008

# ICT Call 4

Indicative budget for call € 801m

19 Objectives covering all Challenges except Ch 4 -  
“Digital libraries and content”

3 FET Proactive Initiatives & FET Coordination and  
support actions

International cooperation

General accompanying measures

# ICT Call 4

Estimated number of proposals 1800

Call launch 19 November 2008

Call close 1 April 2009 17h00

Evaluation weeks Mon 25 May-Fri 12 June

Hearing weeks Tue 2-Fri 12 June

ESRs end-June

# ICT-ENERGY Joint call

Indicative budget for joint call €10m+ €10m

Novel ICT solutions for Smart Electricity Distribution  
Networks

Call launch 8 December 2008

Call close 31 March 2009 17h00

# FET Open

Indicative budget €61m

Call launch 19 November 2008

Call close 31 December 2010

# Other Call 4 objectives

## ICT 2009.9.3 General accompanying measures (€4m CSA)

- a) Build up ICT research skills - 1 CSA €400k
- b) Raise awareness of pre-commercial procurement - 3 CSA €400k each
- c) Coordinated approach to set-up of shared research facilities, excellence centres or clusters - 3 CSA €400k each
- d) Coordination of research into the economics of ICT - 1 CSA €500k
- e) Platform to facilitate access to finance for innovative SMEs participating in ICT projects - Up to 2 CSA €700k total

## ICT 2009.9.4 Strengthening cooperation in ICT R&D in an enlarged Europe (€5m CSA)

Reinforce cooperation between research teams (secondment of PhD students, research workshops and events) -  $\pm 10$  CSA €500k each

# Future calls

ICT Call 5 Indicative budget €722m

11 objectives (Ch 1,3,4)

3 FET Proactive Initiatives & FET Coordination and support actions

Call launch 31 July 2009

Call close 3 November 2009 17h00



# Future calls

ICT Call 6 Indicative budget €287m

4 objective (Ch 2,4,5,6)

2 FET Proactive Initiatives & FET Coordination and support actions

International cooperation

Call launch 24 November 2009

Call close 13 April 2010 17h00

# ICT Challenges

Challenge 1: **Pervasive and Trusted Network and Service Infrastructures**

Challenge 2: **Cognitive systems, interaction, robotics**

Challenge 3: **Components, systems, engineering**

Challenge 4: **Digital libraries and content**

Challenge 5: **Towards sustainable and personalised healthcare**

Challenge 6: **ICT for mobility, environmental sustainability and energy efficiency**

Challenge 7: **ICT for independent living, inclusion and participatory governance**

**Future and emerging technologies (FET)**

**Horizontal support actions**

# 4. výzva ICT - témy

## **Challenge 1: Pervasive and Trusted Network and Service Infrastructures**

- ICT 2009.1.1 The Network of the Future (*CP*)
- ICT 2009.1.5 Networked Media & 3D Internet (*CP, NoE, CSA*)

## **Challenge 2: Cognitive systems, interaction, robotics**

- ICT 2009.2.1 Cognitive Systems and Robotics (*CP, NoE, CSA (CA only)*)
- ICT 2009.2.2. Language-Based Interaction (*CP, NoE*)

## **Challenge 3: Components, systems, engineering**

- ICT 2009.3.2 Design of Semiconductor Components and Electronic-based Miniaturised Systems (*CP, CSA*)
- ICT 2009.3.3 Flexible, Organic and Large Area Electronics (*CP, NoE, CSA*)
- ICT 2009.3.4 Embedded Systems Design (*CP, CSA*)
- ICT 2009.3.6 Computing Systems (*CP (STREP only), CSA*)
- ICT 2009.3.7 Photonics (*ERA-NET Plus*)
- ICT 2009.3.8 Organic Photonics and other Disruptive Photonics Technologies (*CP (STREP only), NoE*)

## **Challenge 5: Towards sustainable and personalised healthcare**

- ICT 2009.5.1 Personal Health Systems (*CP, CSA (SA only)*)
- ICT 2009.5.2 ICT for Patient Safety (*CP, CSA (SA only)*)
- ICT 2009.5.4: International Cooperation on Virtual Physiological Human (*CP (STREP only)*)

# 4. výzva ICT – témy II

## **Challenge 6: ICT for mobility, environmental sustainability and energy efficiency**

- ICT 2009.6.1 ICT for Safety and Energy Efficiency in Mobility (*CP, CSA*)
- ICT 2009.6.3 ICT for Energy Efficiency (*CP (STREP only), CSA (CA only)*)
- ICT 2009.6.4 ICT for Environmental Services & Climate Change Adaptation (*CP (STREP only), CSA (SA only)*)

## **Challenge 7: ICT for independent living, inclusion and participatory governance**

- ICT 2009.7.1 ICT and Ageing (*CP, CSA*)
- ICT 2009.7.2 Accessible and Assistive ICT (*CP, CSA (CA only)*)
- ICT 2009.7.3 ICT for Governance and Policy Modelling (*CP (STREP only), CSA*)

## **Future and emerging technologies (FET)**

- ICT 2009.8.1 Concurrent Tera-Device Computing (*CP*)
- ICT 2009.8.2 Quantum Information Foundations and Technologies (*CP (IP only)*)
- ICT 2009.8.3 Bio-chemistry-based Information Technology (*CP (STREP only)*)
- ICT 2009.8.9 Coordinating Communities, Plans and Actions in FET Proactive Initiatives (*CSA*)
- ICT 2009.8.10 Identifying new research topics, Assessing emerging global S&T trends in ICT for future FET Proactive initiatives (*CSA*)

## **Horizontal support actions**

- ICT 2009.9.1 International Cooperation (*CSA (SA only)*)
- ICT 2009.9.2
- Supplements to support International Cooperation between ongoing projects (*NA*)
- ICT 2009.9.3 General Accompanying Measures (*CSA*)
- ICT 2009.9.4 : Strengthening cooperation in ICT R&D in an enlarged Europe (*CSA*)

7FP – Cooperation Programme / the thematic area:

**Information and Communication Technologies (ICT)**

and its potential interaction with the thematic area:

**Nanosciences, Nanotechnologies, Materials and new Production Technologies (NMP)**

In framework of the WP for 2009 – 2010

ICT je priamo prepojené s CIP, výskumnými infraštruktúrami (Kapacity),  
Energiou (joint call) a zároveň so všetkými prioritami 7. RP

**THE JOINT TECHNOLOGY INITIATIVES (JTIs) AND JOINT NATIONAL PROGRAMME**  
**very perspective instruments for join activities between ICT and NMP areas**  
(~ EURO 50 million from side of DG IS&Media)

JTIs are a pioneering approach to pooling public-private efforts, designed to leverage more R&D investments from Member States, Associated Countries and industry, and to reduce the tremendous fragmentation of EU R&D and increase impacts of RTD on competitive ability of EU industries. JTI is instrument supported as by relevant ETP (European Technology Platform) as by EC (European Commission)

•**The ENIAC JTI** in nanoelectronics will be industrial developments addressing mainly technology for the next generation of 'More Moore' and the 'More than Moore' domains. They are typically cover the beyond CMOS fields and more advanced 'More than Moore' domains preparing Europe for the design and manufacturing of the next generation components and miniaturised systems. <http://www.eniac.eu/index.php>

•**The ARTEMIS JTI** will focus the development and implementation of embedded systems responding to industry requirements in specific application domains (e.g. for the automotive and aerospace sector, for smart homes and public spaces, energy efficiency, manufacturing etc.). <http://www.artemis.eu/>

•**The Ambient Assisted Living (AAL) initiatives** - joint national programme will cover market-oriented R&D on concrete ICT-based or support solutions for ageing well with a time to market of 2-3 years, in particular with focus on involvement of SMEs and the business potential. <http://www.aal-europe.eu/>

## Addressing synergies by ICT throughout the Programme

Mainly from NMP point of view.

More and more, innovations come from the use of ICT in demanding application contexts. In the more technology-led challenges, research is directed **towards removing roadblocks** and improving the capability of generic technology components, systems and infrastructures suitable for a range of applications.

The ICT work programme addresses a research problem through different angles corresponding to different technological challenges. One is “**overcoming technology roadblocks and reinforcing Europe's industrial strengths**”. For European industry to be among the leaders in ICT and ICT applications in the next ten years, our researchers and engineers have to address three major technological challenges:

- **Pervasive and trustworthy network and services infrastructure** that will gradually replace the current Internet, mobile, fixed and audiovisual networks. The 'Future Internet' / “Internet of things” is a major federating research theme within this challenge.

- **Engineering of context-aware and easy-to-use ICT systems** that self improve and self-adapt within their respective environments. The fields of cognitive systems, robotics and interaction remain priority research topics.

- **The increasingly smaller, cheaper, more reliable and low consumption electronic components and intelligent embedded systems** taking into account the alternative paths to next generation technologies and building the basis for innovation in all major products and service.

Technological challenges are supported as well by one of overall feature of ICT WP as “**The direct involvement of end user communities is encouraged, as appropriate, across the work programme.**”

*In next slides it will be some selected examples from ICT WP:*

## **Challenge 1: pervasive and trustworthy network and service infrastructures**

Leading ICT Challenge (EUR 557 million )

**The 'Future Internet' is emerging globally as a federating research theme of ICT WP.** One of impact will be advances in 3D processing give rise to innovative applications notably in gaming technologies and in virtual worlds. From this point of view, the Internet is also revolutionising the Enterprise and businesses environments, with the introduction of RFID technologies enabling more automated processes. **These open the way towards an “Internet of things”**, where multiplicity of tags, sensor, and actuators provide physical world information enabling new classes of applications combining virtual and physical world in RTD as well in production.

Objective ICT-2009.1.3: Internet of Things and Enterprise environments . ***Optimised processes and production technologies covering distribution of intelligence*** between the edge network and the more centralised business/process information system. ***Software platforms supporting highly innovative networked businesses (Internet based Enterprise Systems)*** on top of an Internet of Services. These platforms should enable **increased flexibility of the resources managed by virtual organisations**. Collaboration and interoperability are key features of these dynamic ecosystems supported by next generation knowledge management services. Trustworthy platforms and frameworks for autonomously monitoring and managing threats, which need to be typically cross-border, cross-organisational, scalable, distributed, dynamically evolving and collaborative.



## Challenge 2: cognitive systems, interaction, robotics (EUR 179 million)

Engineering systems with the capability to sense and understand an unstructured environment is a challenge which goes beyond today's systems engineering paradigm. Cognitive approach open important innovations as in service and industrial robots, and industrial production and manufacturing processes as well. **There one of main area of collaboration with NMP thematic area.** Challenge 2 aims to extend systems engineering to the design of systems that can carry out useful tasks (e.g. manipulation and grasping, exploration and navigation, monitoring and control, situation assessment, communication and interaction), autonomously or in cooperation with people. Specifically, such systems should be:

**more robust**: performance should not degrade when they are presented with unexpected situations;

**more adaptive**: performance should be open (within reasonable constraints) to changing service requirements, without the need for extensive human intervention;

**more effective**: performance should improve because they can predict or anticipate what might happen at some point in the future, near or far;

**more natural**: performance should be tolerant to the ambiguity and uncertainty that is a consequence of dealing with humans, and performance should improve with time.

## Challenge 3. components, systems and engineering (EUR 375 million)

The component and systems business in Europe concentrates on added value operations, on systems integration, on new technologies and on enabling the end user industry to offer new materials, technologies and total product or service solutions. **The Challenge is really very open for NMP “join” research.**

- **Organic and large area electronics** have very high market growth expectations with about half of the market for cheap and even disposable electronics, including RFID-tags and sensors.
- **Photonics** in core as well as in access networks, is gradually replacing electronics. Photonics is also an enabling technology that exploits advances in lasers, light sources, fibres, detectors, in materials (e.g. nano-crystals, organics, nano-tubes) and in manufacturing processes (hybrid integration, silicon photonics and CMOS compatibility). It promises to play a major role in new areas such as energy saving (e.g. by improving photovoltaic and lighting efficiency), nano-technology, medicine, biology, environment and safety. The possibility to manufacture structures at the nano-scale - far below the wavelength - will radically change the traditional approaches by exploiting physical effects not accessible before.

### Challenge 3. components, systems and engineering – continuing

**Microsystems** integrate and interface multiple core technologies and related materials to implement a variety of functions. They are implemented through scalable homogeneous or heterogeneous hardware integration technologies in order to advance miniaturisation, functionality and reliability of the sensing, processing, actuating and communicating functions. Power autonomy (consumption and supply) is a common issue. Integration of multiple functions (sensing, logic, energy collection, wireless communication) into traditional or not-traditional materials, in particular textiles, is one of the priorities. In the medium term, there is growing industrial interest to [integrate nano-sensors in micro-systems](#), mainly due to an increase in sensitivity, a device simplification and the associated cost reduction.

**Embedded systems, intelligent computing and control:** Inexpensive networking, sensing and sophisticated control is moving decision-making to the point-of-action, and value-added functions in software are driving the diffusion of embedded systems in an ever broader range of applications. Engineering of large distributed systems increasingly requires cooperative networked control systems, and optimisation and decision support methods and tools which are used to modernise physical infrastructures, **to control complex processes in manufacturing, or to monitor and control systems performance.**

**Note:** Research addressing this Challenge in particular will encourage international cooperation under the Intelligent Manufacturing Systems (IMS <http://www.ims.org/>) scheme. Technologies developed under this Challenge are expected to be tailored to meet key societal and economic needs.

## **Challenge 5: towards sustainable and personalised healthcare (EUR 161 million)**

Open for **collaboration mainly with NMP** and Health thematic areas.

The health domain and its three main industries, pharmaceuticals, medical devices and eHealth, are dominant economic sectors with respect to employment creation and growth. Recent capabilities of modelling, simulation and biomedical imaging, combined with the latest knowledge about diseases, give rise to a new generation of predictive medicine. In this challenge, support will go to **highly interdisciplinary research** aiming at:

- **Improved productivity** of healthcare systems by facilitating better integrated care and management of chronic diseases at the point of need and quicker transfer of knowledge to clinical practice.
- **Continuous and personalised care solutions**, addressing the participation of patients in care and prevention processes, and responding to the needs of elderly people.
- **Savings in lives and resources** by focusing on prevention and prediction of diseases and on improved patient safety by optimising medical interventions and preventing errors.
- **New ICT-based environments** for biomedical research and predictive medicine that push the boundaries of technologies like grid computing, modelling and simulation.
- **Reinforcing the leadership** of Europe's eHealth and medical imaging/devices industries and attracting back to Europe research activities of the pharmaceutical industry.

**Note.** All activities will take into consideration relevant regulations as well as relevant results and work from successful or ongoing projects from EU Framework Programmes or other initiatives such as Joint Technology Initiatives or AAL initiative. The centre of gravity of all activities will be in ICT, however, if any efforts are required in other directions such as data collection or basic clinical, medical, biological or nanotechnology-related research, these will represent less than 25% of the total effort.

## **Challenge 6: ICT for mobility, environmental sustainability and energy efficiency** (EUR 154 million)

As well interesting area for [collaboration with NMP](#) but regards to the Challenge objective it is strong interaction with transport and mainly wit energy thematic areas.

Economic growth is increasing the demand for energy. To maintain its prosperity and competitiveness on global markets, Europe has to focus on energy efficiency in the most energy-intensive sectors . Main research topics / objectives are:

***ICT for safe, clean and smart mobility*** continues to provide new intelligent systems that assist the driver to avoid accidents, provide drivers with real time information to avoid congestion, and optimise a journey or the engine performance to improve energy efficiency.

***ICT for environmental sustainability and climate change adaptation.*** There improved connectivity of environmental systems is increasingly required as a result of the multiplication of international environmental commitments.

***ICT and urban infrastructures.*** Cities represent a particularly complex environment with acute sustainability challenges. Four out of five Europeans live in urban areas which consume about 80% of the energy in Europe. Urban transport faces congestion problems and accounts for up to 70% of pollutants from transport. Optimal management of urban complexity requires full integration of a wide range of technologies.

**Note.** Research under this Challenge should take into consideration relevant technologies and other results from successfully completed or ongoing projects. This is reason for the “Joint call” between the ICT and Energy Themes: “Objective ICT-2009.6.5: Novel ICT Solutions for Smart Electricity Distribution Networks”.

**ICT for independent living and inclusion, (Challenge 7) this is as well **very interesting topic / objective for collaboration.****

A number of societal trends will deeply transform the future markets of ICT for independent living, inclusion and participation. Firstly, ageing is beginning to change the shape of labour markets and is already strongly influencing the needs for care and 'lifelong participation' in society. Cooperation is interesting mainly in topic “**Service robotics for ageing well**”, Major challenges to be addressed include autonomous self-learning robotics solutions, sharing of contextual information with other artefacts in the surroundings of the user, navigation in unknown environments, precise manipulation of relevant objects and user robotic interaction taking into account the usability requirements of elderly people.

**But sorry:** It is not intended to support development of basic robotics components!

## Future and Emerging Technologies (FET)

**FET** fosters frontier research that will open up new avenues across the full breadth of future information technologies. **(Really “basic research” in ICT thematic area and R&D orientation create opportunities for close cooperation with NMP R&D communities)**

**FET-Open** targets foundational breakthroughs that open the way towards radically new forms and uses of information and information technologies. **“Bottom-Up” – approach for research content.** (EUR 61 million) :

- For STREP projects: contribution to the scientific foundations of future information and communication technologies that may be radically different from present day ICT.
- For CSA actions: contribution to catalyse a lasting and transformative effect on the communities and practices for high-risk and high-impact research.
- All FET-Open activities should contribute to securing and strengthening the future potential for high-risk / high-impact visionary research.

**FET proactive** will spearhead transformative research of fundamental long-term challenges in ICT that will be key to the long-term sustainability of a technological future in Europe (EUR 110 million). In particular (**research priorities**):

- Computer systems*: Quantum Information Foundations and Technologies and in Molecular-Scale Devices and Systems. Research will pursue alternative directions for architectures in Concurrent Tera-Device Computing, for individual devices in Molecular-Scale Devices and Systems, and focus on power issues in Towards Zero-Power ICT.
- Computing and Communication Paradigms*: Inspiration for radically new paradigms is taken from the functioning of the brain in Brain-Inspired ICT or from chemical networks in cells in Bio-chemistry-based Information Technology.
- Living with* : Radically new forms of sensing and interactions will be studied in Brain-Inspired ICT, while specific sensing modalities may emerge from work in Molecular-Scale Devices and Systems and in Bio-chemistry-based Information Technology.
- Widening the Horizon of ICT*: New ways of reaching societal benefits and responding to industrial needs using ICT. Examples include improving human health in Bio-chemistry-based Information Technology and in Brain-Inspired ICT, new forms of therapy in Human Computer Confluence.

So, if you are member of NMP community and you want be active in any ICT project - you would be very careful with presentation of your R&D objectives - they must be hidden within relevant ICT objectives or they can be presented as a subject for the ICT applied research.

With all the best

Anton Lavrin ;-)

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# Events

- 25 – 27. 11. 2008 ICT event, Lyon
- 22. 1. 2009 Proposer's Day, Budapest
- 21. – 23. 4. 2009 FET Conference, Prague
- ca február 2009 – FET tour

Ďakujem za pozornosť.

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