

Information and Communication Technologies in FP7

A guide through the 2009-10 Work Programme:
Focus on Calls 5 and 6

2nd EU-Japan Cooperation Forum on ICT Research
July 2, 2009, Brussels

Outline

- Programme approach and features
- Research challenges and objectives
- Calls for Proposals

Note:

- *WP 2009-10 (except Objectives 9.5, 10.1, 10.2 and 10.3) has been agreed by the ICT Programme Committee.*
- *Final agreement and Commission decision on Calls 5 and 6 foreseen for end of July 2009.*





Ongoing ICT projects with Japanese participation

1. Quantum Information Processing (FET) (Res. Org of Inf. Systems)
2. Fibre Optic Networks (Nat Int of Information and Communication)
3. Mobile and Wireless
4. RFID-related Activities and Standardisation (Yokosuka Telecom Res.)
5. Software systems (U. Nations University)
6. Intelligent content and semantics (NIICT)
7. Learning robots (Nat Inst for advanced industrial S&T)
8. Collaborative robotic systems
9. Mobile Speech-to-Speech translation (Nagoya Inst of Technology)
10. Grid services for health (Hokkaido U)
11. ICT for Independent Living (Waseda U)
12. Distant Early Warning System (Nat res Inst for Earth Science)

A very rich set of
activities

An excellent basis
to build on

More industrial
participation
required



Where do we stand?

Behind us:

- Four Calls for proposals in 2007-08
- 2.9 B€ of EU funding,
- ~ 550 projects launched (out of ~3000 received)
- Call 4 under evaluation



Ahead of us

- Two major calls for proposals in 2009-10
- ~1.1 B€ funding



Positioning of the Programme

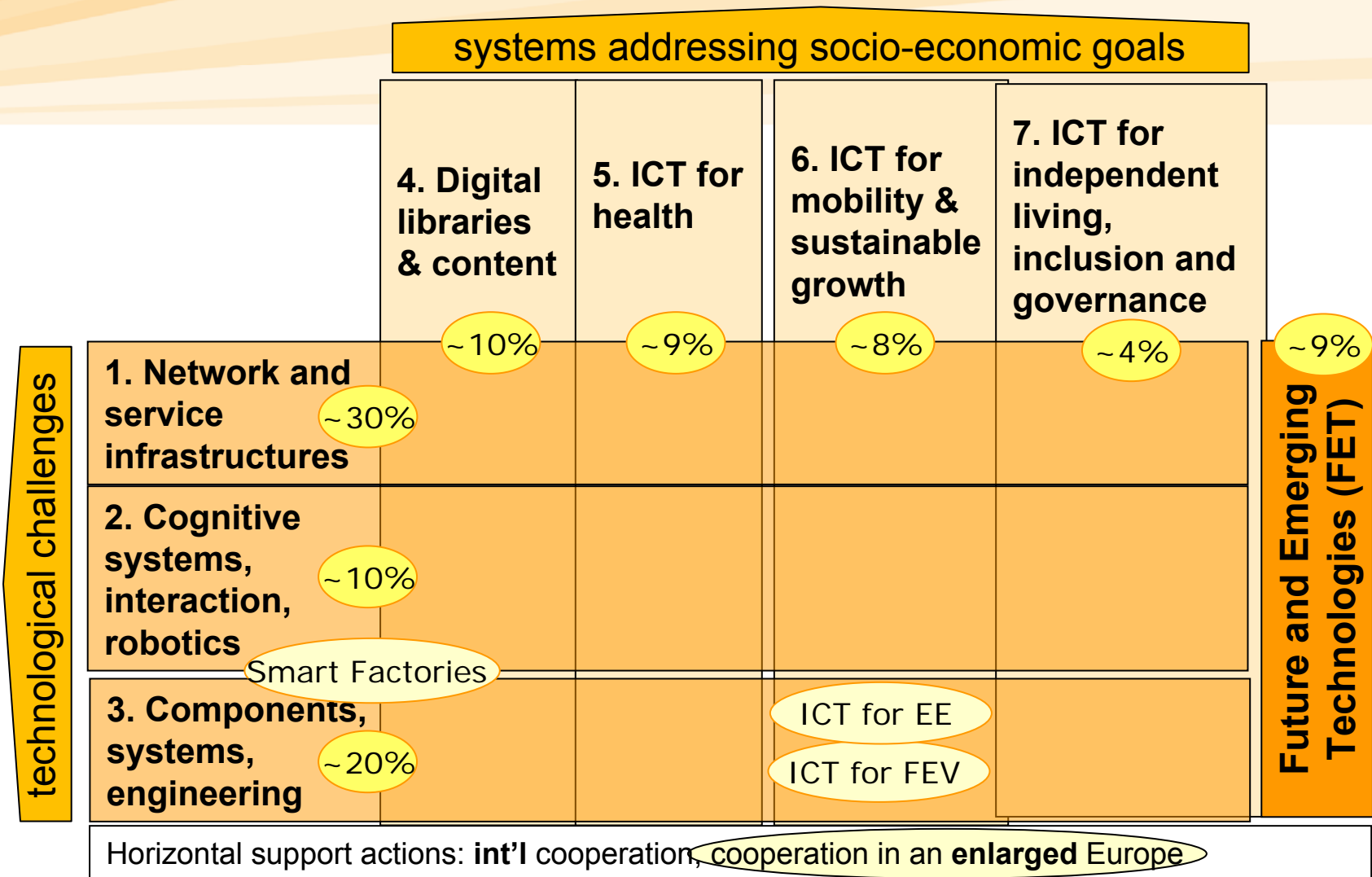
- Projects launched in 2009-10 to have impact in 2015-20
- By then, global ICT/knowledge infrastructure – market structures - value chains - business models: all will have significantly changed

Research challenges should:

- Encourage firms to explore more innovative options than they would otherwise pursue
- Focus on higher-risk ICT collaborative research in a medium to long-term agenda



Programme structure



Budget shares

ICT R&D in EU Eco. Recovery Package

Challenge 1: Pervasive and Trustworthy Network and Service Infrastructures

Challenges

- Current Internet: severe limitations in terms of capacity, mobility, flexibility, scalability, security, reliability and resilience of networks and services

Need to:

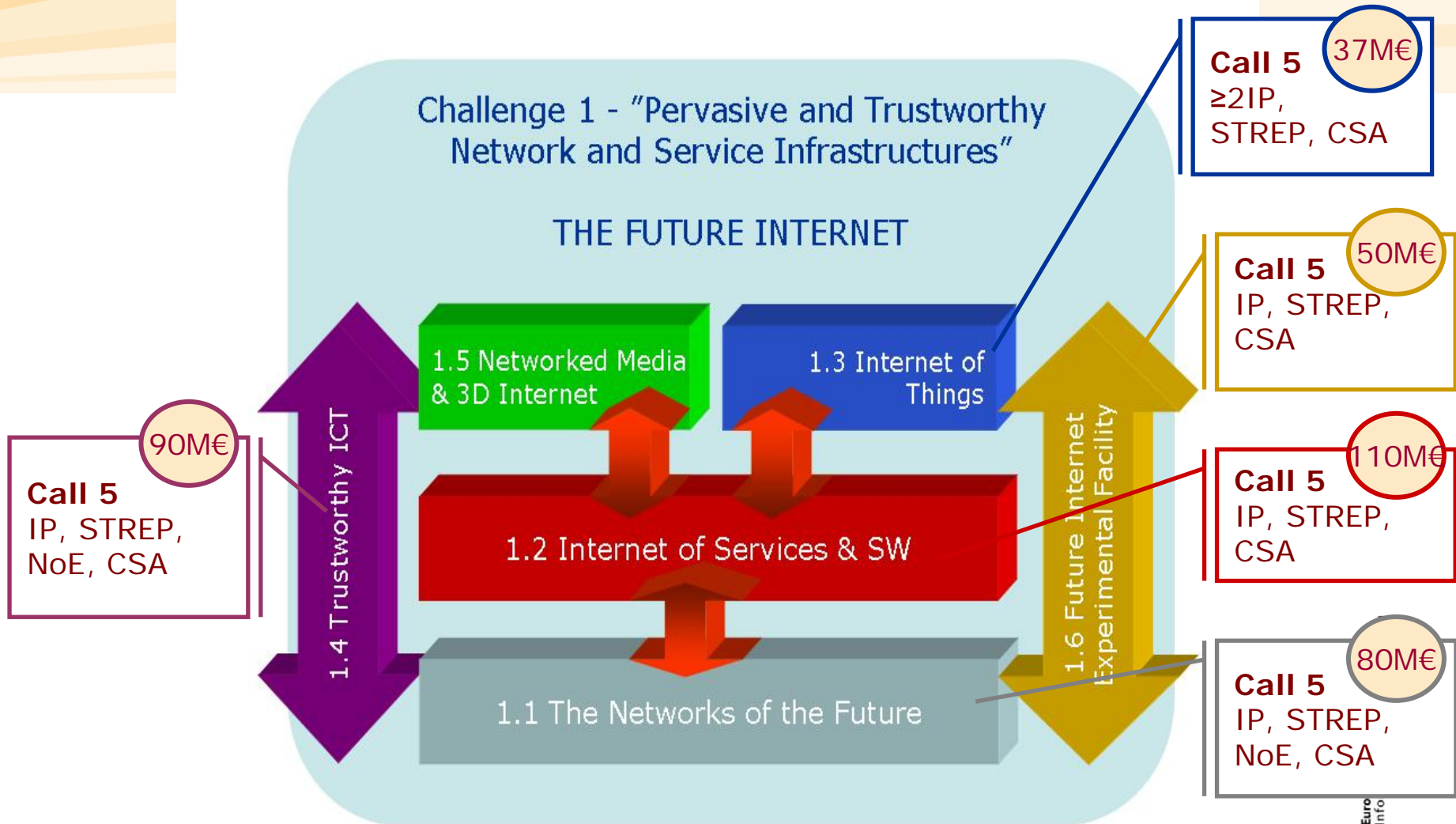
- rethink networking architectures
- support an "Internet of Services"
- support an "Internet of Things"
- be trustworthy
- support a "3D Media Internet"
- +
- bridge the gap between long-term research and large-scale experimentation
- federate research activities across Europe

Expected Impact

- Strengthened position of European industry
- European leadership in supply of integrated business solutions
- +
- Wider market opportunities from new classes of applications taking advantage of convergence
- Global standards, interoperability and European IPRs
- +
- Integrated large scale Experimental Facility
- Improved coordination and integration of research activities in Europe

Challenge 1: Objectives

557 M€ in total
(~30%)



Challenge 1: Objectives and Target Outcomes (I)

80M€

1.1 The Network of the Future

(IP, STREP)
- Call 5 -

“Future Internet” Architectures and Network Technologies

- novel Internet architectures and technologies
- flexible and cognitive network management

Networks of Excellence and Coordination/ Support actions (NoE, CSA)

110M€

1.2 Internet of Services, Software and Virtualisation

(IP, STREP)
- Call 5 -

Service Architectures and Platforms for the “Future Internet”

- service front ends
- open, scalable, dependable service platforms
- virtualised infrastructures

Innovative Service / Software Engineering

- service / Software engineering methods and tools
- verification and validation

Coordination and support actions (CSA)

37M€

1.3 Internet of Things and Enterprise environments

(≥2 IP, STREP)
- Call 5 -

Architectures and technologies for an “Internet of Things”

- architectures and technologies using open protocols, which enable novel Internet-based applications
- distribution of intelligence
- architectural models

Future-Internet based enterprise systems

- software platforms
- interoperability
- dynamic ecosystems

International cooperation and coordination (CSA)

Challenge 1: Objectives and Target Outcomes (II)

90M€

1.4 Trustworthy ICT- Call 5 -

"Trustworthy Network Infrastructures" (IP)

- novel architectures with built-in security / dependability / privacy
- trustworthy management of billions of networked devices

"Trustworthy Service Infrastructures" (IP)

- identity management for persons, tangible objects and virtual entities

Technology and Tools for Trustworthy ICT (STREP)

- Understanding threat patterns for pro-active protection
- user-centric and privacy preserving identity management
- assessment of trustworthiness

Networking, Coordination and Support (NoE, CSA)

50M€

1.6 "Future Internet" experimental facility and experimentally- driven research – Call 5 -

Building the Experimental Facility and stimulating its use (IP)

- prototype of FIRE experimental facility
- large scale experimentation
- direct involvement of user communities

1/ FIRE Components:

operational prototype facility

2/ FIRE Users:

open calls; results of mutual interest

Experimentally-driven Research (STREP)

- iterative cycles of research, design and large-scale experimentation
- taking into account energy, low cost, environmental or socio-economic aspects

Coordination actions (CSA)

- EU-level / MS
- international cooperation/ standardisation
- co-ordination of experience research and user-driven open innovation



Challenge 2: Cognitive Systems, Interaction, Robotics

Challenges

Artificial Cognitive Systems

- Robots operating in 'modelled', 'structured' and 'constrained' environments
- Basic understanding of computational representations of cognitive processes
- Human-robot interactions rather static/passive

Translation Systems

- Machine translation of limited quality, human supervised
- Automatic translation in limited domains / language pairs
- Content / workflow management not automated

Expected Impact

- More competitive robotics industry + more innovation capacity in application domains
- Robots, machines and systems exhibiting advanced behaviour: operating with gaps in knowledge, in changing environments
- Machines and systems that understand their users / context
- Robotic systems with rich interaction

- Higher quality automatic translation
- Faster human translation
- +
- Self-learning machine translation
- Progressive independence from topic and language pair
- Automated versioning and management of multilingual web sites

Cognitive systems and robotics

a) engineering of artificial cognitive systems (Strep)

- Interpretation of objects, situations, events
- Memory and learning
- Anticipatory behaviour in incompletely specified environments
- Collective behaviour

c) complete robotic systems (IP)

- Autonomous action in real-world environments
- Demonstrate robustness and improve through learning

e) cross-fertilisation between academic and industrial research (IP)

- Experiment with industry-strength platforms in labs

h) coordination: multidisciplinary artificial cognitive systems research (CA)

- Cohesion among communities

Challenge 3: Components, Systems, Engineering

Challenges

Trends: miniaturisation, diversification, increasing software content and emphasis on a systems approach

Challenges:

- Integrated hardware/software systems
- Heterogeneous micro-systems
- Widely distributed systems
- Multi-disciplinarity

Cross cutting issues:

- Efficient energy management
- Minimum environmental footprint

Opportunities:

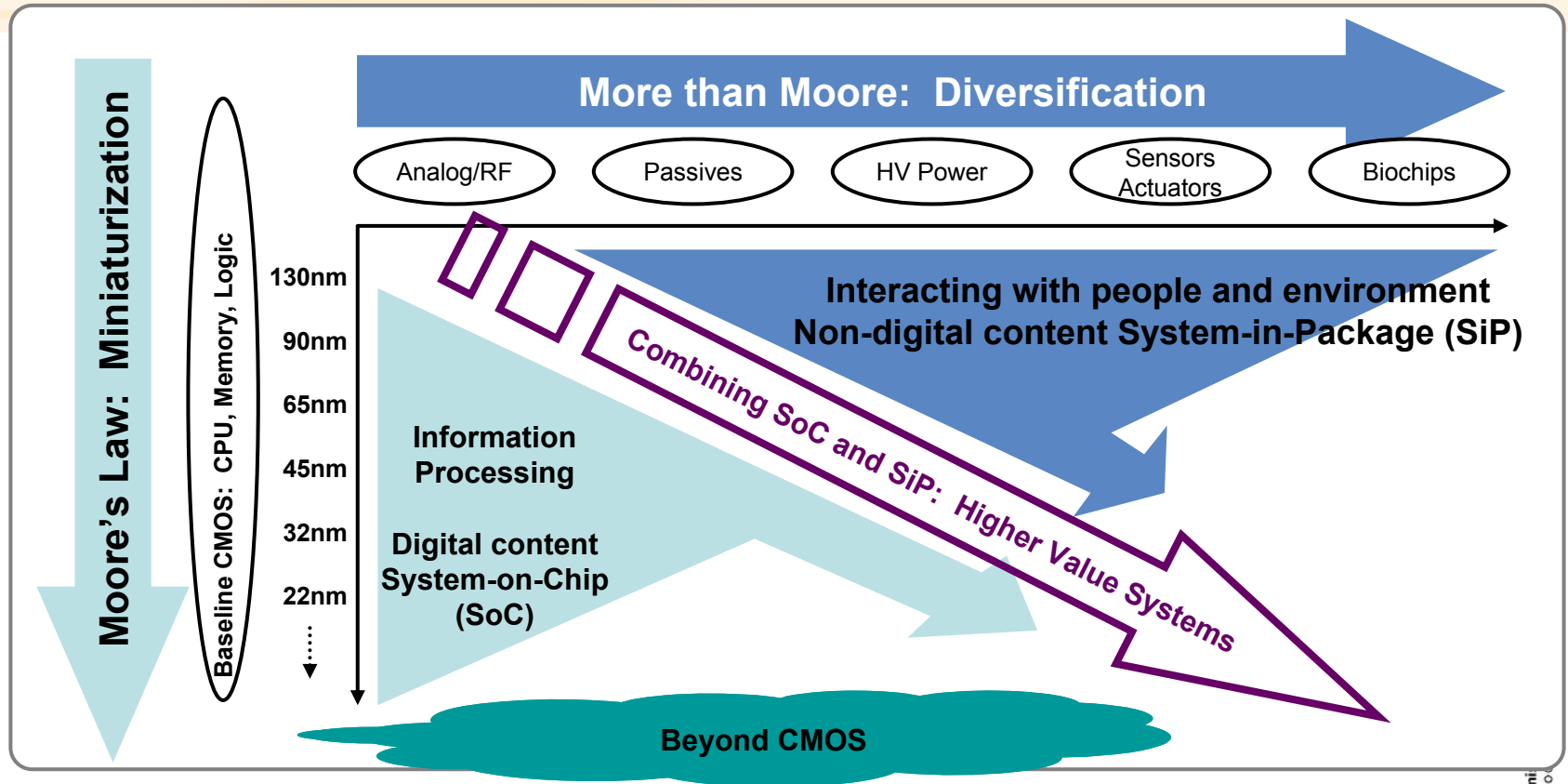
New types of devices & intelligent system

- nano-scale integration ...
- embedded ICT ...
- new materials, photonics, organic electronics ...

Expected Impact

- Strengthened competitiveness of EU industry through risk sharing and pooling of resources in generic underlying technology developments
- Exploration of alternative paths, fostering of new types of collaborations, emergence and growth of new companies
- Higher attractiveness of EU to investments and skills
- Higher energy efficiency and lower environmental impact
- Maintained leading position of EU in product innovation and design
- Wider use of smart devices and systems in various application sectors
- Closer cooperation between Member States, and internationally

Challenge 3: Components, Systems, Engineering



Challenge 3: Objectives and Target Outcomes (I)

35M€

3.1 Nanoelectronics Technology

- Call 5 -

Miniaturisation and functionalisation

- Beyond 22 nm devices (STREP)
- Merging of 'Beyond CMOS' and advanced 'More than Moore' devices and processes (NoE)

Manufacturing technologies (≥1 IP, STREP)

Support measures (CSA)

32M€

3.5 **Engineering of Networked Monitoring and Control systems**

- Call 5 -

Foundations of complex systems engineering (STREP, NoE)

Wireless Sensor Networks and Cooperating Objects

- 1 IP: architectures and integration platforms
- STREP: specific issues or topics

Control of large-scale systems

- 1 IP: architect, develop and demonstrate process automation systems
- STREP: specific issues or topics

International cooperation (CSA)

(Complementing ARTEMIS JTI)



Challenge 3: Objectives and Target Outcomes (II)

3.7

Photonics

- Call 5 -

60M€

Photonics technologies, components and (sub)systems

- Lighting and light sources (IP/STREP)
- Imaging for Safety & Security (STREP)
- Biophotonics (STREP)
- Communications (IP/STREP)
- Integrated components for power lasers (STREP)

Cost-effective versatile foundry processes for photonic integrated components (IP)

Coordination and support actions (CSA)

3.9

Microsystems and Smart Miniaturised Systems

- Call 5 -

80M€

Heterogeneous integration (IP, STREP)

- processing, comms, sensing, actuating ...

Autonomous energy efficient smart systems (STREP)

- energy management
- communication solutions

Application-specific microsystems and smart miniaturised systems (IP, STREP)

- Biomedical
- Telecommunications
- Environment and food/beverage
- Transport, safety and security
- Smart Fabrics and Interactive Textiles

Coordination and support actions (CSA)



Challenge 4: Digital Libraries and Content

Challenges

- Data volumes growing faster than manageable
 - interpreting data (real-time, multi-dimensional, semantics)
 - automating preservation
 - complex objects
- Content and cultural experiences are not sufficiently immersive, adaptive
- Learning tools do not exploit creativity, collaboration and independent experimentation



Expected Impact

- Increased competitiveness in effective, intelligent information management systems
- Effective and reliable preservation and usability over time of digital objects
- New cultural experiences
- Personalised learning (through ICT) experiences



Challenge 4: Objectives and Target Outcomes

4.1

69 M€

Digital Libraries and Digital Preservation

- Call 6 -

Advanced preservation scenarios

- complex objects (STREP)
- intelligent digital curation and preservation systems (IP)

Digital content preservation systems and services (IP)

- end-to-end workflows
- demos in large-scale testbeds
- integrity and authenticity

+

Adaptive cultural experiences (STREP)

- knwl tech, visu, interaction ...

Solutions for assembling multimedia libraries (IP)

- collaborative use
- aggregate, annotate ... objects ...

Research Network (NoE)

Uptake and roadmapping (CSA)

4.2

49M€

Technology-enhanced Learning

- Call 5 -

Learning appliances (STREP)

- e.g. virtual characters ...

Adaptive and intuitive systems (STREP)

- e.g. game-based ...

Link between individual and organisational learning (IP, STREP)

- embed in organisational processes ...

Learning in the 21st century (IP)

- large-scale pilots for design of future classroom ...

Research network (NoE)

Awareness and knowledge management (CSA)

4.3

70M€

Intelligent Information Management

- Call 5 -

Capturing tractable information (IP, STREP, NoE)

Delivering pertinent information (IP, STREP)

+

Collaboration and decision support (IP, STREP)

Personal sphere (STREP)

+

Coordination and networking (CSA)

Challenge 5: Towards Sustainable and Personalised Healthcare

Challenges

- Sustainable delivery of quality health care at affordable cost
- Demographic changes
- Chronic diseases
- Inefficiencies, inadequate safety and control

- Demand for best-quality care
- Demand for prevention as well as treatment
- Demand for skilled specialists



Expected Impact

- Saving in lives and resources
- Improved productivity of healthcare systems
- Continuous and personalised care solutions

- +
- New ICT-based environments for biomedical research and predictive medicine
- Reinforced leadership of EU's eHealth and medical devices industries



Challenge 5: Objectives and Target Outcomes

63M€

5.3 Virtual Physiological Human – Call 6 –

**Patient-specific computer
based models and simulation**
(≥1 IP, STREP)

- Integrating multi-scale models ...

**ICT tools, services and
infrastructures for bio-
medical researchers** (≥1 IP,
STREP)

- sharing data and applications,
collaborative environments ...

Support action (1 CSA) on
evaluation and assessment

Observatories on achievements
and evolution of Biomedical
Informatics (1 CSA)



Challenge 6: ICT for Mobility, Environmental Sustainability and Energy Efficiency

Challenges

- Increasing demand for energy
- Need for energy efficiency in most energy-intensive sectors
- Need for climate change adaptation
- Need for environmental sustainability
- Need to increase safety
- Need to reduce CO2 emissions



Expected Impact

- Reduced energy intensity
- Reinforced competitiveness in ICT-enabled energy efficiency technologies
- New environmental services
- Increased capacity to mitigate impacts of disasters
- Improved safety, security and comfort of transport
- European leadership in clean and intelligent vehicle systems and in cooperative systems



Challenge 6: Objectives and Target Outcomes (I)

6.2 ICT for Mobility of the Future – Call 6 -

37 M€

Field Operational Tests for Integrated Safety and Co-operative Systems (≥2 IPs, STREP, CSA)

- assess efficiency of transport systems
- assess safety of all road users
- assess impact of integration of in-vehicle safety systems with co-operative systems
- large-scale test programmes

ICT-based systems and services for Smart Urban Mobility and new Mobility Concepts (STREP)

- address environmental footprint and safety of mobility
- tools, services and methods for demand management
- multi-modal urban mobility concepts

Coordination and support actions (CA)

- Intelligent Car initiative: roadmaps, dissemination, assessments, training

International cooperation (CA)

- Japan / USA: mutual validation and exploitation of results



Challenge 7: ICT for Independent Living, Inclusion and Participatory Governance

Challenges

- Ageing population
- Demand for inclusion

- Meeting eAccessibility requirements

- ICT-enabled governance and policy modelling: lack of models, process flows and analytical tools

Closed



Expected Impact

- Increased efficiency of care and prolonged independence of elderly and their carers

- Generalised accessibility support for people with special needs

- Empowerment of individuals, groups and communities and more efficient feedback in governance and policy making

- New markets and reinforced competitiveness



Future & Emerging Technologies – FET

An incubator and pathfinder for new ideas and themes for long-term research in the area of ICT

High risk research, offset by potential breakthrough with high technological and/or societal impact

FET Open

- bottom-up approach
- exploring new and alternative ideas at the frontiers

61 M€



FET Proactive

- top-down approach
- spearheading transformative research and supporting community building

110 M€

FET Proactive

CSA

CSA

Call 5

8.4 Human-Computer Confluence (IP) 15M€

8.5 Self-Awareness in Autonomic Systems (IP, STREP) 15M€

8.6 Towards Zero-Power ICT (STREP) 7M€

8.9 Coordinating Communities, Plans & Actions in FET Proactive Initiatives

1,5M€

1,5M€

8.10 Identifying new research topics, Assessing emerging global S&T trends in ICT for future FET Proactive Initiatives

0,5M€

0,5M€

Call 6

8.7 Molecular Scale Devices and Systems (IP, STREP) 15M€

8.8 Brain Inspired ICT (IP, STREP) 15M€



ICT contribution to Public Private Partnerships for R&D in the European Economic Recovery Plan

- 'Factories of the Future'
- 'Energy-Efficient Buildings'
- 'Green Cars'



Objective 10.1: Smart Factories: ICT for agile and environmentally-friendly manufacturing

Call 5

35M€

- a) **Integrated process automation and optimisation**
 - shopfloor-based platforms and systems ... (IP)
 - b) **Real-time monitoring of energy use and material flow**
 - context-aware ICT applications and scalable sensor networks integrated in machines and factory-level infrastr. (IP)
 - c) **Robotics-enabled production processes**
 - robotic prototypes in smart factory environments ... (STREP)
 - d) **Laser applications**
 - laser systems in processes and production ... (STREP)
 - e) **Coordination Action**
 - industrial learning and roadmapping across industries ... (CSA)
- a) – d) -> integration + validation



Objective 10.2: ICT for energy-efficient buildings and spaces of public use

Call 5

15M€

- a) Integrated ICT-based management and control systems
 - governing lighting/heat exchange/air treatment subsystems
 - deployed in spaces of public use
 - interoperating with security/safety/comfort subsystems (STREP)

-> systems integration + validation

- b) Coordination Action
 - reviewing needs, roadmapping ... (CSA)



Objective 10.3: ICT for the Fully Electric Vehicles

Highly energy-efficient ICT components and solutions for FEVs

Call 5

20M€

- a) Solutions for overall efficiency gains in electric vehicle
 - electrical and thermal management, electrified auxiliaries, closed-loop control and cooperative interaction ... (STREP)
 - b) Safe and robust subsystems
 - communication, sensors, actuators, distributed controls, power electronics, active safety and comfort ... (STREP)
 - c) Fail-safe systems and electrical architectures, vehicle-to-road infrastructure integration ... (STREP)
 - d) Coordination Action
 - reviewing needs, roadmapping ... (CSA)
- a) – c) -> optimisation at vehicle and system level
+ simulation, testing ...



International Cooperation

Targeted opening

- Challenge 1. Networks and services
 - Future Internet (Japan, USA)
 - Internet of Things / RFID (North America, China, Japan, Korea)
 - Trustworthy ICT (Developed countries, BRICs)
- Challenge 3. Components, Systems, Engineering
 - Semiconductors, components, nanoelectronic technologies (Russia, India, Japan, USA, Taiwan,)
 - Embedded systems (USA, India)
 - Photonics (Canada, Russia, USA, Australia)
- Challenge 6: ICT for mobility, environmental sustainability.
 - ICT for Mobility of the Future (Japan, USA)
- Objective 9.1b) Support to the uptake of EU ICT research results in developing economies
 - adapt to local requirements
 - STREP/SICA
- Objective 9.2: Supplements to ongoing projects
 - Trustworthy ICT, Nanoelectronics, Micro-nanosystems, Embedded Systems, ICT for Mobility (100K€/project)

5M€

Call 6

0.7M€

Calls 5, 6





Ongoing ICT projects with Japanese participation

1. Quantum Information Processing (FET) (Res. Org of Inf. Systems)
2. Fibre Optic Networks (Nat Int of Information and Communication)
3. Mobile and Wireless
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Call 5: Open **30 Jul 2009**, Close **26 Oct 2009**; 732 M€

Challenge	Objectives
Challenge 1: Pervasive and Trusted Network and Service Infrastructures	ICT 2009.1.1 The Network of the Future ICT 2009.1.2 Internet of Services, Software & virtualisation ICT 2009.1.3 Internet of Things and enterprise environments ICT 2009.1.4 Trustworthy ICT ICT 2009.1.6 Future Internet Experimental Facility and Experimentally-driven Research
Challenge 3: Components, systems, engineering	ICT 2009.3.1 Nanoelectronics Technology ICT 2009.3.5 Engineering of Networked Monitoring and Control Systems ICT 2009.3.7 Photonics ICT 2009.3.9 Microsystems and Smart Miniaturised Systems
Challenge 4: Digital Libraries and Content	ICT 2009.4.2 Technology-Enhanced Learning ICT 2009.4.3 Intelligent information management
Future and emerging technologies	ICT 2009.8.4,5,6,9,10 FET-Proactive
Horizontal support actions	ICT 2009.9.2 Supplements to support International Cooperation between ongoing projects ICT 2009.9.5 Supplements to Strengthen Cooperation in ICT R&D in an Enlarged Europe



Three Cross-Thematic Calls:

Open **30** Jul 2009, Close **3 Nov 2009**; 35 + 15 + 20 M€

	Objectives
Contribution of ICT to PPPs for R&D in the EERP: Factories of the Future	FoF-ICT-2010-10.1 Smart Factories: ICT for agile and environmentally friendly manufacturing
Contribution of ICT to PPPs for R&D in the EERP: Energy-Efficient Buildings	EeB-ICT-2010-10.2 ICT for energy-efficient buildings and spaces of public use
Contribution of ICT to PPPs for R&D in the EERP: Green Cars	GC-ICT-2010-10.3 ICT for the Fully Electric Vehicle



Call 6: Open 24 Nov 2009, Close **13 April 2010**; 286 M€

Challenge	Objectives
Challenge 2: Cognitive systems, interaction, robotics	ICT 2009.2.1 Cognitive Systems and Robotics
Challenge 4: Digital Libraries and Content	ICT 2009.4.1 Digital Libraries and Digital Preservation
Challenge 5: Towards sustainable and personalised healthcare	ICT 2009.5.3 Virtual Physiological Human
Challenge 6: ICT for mobility, environmental sustainability and energy efficiency	ICT 2009.6.2 ICT for Mobility of the Future
Future and emerging technologies	ICT 2009.8.7,8,9,10 FET-Proactive
Horizontal support actions	ICT 2009.9.1 International Cooperation ICT 2009.9.2 Supplements to support International Cooperation between ongoing projects



More Information

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





“FET-Open targets *foundational breakthroughs* that open the way towards radically new forms and uses of ICT”

- **STREP: scientific foundations** of future ICT that may be radically different from present day ICT
 - **new avenues, paradigm shifts ...**
- **CSA: catalyse lasting and transformative effect on communities and practises** for high-risk and high-impact research
- **Continuously receivable**
 - **two step submission for STREPs**
 - **specific eligibility and evaluation criteria**
- **61M€**
 - **committed following cut-off dates**



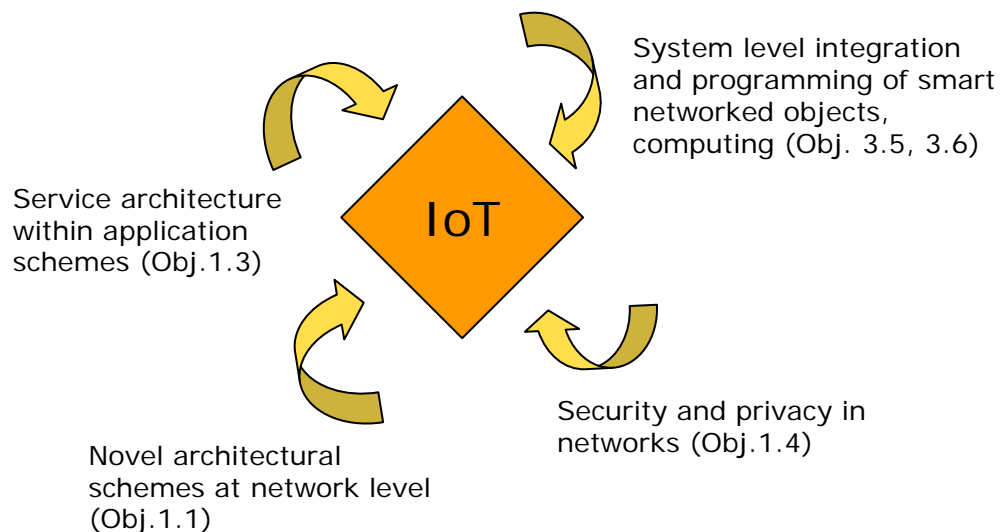
Addressing synergies throughout the Programme

Breakthroughs from cross-overs and convergence of technologies and disciplines

Innovations from the use of ICT in demanding application contexts

Technology-led challenges: removing roadblocks and improving the capability of generic technology components, systems and infrastructures

Application-led challenges: new systems, products and services that provide step-changes in the capabilities of the resulting application solution



Example: Internet of Things



Other important features

Involving **SMEs** and feeding innovation

- finance high-risk, early-stage research and development
- build strategic partnerships and operate outside local markets

-> aim is to ensure that SMEs constitute an important part of the ICT research consortia

Contributing to European and global **standards**

- contribution and active support to industrial consensus eventually leading to standards is strongly encouraged

Encouraging the use of **IPv6**

- research projects facing a choice of computer network protocol are encouraged to utilise IPv6

Bringing the **user** in research cycles

- discovering new and emerging behaviours and use patterns
- assessing at an early stage the socio-economic implications of new technological solutions

-> Proposers are encouraged to apply user-driven Open Innovation methodologies

- Future Internet experimental facility in Challenge 1
- challenge 7
- other challenges driven by socio-economic goals

