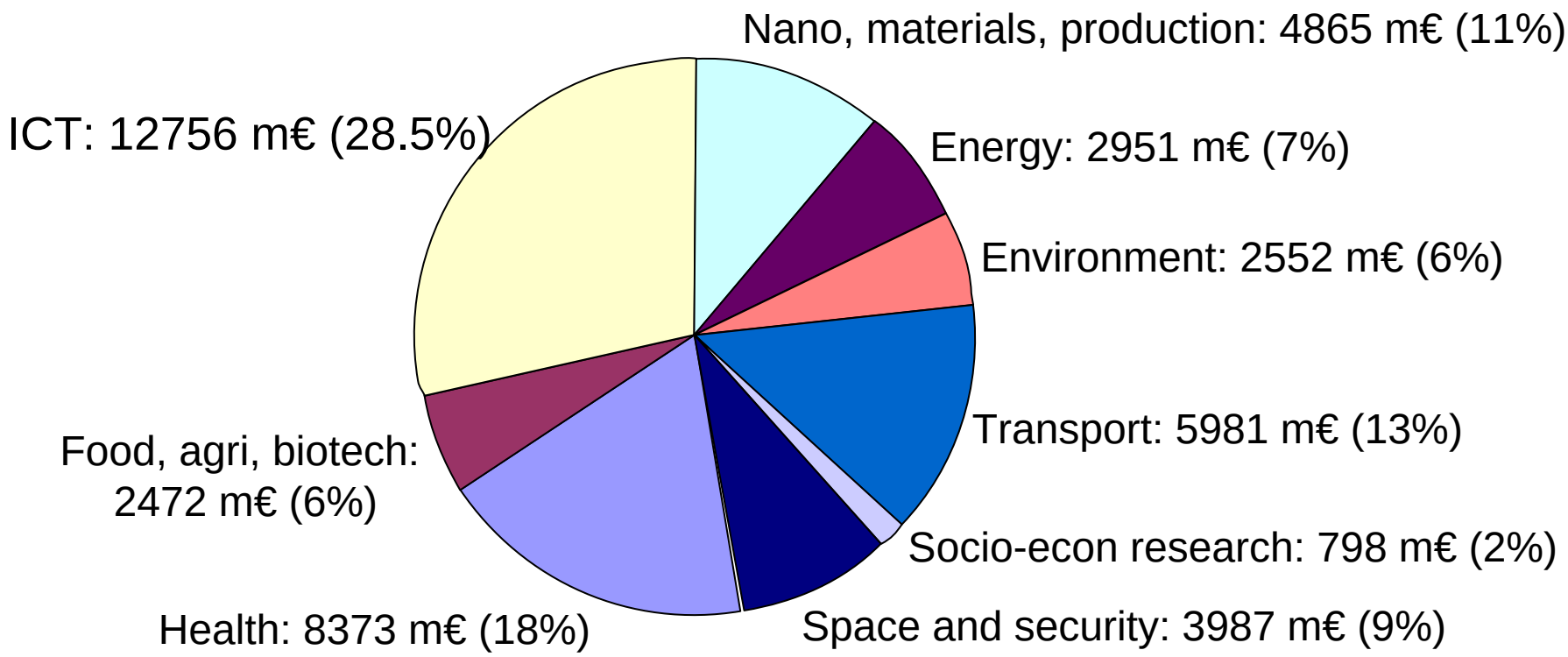
7º Programa Marco de I+D de la UE
ICT

I. Laso Ballesteros,
Directorate General Information Society and Media.
European Commission
Email: Isidro.laso@ec.europa.eu

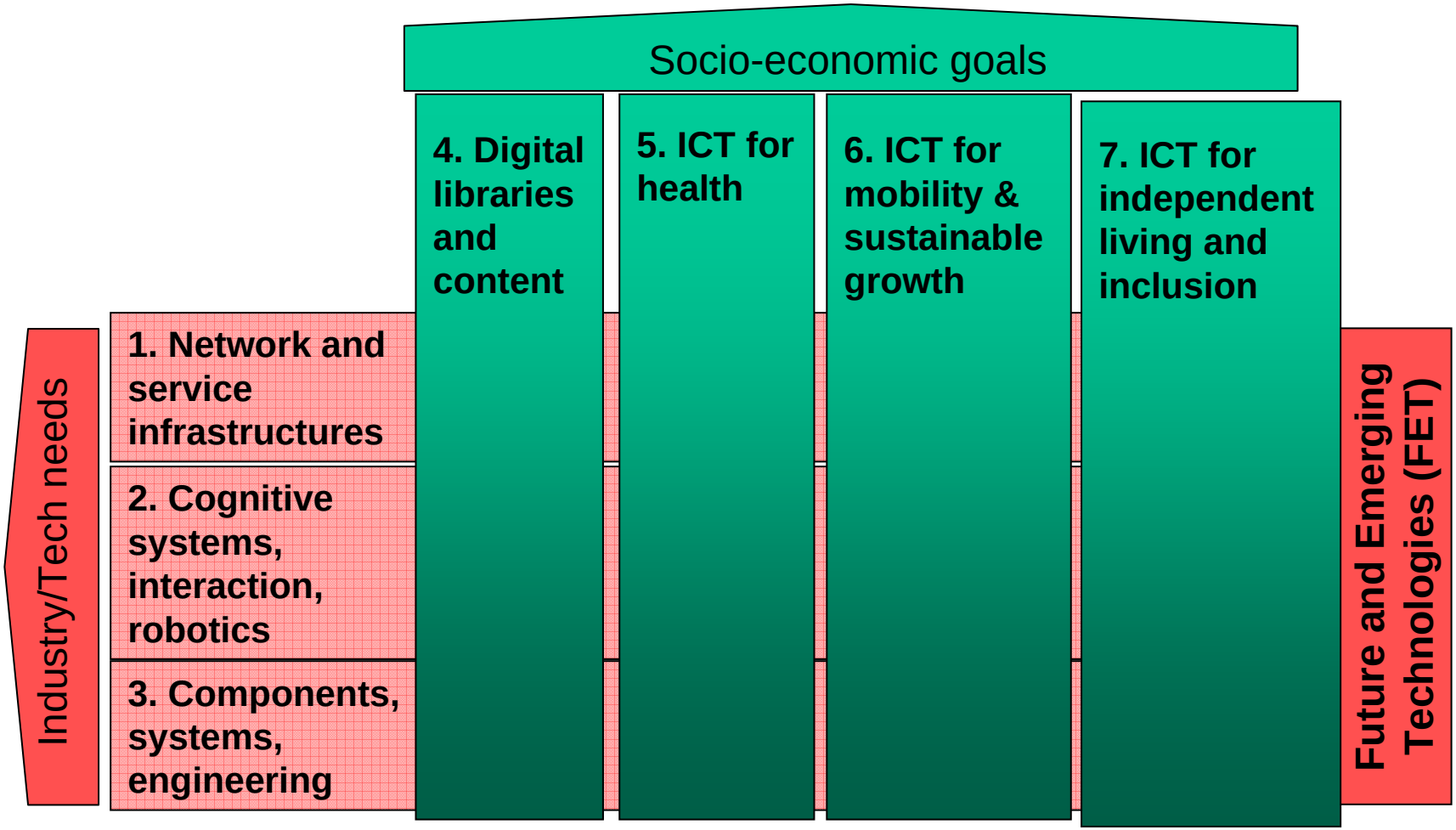
“Cooperation” – Collaborative Research – Themes



Work Programme approach and structure

- A limited set of *Challenges* that
  - respond to well-identified industry and technology needs
    and/or
  - target specific socio-economic goals
- A *Challenge* is addressed through a limited set of Objectives that form the basis of Calls for Proposals
- An Objective is described in terms of
  - target outcome
  - expected impact on industrial competitiveness, societal goals,..
  - Funding schemes
- A total of 25 Objectives expressed within 7 *Challenges*

Work Programme - *Challenges*



Challenge 1: Pervasive and trusted network & service infrastructures.

- Network and service infrastructures underpin economic progress and the development of our societies
  - 2 billion mobile terminals in commercial operation, 1 billion Internet users, 400 million internet enabled devices
- A growing and changing demand
  - for increasing user control of content/services
    for networking 'things' - TV/PC/phone/sensors/tags …
    for convergence: networks|devices|services - video/audio/data/voice/.
- Current technologies can be, and need to be improved significantly
  - for scaling up and more flexibility
    for better security, dependability and robustness
    for higher performance and more functionality
- Europe is well-positioned: industry, technology and use
  - networks equipment and services, business software, middleware, security, home systems …

Challenge 1 targets

Today	5 – 10 years

• "Convergence" emerging but:
  • user handles separate networks
  • a multiplicity of devices
  • disparate services
• Billions of devices connected
• Security and trust are "added on"
• Robustness/dependability a key hurdle
• Difficulty to cope with the fragmentation of the value chain
	• Anywhere, anytime, any device
	  • seamless, ubiquitous
	  • broadband, mobile
	  • reconfigurable to load/use/context
	• Trillions of devices connected
	• "Built-in" security and trust
	• Highly dependable software and systems
	• Full support to distributed value chains and to the networked enterprise

Challenge 1: Objectives in in Calls for Proposals

ICT Call 1

1. The network of the future
   - mobile, broadband … spectrum-efficient, high-speed … context-aware, scalable … controlled, managed …

2. Service & software architectures, infrastructures & engineering
   - dynamic composition of services … service/software engineering tools … complexity transparency … virtualised resources …

3. ICT in support of the networked enterprise
   - inter-enterprise interoperability … integrated enterprise … intra-enterprise collaboration …

4. Secure, dependable and trusted infrastructures
   - resilience in networks … trust in services … trusted computing … identity management and privacy enhancing …

5. Networked media
   - audio-visual distribution/flow infrastructure … media manipulation platforms …

ICT Call 2

6. New Paradigms and Experimental Facilities
   - Advanced networking approaches to architectures and protocols … Interconnected test beds …

7. Critical Infrastructure Protection (Joint Call between ICT and Security Themes)
   - Technology building blocks for creating, monitoring and managing secure, resilient and always available information infrastructures … that link critical transport and energy infrastructures …

Challenge 2: Cognitive systems, robotics and interaction

- Today's ICT systems cannot learn from experience and reason, cannot contextualise and adapt, and cannot (inter)act based on observation and learning
  - many ICT applications cannot be developed further if there are no new breakthroughs in machine intelligence and systems engineering …
- Overcoming such technology roadblocks opens the doors to a wide range of opportunities in new application fields
  - vision/sensing systems, service robots, health robots, industrial robots, multimodal and multilingual interactions ...
- Europe has key assets to build on
  - world leadership in industrial robotics and systems engineering
  - mastering of multiple disciplines: neuroscience, microsystems …
  - excellent academic research in these fields

Challenge 2 targets

Today

- Robots operating in ‘modelled’, ‘structured’ and ‘constrained’ environments
  - industrial robots
  - ‘programmed’ service robots
- Basic understanding of computational representations of cognitive processes
  - first applications in cognitive vision
- Human-machine interactions that are rather static / passive
  - unable to adapt to human behaviours and to empower humans in their interactions

5 – 15 years

- Robots, machines and systems exhibiting advanced behaviour
  - operating with gaps in knowledge
  - operating in open-ended env.s
  - operating in dynamic / frequently changing environments
- Machines and systems that understand their users / context
  - learning from observation
  - adapting to context
- Systems that analyse and understand multimedia and multimodal digital information
  - all senses, gestures, natural language – ‘human-in-the-loop’

Challenge 2: Objectives in Calls for Proposals

ICT Call 1

1. Cognitive systems, interaction, robotics
   - engineering principles for intelligent, integrated systems …; robots/agents that operate autonomously …; human-machine interaction based on sensor data and human language …

ICT Call 3

1. Cognitive systems, interaction, robotics
   - as above

Challenge 3: Components, systems, engineering

- Electronic systems underpin trillion Euro ICT markets
- Electronic systems are embedded in all artefacts of life
  - 20-40% of the value of new products comes from embedded electronics
  - increasing demand for lower cost, higher performance components
- Europe is currently leading in embedded electronics in a number of industries
  - car safety, engine control, fly-by-wire avionics, telecom equipment, medical equipment, industrial automation …
- European firms also among top semiconductor manufacturers and equipment companies
- Europe enjoys leading positions in emerging fields
  - photonics, plastic electronics, flexible displays, integrated micro/nanosystems …

Challenge 3 targets

Today	5 – 10 years

• 45 nanometer node
  • 300 mm wafers
	• Below the 32 nanometer node
	  • 450 mm wafers
	  • materials, processes, interconnects, design, manufacturing

• Conventional CMOS Silicon dominate
  • ‘homogeneous’ integration
	• New materials, higher levels of integration
	  • more heterogeneous (SoC, SiP)

• Photonics applications emerging	• Wider use of advanced photonics
• Design gap for embedded software	• Higher productivity in the design of embedded systems / software
• Unable to analyse aggregate behaviours, predict and control systems	• Higher control capacity of large-scale real time embedded systems • Embedded computing

Challenge 3: Objectives in Calls for Proposals

ICT Call 1

1. Next generation nanoelectronics components and electronics integration
   - more Moore, more than Moore: Soc / SiP, beyond CMOS, …
2. Organic and large-area electronics and display systems
   - for logic, memory and light-emitting fct … visualisation systems …
3. Embedded systems design
   - design methods, integrated tool chains …
4. Computing systems
   - architectures for multi-core computing system, for embedded platforms …

ICT Call 2

5. Photonic components and subsystems
   - core and application-specific components/subsystems …
6. Micro/nanosystems
   - smart systems, nano/bio/ICT, smart fabrics, memory systems …
7. Networked embedded and control systems
   - middleware platforms, cooperating objects, advanced control …

Challenge 4: Digital libraries and content

- Growing load of information and content and increasing demands for knowledge and skills
  - in less than 10 years, the average person will be managing terabytes of videos, music, photos, and documents every day
  - digital content production | consumption:
    from “few-to-many” to “many-to-many” models
- Today’s technology provides limited tools for access/interaction, development/creation, delivery/diffusion and preservation of content & knowledge
- Europe, with its unique cultural heritage and creative potential, is well placed to take advantage of technology developments and their use

Challenge 4 targets

Today

- Limited access and usability
  - content not efficiently exploited
  - interactivity limited to smart menus
- Tools for capturing and editing still in their infancy
- Content is not personalised
- Learning tools primarily focus on the delivery of content

5 – 10 years

- "Digital libraries" widely available
  - easy to create, access, interpret, use and preserve content and knowledge
  - cost-effective, reliable, multilingual
- Advanced authoring tools
- Effective semantic-based systems and knowledge management
- Mass-individualisation of learning experiences with ICT (mid-term); adaptive and intuitive learning systems (longer term).

Challenge 4: Objectives in Calls for Proposals

ICT Call 1

1. Digital libraries and technology-enhanced learning
   - large-scale libraries, preservation, adaptive and intuitive learning …
2. Intelligent content and semantics
   - authoring, workflow, personalisation, semantics, knowledge …

ICT Call 3

1. Digital libraries and technology-enhanced learning
   - as above
2. Intelligent content and semantics
   - as above

Challenge 5: Towards sustainable and personalised healthcare

- Rising demands on healthcare
  - by 2050 close to 40% of the Union′s population will be over 65 years
  - growing expectations of citizens for better care
  - increasing mobility of patients and health professionals
  - need to respond to risks for emerging diseases
- By 2010, ICT for Health spending may account for up to 5% of the EU's total health budget, up from just 1% in 2000
  - need to access, understand and securely manage huge amounts of health information
- ICT is also supporting progress in medical research and a shift towards evidence-based medicine
- European businesses have every opportunity to become leading global players in the new ICT for Health industry

Challenge 5 targets

Today

- Citizens, healthy or under treatment, cannot monitor their health
  - no access to comprehensive and secure Electronic Health Records
- Health professionals do not have fast and easy access to patient-specific data @ point-of-need
  - to support diagnosis or plan clinical interventions
- Health authorities do not make sufficient use of information processing systems

5 – 10 years

- Innovative systems and services for personalised health monitoring.
  - e.g. wearable/portable ICT systems
- Efficient systems for point-of-care diagnostics
  - e.g. alert and management support
- ICT-based prediction, detection and monitoring of adverse effects
  - e.g. data mining
- Tools for patient-specific computational modelling & simulation of organs or systems (longer term)

Challenge 5: Objectives in Calls for Proposals

ICT Call 1

1. Personal health systems for monitoring and point-of-care diagnostics
   - personalised monitoring/diagnostics, chronic disease management, preventive monitoring for people at risk …
2. Advanced ICT for risk assessment and patient safety
   - computerised adverse event systems, risk prediction for large scale events …

ICT Call 2

3. Virtual physiological human
   - patient-specific computational modelling and simulation, data integration, knowledge extraction, clinical applications/demos …

Challenge 6: ICT for Mobility, ~~environmental sustainability and energy~~ efficiency

- Growing demand for transport services
  - more congestion, higher energy consumption, pollutant emissions
- Accidents causing fatalities and injuries
  - over 40.000 fatalities on the EU roads every year
- Increasing demand for natural resources
  - 1-2% per year for energy and growing water consumption
- Natural and industrial disasters has doubled in one decade
  - killing 500.000 people and causing 700 billion of damage
- Europe's industry is one of the most competitive
  - automotive, transportation, civil protection, equipment supply …

Challenge 6 targets

Today

- Safety of vehicles and their energy efficiency have improved, but
  - the “zero-accident scenario” is still a distant goal
  - current vehicle active safety (driver warning, hazard detection …) is still limited to stand-alone systems
- Risk management systems provide isolated solutions
  - no co-ordinated ICT-triggered alert of rescue and security forces
- Infrastructures are not sufficiently energy efficient
  - transport, buildings, production plants …

5 – 10 years

- Intelligent Vehicle Systems
  - secure and reliable vehicle-to-vehicle and vehicle-to-infrastructure comm systems
  - optimised traffic management at large scale + mobility services
- Fully integrated management systems / shared data to monitor, warn and react to environmental and other risks
- Intelligent monitoring of energy production, distribution, trading and use

Challenge 6: Objectives in Calls for Proposals

ICT Call 1

1. ICT for the intelligent vehicles and mobility services
   - accident prevention, services for people and goods …

ICT Call 2

2. ICT for cooperative systems
   - vehicle-to-vehicle, vehicle-to-infrastructure, field operational tests …
3. ICT for the environmental management and energy efficiency
   - collaborative management systems, energy-neutral environments …

Challenge 7: ICT for Independent Living and Inclusion

- Between 1998 and 2025 the proportion of the population classified as elderly will increase from 20% to 28%
  - more people with high disability rates
  - smaller productive workforce
- Need for a paradigm shift in health and social care and new requirements for inclusion, accessability and usability
- Complexity and lack of accessibility and usability of many ICT-based products and services is a major barrier for many people
- A major economic opportunity for European industry

Challenge 7 targets

Today

- Research on technology for independent living is in its infancy
  - systems for inclusion
  - assistive technology
- Increasing complexity and limited usability of many products and services
  - eAccessibility
- Lack of interoperability between existing inclusive systems
- Lack of interoperability between assistive technologies and mainstream ICT

5 – 10 years

- ICT-based solutions extending independence and prolonging active participation in society
- ICT solutions that help reduce the 30% of the population currently not using ICT
  - user-friendly systems
- Cost-effective, interoperable solutions enabling seamless and reliable integration of devices and services

Challenge 7: Objectives in Calls for Proposals

ICT Call 1

1. ICT and ageing
   - personal autonomy, participation in society …

ICT Call 2

2. Accessible and inclusive ICT
   - embedded generalised accessibility support, assistive systems …

Future and Emerging Technologies

Objective

- To lay foundations of the ICT innovations of tomorrow
- To foster trans-disciplinary research excellence in emerging ICT-related research domains
- To help emerging research communities to organise and structure their research agenda

Impact

- Pathfinder role: prepare for future ICT directions in the WP
- Create new long-term competitive options for ICT
- Avoid ‘tunnel vision’ in FP7, by exploring unconventional ‘minority’ options and opportunities off the beaten track

Future and Emerging Technologies

- FET Open Scheme
  - Open to any foundational ICT-related research
  - High-risk / high-potential impact
  - To shape emerging research communities and agendas
  - Coordination and international cooperation
  - Continuous submissions
- FET Pro-active Initiatives
  - Fundamental cross-cutting long-term challenges in ICT:
    1. Nano-scale ICT devices and systems
    2. Pervasive adaptation
    3. Bio-ICT convergence
    4. Science of complex systems for socially intelligent ICT
    5. Embodied Intelligence
    6. ICT forever yours

Horizontal support actions

- International cooperation
  - To pave the way for strategic partnerships in view of developing global standards and interoperable solutions and strengthening EU competitiveness
  - To widen the diffusion of the information society, especially in developing countries and strengthened the EU policy for development

- Trans-national co-operation among National Contact Points
  - One proposal including officially appointed NCPs
  - To improve NCP service across Europe
  - To help to simplify access to FP7 calls
  - To lower the entry barriers for newcomers
  - To raise the quality of submitted proposals

Próximas llamadas para propuestas

- ICT2008 en Lyon. Evento con varias miles de personas, el mejor lugar para hacer ‘networking’ y conocer futuros partners para propuestas. Ser activos y tratar de ‘decir algo’ en la parte de discusión del final de las “Networking sessions” para que sepan que existís.

- Nuevo programa de Trabajo WP2009/10. lineas de trabajo similares, se ha añadido “La futura internet”

- Publicación: Noviembre 2008

- Deadline (todavia no esta decidido): February/March 2009

More Information

- FP7: http://ec.europa.eu/fp7/ict
- ICT2008: http://ec.europa.eu/ictevent
- FP6: http://cordis.europa.eu/ist
- Gaceta SOST: http://www.sost.es/GACETAS%202008/JUNIO%202008/Junio%202008.pdf

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- Email: Isidro.laso@ec.europa.eu