The FET Proactive Initiative QIPC+E2QT

Strategy and Planning

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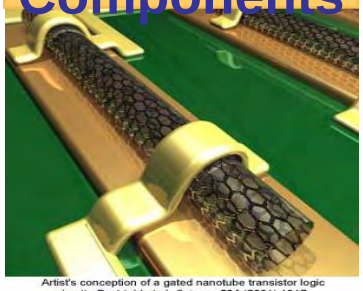
FET Mission (1)

Tackling the limits of traditional ICT & stimulating the emergence of new ICT foundations

Components



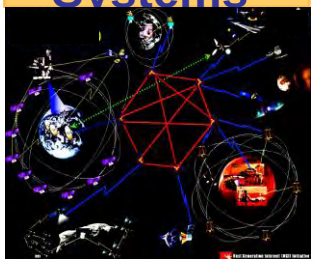
Artist's conception of a gated nanotube transistor logic circuit. Bachtold et al.,*Science* **294** (2001) 1317.

Miniaturisation!

Core ICTs

IT, Communications, Interfaces

Systems



Managing Complexity!

Intelligence

Inspiration from nature!

FET Mission (1)

Tackling the limits of traditional ICT & stimulating the emergence of new ICT foundations

Bringing new science into technology!

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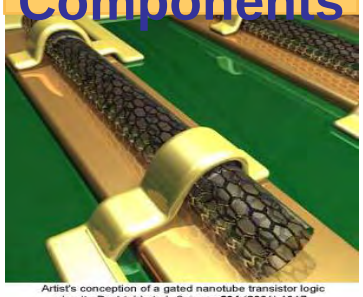

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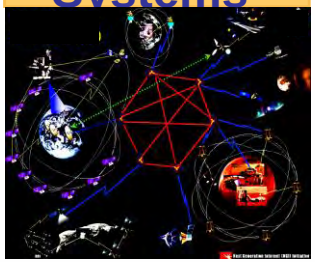

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Biology & Life-sciences

Materia… Scienc…

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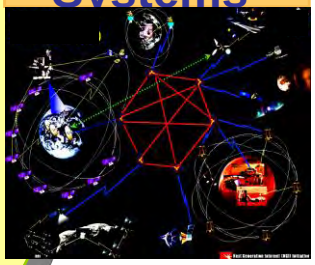
IT, Communications, Interfaces

Neuro… sciences

…ocial Sciences

Cognitive

Systems



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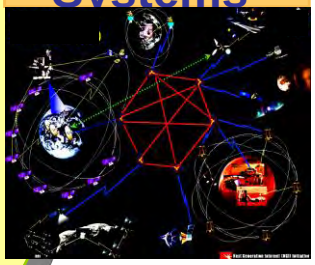

Managing Complexity!

Intelligence

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Co-evolution of societal and technological change

FET Mission (2)

Role of FET: Pasteur's Quadrant

	Consideration of use? *No*	Consideration of use? *Yes*
Quest for fundamental understanding? *Yes*	Pure basic research (Bohr)	Use-inspired basic research (Pasteur)
Quest for fundamental understanding? *No*	N/A in ICT or ERC	Pure applied research (Edison)

FET Mission (2)

Role of FET: Pasteur's Quadrant

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Quest for fundamental understanding? *Yes*	Pure basic research (Bohr)	Use-inspired basic research (Pasteur)
Quest for fundamental understanding? *No*	N/A in ICT or ERC	Pure applied research (Edison)

Ideas ERC

FET

ICT

FET Mission (3)

Supporting the emergence of new visionary ICT research

1. Pathfinder and Incubator for exploring new visionary ideas

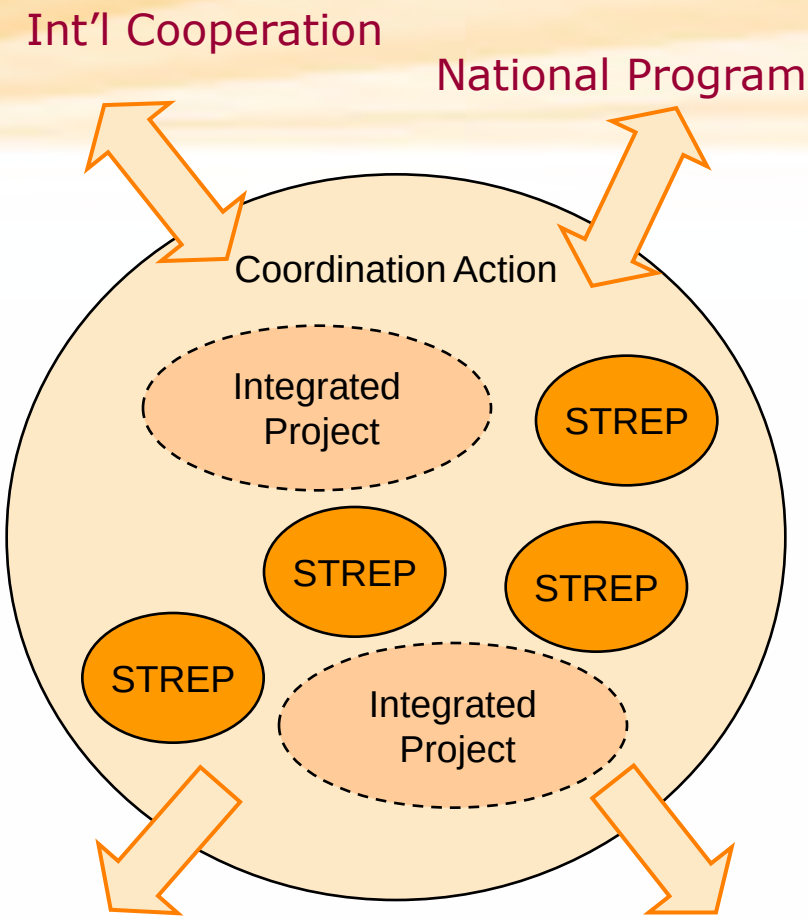
FET Proactive
- **Top-down approach**
- **Set of novel pre-defined themes**
- **Fixed calls**

FET Open
- **Bottom-up approach**
- **Open to any research idea**
- **Continuous call/two steps**

4. Maturing & structuring emerging research fields, research communities and research practices

FET Proactive + FET Open:
two intertwined successful schemes

What are Proactive Initiatives?



- Pathfinder of new concepts, paradigms, disciplines,
- Promising a breakthrough
- Foundational, visionary, high-risk
- New interaction of existing disciplines
- Integration of activities in a mini-research programme
- A set of projects & non-research initiatives
- In FP6: Integrated Projects
- FP7 Call 1: IP + STREP
- FP7 future calls: ?
- Typically: EC funding 10-30 M€
  3-10 projects

FET Proactive Consultations

Context - Objectives

- Context: Preparation of Work Programme 2009-2010
  - Define 5 to 7 initiatives for 2009-2010
  - Renewal and continuity
  - Revisit initiatives foreseen for 2009
  - Give perspectives for 2011

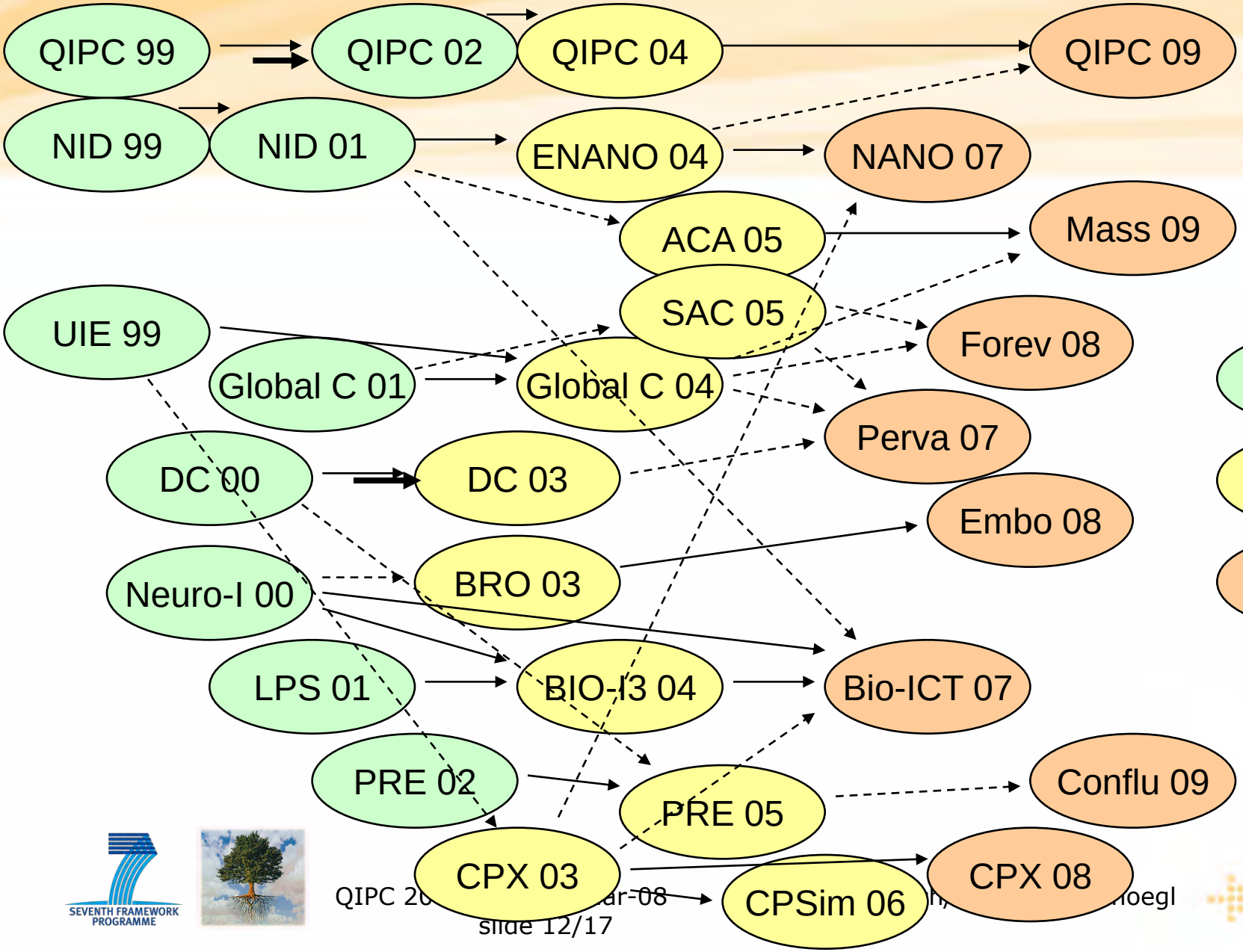
- Objective: Identify topics for future proactive initiatives.
  - Consult a wide range of expertise
  - identify strategic areas
  - beyond traditional lines of research
  - novel opportunities for collaboration between scientific communities or disciplines.

FET Proactive Consultations

Process – Overview

- Broad ranging views: *Shaping the Future of FET Proactive*
  - 20/21 September 2007
  - 22/23 November 2007
- Topical workshops with specific communities:
  - *Human Computer Confluence* (16 Nov 2007)
  - *Massive ICT Systems* (27 Nov 2007)
  - *QIPC and Entanglement-enabled Technologies* (6 Dec 2007)
  - *BIO-ICT* (17 Jan 2008)
  - *Overlay Computing* (25 Jan 2008)
  - *Molecular ICT Systems* (30 Jan 2008)
  - *Alternative Bio-inspired ICTs* (20 Feb 2008)

FET PROACTIVE: Evolution FP5 to FP7



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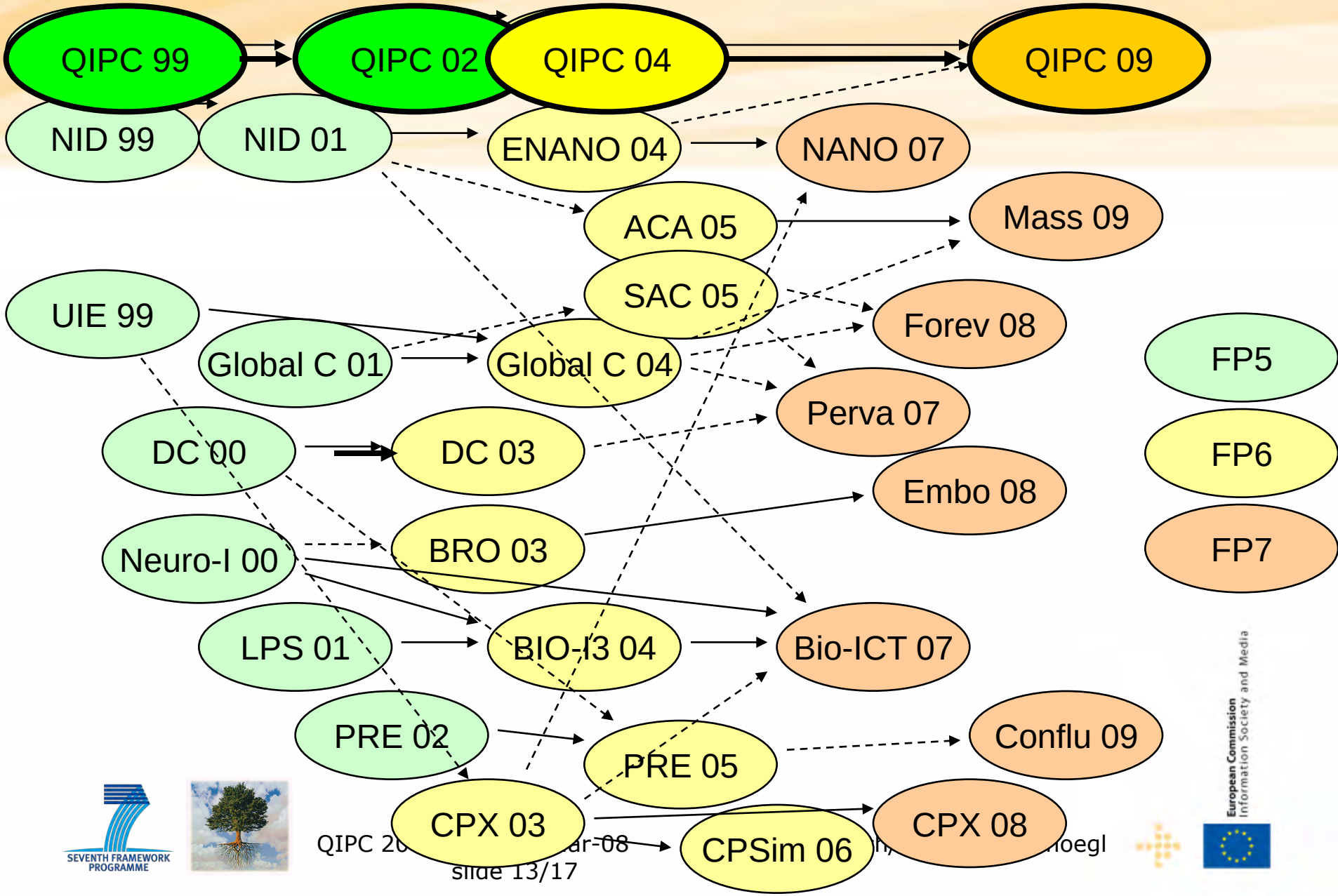
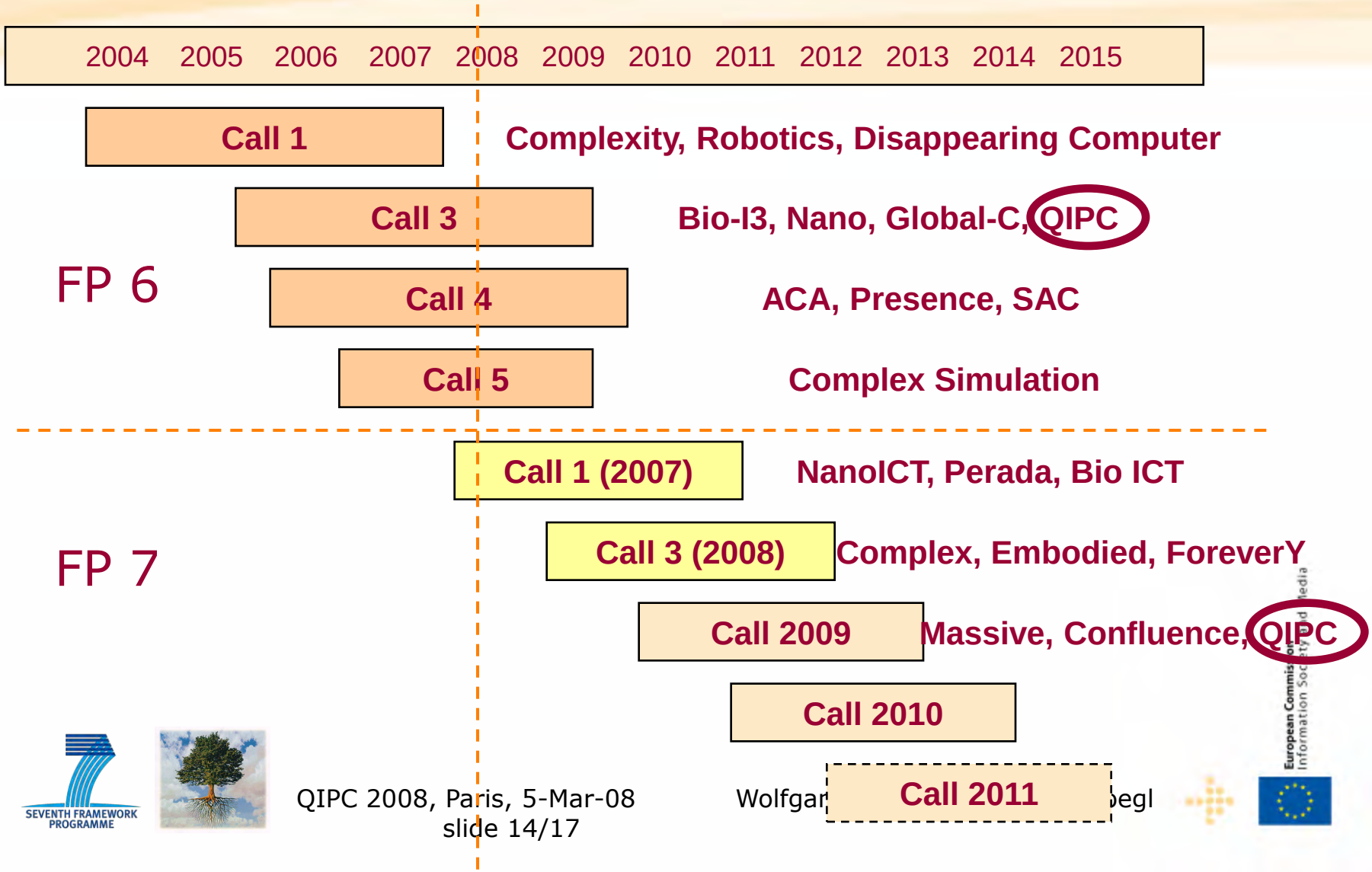


FET Proactive Initiatives
Scheduling and Motivation



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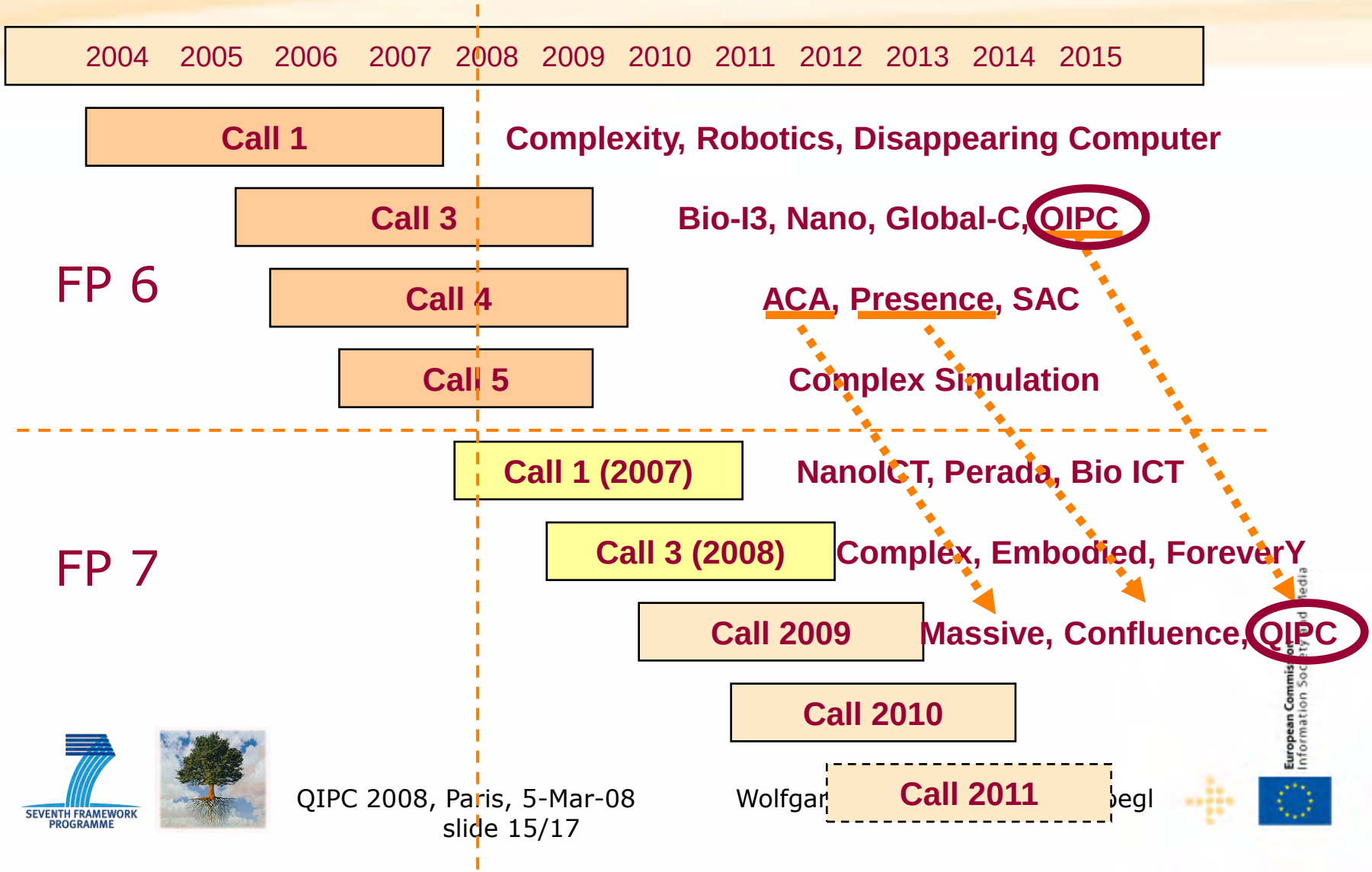

QIPC: An European research activity
History

- First precursors in FP4 (’95-’98): “quantum information processing”
- In FP5 (’99–’02) FET launched QIPC as a Proactive Initiative (PI).
- In FP6 (’03–’06) QIPC continues as a FET PI
- Total investment of FET PI + FET OPEN in QIPC:
  - FP5 ~40 MEuro (thereof FET PI 30 MEuro)
  - FP6 ~40 MEuro (thereof FET PI 25 MEuro)
- Trend: mainstream-oriented programmes like “security”, take up research activities based on QIPC, e.g. FP6 SECOQC (“Secure Communication ..”) budget 11.3 MEuro **-> success!**

QIPC: An European research activity
Achievements

- QIPC built an European wide network of scientists.
- In total: 167 groups with >1000 scientists active in QIPC
- QIPC has achieved important scientific results over the last ten years recognized by numerous publications in high-impact journals like “Science”, “Nature” and others
- QIPC put together a strategic report giving itself near-term and long-term research objectives.
- QIPC took first steps to commercialisation of scientific results -> e.g. quantum cryptography.
- FET was 1st European funding agency to recognize the relevance of QIPC.

Work Programme Inputs
FET Proactive

- Draft Call 4 text in WP 2007-08 ✓
- Shaping Future FET Proactive (workshop) ✓
- Shaping Radically New Ideas (workshop) ✓
- Topical Workshop QIPC+QT on Dec. 6th ✓
- ICTAG Long-Term Working Group
- Public Consultation

→ **Work Programme 2009-2010**

Work Programme Timetable

21/22 Sep-07 Workshop "Shaping FET Proactive"

⇨ Report is public since beginning of Nov.

6th Dec-07 Consultation workshop "QIPC and other quantum technologies"

⇨ Final Report has been published on FET web-site

Until 20th Mar-08 Public web consultation

⇨ is open to all stakeholders

Mar-08 First Work Programme Draft

May-08 WP to Programme Committee

Oct-08 WP adoption

Call 4 including QIPC

Tentative Timetable

- TENTATIVE: Call to be launched: December 2008
- Tentative: Deadline for submission of proposals : March - April 2009
- Tentative: Evaluation: May - June 2009
- Tentative: Negotiations: Autumn 2009
- Tentative: Start of projects : Dec 2009 - Jan-Febr 2010

« QIPC and other Quantum Technologies »

Consultation workshop on Dec. 6th, 07 in Brussels

- **Scalability of Quantum Processing Systems**
- **Long-Distance Quantum Communications & Interconversion of qubits**
- **Quantum Information Theory, Algorithms and Paradigms**
- **Entanglement Enabled Quantum Technologies**

QIPC

Atomic Scale Techn.

« QIPC and other Quantum Technologies »

Consultation workshop on Dec. 6th, 07 in Brussels

•**Scalability of Quantum Processing Systems**

•**Long-Distance Quantum Communications & Interconversion of qubits**

•**Quant… Algor…**

• **Entanglement-Enabled Quantum Technologies**

•Develop entanglement-enhanced technologies based on a few qubits (e.g., improved atomic clocks, metrology, sensors and imaging, …)

QIPC

…omic …cale …chn.

QIPC and Entanglement-enabled Technologies

Report of consultation workshop

QIPC and Entanglement-enabled Technologies

Report of consultation workshop

- **Report is available.**
- **Online consultation is open until 20th March on Website:**

http://cordis.europa.eu/fp7/ict/fet-proactive/qipcqt_en.html

QIPC+E2QT: Setting priorities in call4

1. Continue core activities in QIPC with multidisciplinary approaches based on physics, computer science, engineering, mathematics and materials science
2. Broaden research focus to allow for spin-off effects and to enable synergies, e.g. “entanglement enabled quantum technologies”
3. Emphasize research activities potentially leading to applications and reinforce links to industry
4. Consider opportunities in linking with communities other than QIPC such as nanotechnologies, spintronics etc.
5. Maintain critical mass at European level and further strengthen cooperation and coordination (ERA).