Information Society Technologies

The ARTEMIS Technology Platform and Joint Technological Initiative

Athens, 19 January 2007

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Embedded Systems, IST Programme
DG Information Society and Media
European Commission

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Outline

- **The ARTEMIS Technology Platform**
  - ...and links to the FP7 ICT work programme
- **Joint Technology Initiatives in IST**
- **Information on ARTEMISIA**

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EmS business expenditure

2003	ICT R&D business expenses/ total R&D business expenses	ES R&D business expenses/ total R&D business expenses	Ratio of business expenditures for R&D in ES/ICT
EU25	17%	9%	56%
US	36%	15%	42%
JP	30%	19%	62%
Rest of Asia	19%	10%	54%
World	27%	13%	49%

2003-2009 in PPP (Purchasing Power Parity)	ICT R&D Business Expenses	ES R&D Business Expenses	ICT R&D Business Expenses	ES R&D Business Expenses
	2003		2009	
EU25	21.7 b€	12.1 b€	34.6 b€	22.9 b€
US	68.0 b€	28.3 b€	103.2 b€	54.9 b€
JP	24.8 b€	15.4 b€	40.7 b€	29.3 b€
Rest of Asia	14.2 b€	7.6 b€	23.1 b€	15.2 b€
World	128.7 b€	63.4 b€	201.6 b€	122.3 b€

Economic importance of EmS

2002-2004 Industry domains	Average annual growth rate for Embedded System market	% of embedded electronics in final value (2004)	% of embedded electronics in final value (2009)
Automotive	10%	20%	36%
Avionics/ Aerospace	14%	n.a.	n.a.
Industrial automation	7%	>13%	22%
Telecommunications	15%	>23%	37%
Consumer electronics and intelligent homes	15%	>14%	41%
Health & medical equipment	18%	25%	33%

Worldwide trends and R&D programmes in Embedded Systems, FAST 2005

Erkki Liikanen
Commissioner
European Commission

Jürgen Dormann
Chairman and CEO
ABB

Nöel Forgeard
Chairman and CEO
Airbus

Matt Bross
CTO
British Telecom

Daniele Pecchini
CEO
COMAU

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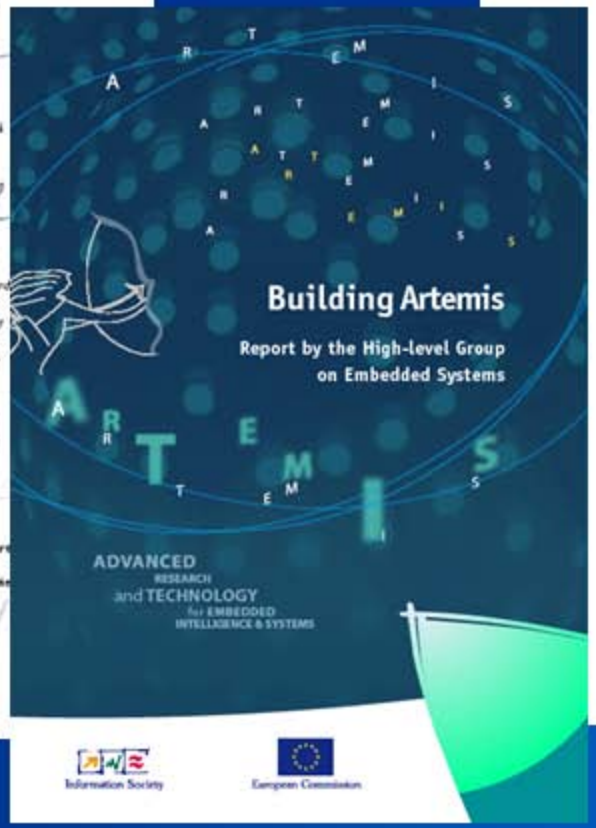
Ericsson

Pier Francesco Guarnaglili
Chairman and CEO
Finmeccanica SpA

Gilbert Declerck
President and CEO
IMEC

Wolfgang Ziebart
CEO
Infineon Technologies



Members of the High Level Group

Jorma Ollila
CEO
Nokia

Alberto Sangiovanni Vincentelli
Founder and Director
Parades

Gerard Kleisterlee
CEO
Philips

Siegfried Dais
Deputy Chairman of the Board, corporate R&D
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ST Microelectronics

David Levin
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Jon Frederik Baksaas
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Telenor

Denis Ranque
CEO
Thales

Peter Skalicky
Rector
Vienna University of Technology

Antoine Petit
Head of STIC
CNRS/Verimag

The Artemis Technology Platform

Advanced research and technology in embedded intelligence and systems

Aim and scope

- **Develop and drive joint European vision on Embedded Systems**
  - R&D and educational challenges
  - structural challenges: IPR, open source, standards, infrastructure,…
- **Align fragmented R&D efforts along common strategic agenda at Community, intergovernmental and national levels**

ARTEMIS Steering Board includes 10 of the top-25 EU companies in terms of global R&D

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ARTEMIS SRA

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ARTEMIS SRA links to ICT in FP7 (WP 2007-2008)

- **Main locus in ICT WP**
- **But also in Capacities programme…**
  - Research infrastructures
  - Regions of knowledge
  - Research potential (for convergence and outermost regions)
- **SF synergies**

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Embedded Systems Design

40 MEuro

- **Target outcomes**
  - Theory and methods for Embedded System Desi
    - Key issues are heterogeneity, composability, predicta
    - International cooperation is encouraged
  - Suites of interoperable design tools for rapid design and prototyping
    - Research will contribute to one or more of:
      - 1) Interoperability of tools from SME vendors
      - 2) Consolidating tool developers joint RTD work
      - 3) Open tool frameworks
- **Expected impact**
  - Increase the productivity of system development by an order of magnitude
  - Stimulate growth of high-tech European Embedded Systems Design companies
  - Reinforce scientific and technological leadership in the engineering of complex systems

SRA foundational R&D

SRA 3rd priority

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25 MEuro

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Computing systems

SRA foundational R&D

Target outcomes

- **Novel architectures for multi-core computing syste**
  - Architectures and system software for scalable and custo systems incorporating multiple networked, symmetric or h reconfigurable processing elements
  - Key issues are versatility in cost, power, performance, lifecycles; reliability and availability
- **Reference architectures for generic embedded platforms**
  - Development of a limited number of reference design/architectures
  - Key issues are composability, networking, robustness/se diagnosis/maintainability, resource management, evolvabi ation

SRA 1st priority

Expected impact

- **Availability of inexpensive generic platforms with high European added value enabling European supplier companies to increase their market share**
- **Develop European competences in the use of high-end computing to enable the development of new applications**
- **Foster European excellence in computing architectures, system software and platforms**

Call 2

47 MEuro

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Networked Embedded and Control Systems

- **Target outcomes**
  - Middleware platforms for embedded systems
    - Key issues: composability, minimum power consumption, open to 3rd parties
    - Emphasis on programmability, reconfiguration, privacy and t
  - Cooperating objects and Wireless Sensor Networks

SRA 1st priority

    - Spontaneous cooperation of objects in spatial proximity
    - Emphasis on new methods and algorithms, hardware/software platforms for distributed execution and programming and tools for self-organising systems
  - Control of large-scale complex distributed systems
    - Models, communication delays, uncertainty, close loop with sensor networks
    - Key issues: efficiency, robustness, safety, security
    - Targets: manufacturing plants and public infrastructures
- **Expected impact**
  - Enable entirely new services and applications
  - Make large infrastructures more efficient, flexible and productive
  - 100% plant availability, reduce maintenance and accidents

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JTIs – motivation and benefits

- **Bringing together fragmented efforts, building critical mass (ERA)**
  - Combine, for the first time, national, EC and private funding in a single R&D programme that focuses on joint objectives (SRA)
- **Ramping up R&D investment in Europe**
  - Provide incentives to industry and Member States to increase R&D investments
- **Combining the strengths of trans-national (EUREKA) and European programmes – while overcoming their weaknesses**
  - No budget uncertainty (e.g. compared to Eureka)
  - No duplication of evaluation/monitoring procedures (as in Eureka)
  - Shorter time-to-contract
  - No additional red tape for participants

This could pioneer new ways for running industrial R&D programmes in Europe !

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Proposed Joint Technology Initiatives in IST

To implement parts of the Strategic Research Agendas of ENIAC and ARTEMIS, aligning fragmented R&D efforts at European level in the fields of:

Nanoelectronics:

addressing the needs of silicon-based technologies & beyond

- shrinking of CMOS logic & memory devices
- development of value-added functions for System-on-Chip or System-in-Package solutions
- equipment & materials
- design automation

Embedded Computing Systems: ubiquitous, interoperable & cost-effective embedded systems

- reference designs and architectures
- middleware for interoperabil[illegible]ng se[illegible]s c[illegible]nectivity
- integrated d[illegible]n software tools for r[illegible]d development & prototyping

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JTI – Principles (1)

- **Single R&D and Innovation programme**
  - Focusing on SRA
- **Governance principles**
  - Transparency & openness in participation & operations
  - Industry has the lead
  - Three-way separation of powers:
    - **Industrial policy**
    - **Decisions on allocation of public money**
    - **Operations**
- **Operations**
  - Accountability
  - Unified common processes (established beforehand) for:
    - **Annual calls to implement the SRA**
    - **Proposal evaluation and project selection**
    - **Project monitoring and reporting**

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JTI – Principles (2)

- **Financing through commitment of resources from all stakeholders**
  - Industrial:
    - **cash for JTI operational cost and some non-R&D actions**
    - **in-kind for participation in R&D projects (>50%)**
  - Member & Associated States:
    - **Yearly earmarked budgets**
  - European Commission:
    - **Funding to participants in projects in proportion to national payments**
  - Other possible sources of funding
    - **EIB, structural funds,…**

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JTI Legal and Governing Structure (draft)

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Joint Technology Initiative

Governing Board
(Industry + Member/Associated States + EC)

Strategic decisions

industrial policy

chair
Research & Innovation Committee

chair
Public Authorities Board

budgets, calls content, project selection

Executive Director

Secretariat

daily management and operations

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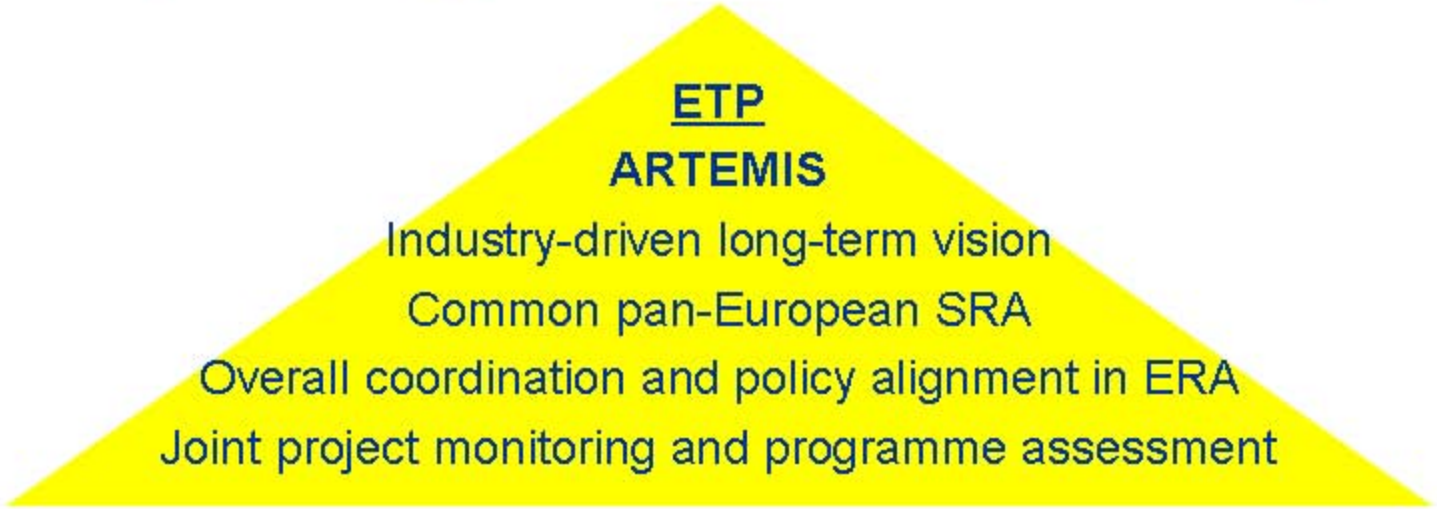
Secretariat | Director (Option)

Synergetic approach for executing SRA



FP7	JTI	EUREKA	National Programmes
Upstream	Downstream	Downstream	
IST collab. R&D	Unified processes	ITEA2, MEDEA+	
ERC, Mare Curie	National contracts	National contracts	
Research infrastructure	EC top-up	No EC top-up	

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JTI vs. FP

- **Upstream vs. downstream**
  - Industrial vs. foundational R&D
    - Inquiry-driven, targeted proactive and targeted reactive foundational research
  - Industrial vs. academic participation
  - Funding rates (50-75% in FP)
- **Who would participate**
  - FP: all MAS
  - JTI: all MAS but more attractive to organisations from countries committing budget

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