



Pervasive Adaptation

Future and Emerging Technologies Proactive

FP7

Wide Hogenhout



European Commission
Information Society and Media

Pervasive Adaptation

pervasive information and communication systems



- **Key features:**
 - Self-adapting software, hardware, protocols, architectures, ...
 - Massively scalable
 - Capable of adapting to highly dynamic contexts
 - Autonomous adaptation strategies (bio-inspired, stochastic, ...)
 - Multidisciplinary, human-centric research
- **Evolve-able pervasive systems**
 - From short term adaptation to long term evolution
- **Networked societies of artefacts**
 - From local autonomy to collaborative systems; ensembles of artefacts



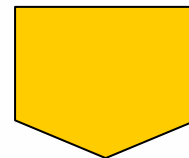
Pervasive Adaptation

pervasive information and communication systems



- **Pervasive**

- Information and communication technologies pervade into everyday life
- Delivering services adapted to person in context of use
- Objects in contact with each other and forming "anyware technologies"
- Autonomous adaptation



- Distribution, heterogeneousness, decentralisation, interdependence
- Dynamic and unpredictable environments



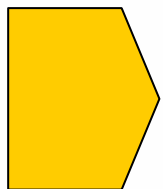
Pervasive Adaptation

pervasive information and communication systems



- **Adaptation**

- Being successful in highly dynamic environments means adapting, taking into account system behaviour
- Coping with increasing expectations in more dynamic environments
- Behaviour emerging from interaction between components

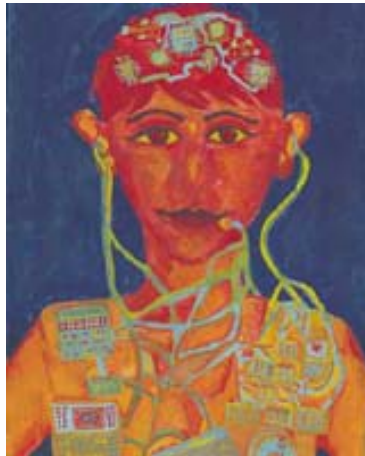


- How will the system react to adaptation? How to change behaviour to induce different system behaviour?
- Influencing behaviour through components that did not exist at design time
- How to give guarantees of system behaviour



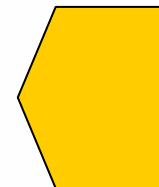
Pervasive Adaptation

pervasive information and communication systems



- **Human-Oriented**
 - Adaptation for implicit and proactive interaction with humans
 - Integrating within human-oriented systems
 - Collaborative systems – complex interactions between people, computers and intelligent objects

- Large, open and non-deterministic environments
- Complexity of interaction and adaptation
- Non-deterministic and non-predictable behaviour of people



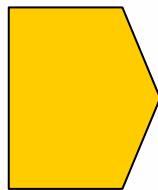
Pervasive Adaptation

pervasive information and communication systems



- **Societies of Artefacts:**

- Cooperatively attempting goals with society-like behaviour
- Beyond localising and recognising other artefacts: adapting to others and helping others to adapt to yourself
- Form ensembles of complementing competencies



- Social ability
- Goal driven interest
- Societal models

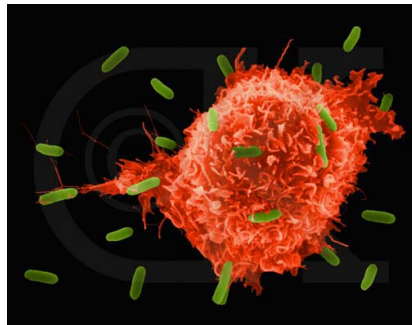


Pervasive Adaptation

pervasive information and communication systems

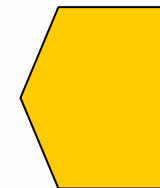


Key technological and user/social aspects to be considered:



- **Adaptive Security and Dependability**
 - Context dependent user expectations for privacy and security
 - Changing threats and risks in evolving pervasive environments

- Heterogeneous networks and dynamic environments
- Changing landscape of threats
- Changing boundaries, adapting security, dependability and trust in response to system and environment changes



Pervasive Adaptation

pervasive information and communication systems



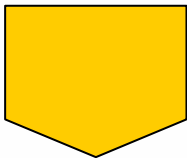
Key technological and user/social aspects to be considered:

- **Dynamicity of Trust**

- Creating trust relationships
- Act and interact within ad-hoc and changing configurations



- **Security for Tiny Networked Devices**



- Very low-power cryptographic algorithms, protocols, mechanisms
 - Contexts where some devices may be sacrificed but a critical mass prevails
-
- Beyond the perimeter
 - Changing view of security



Pervasive Adaptation

pervasive information and communication systems

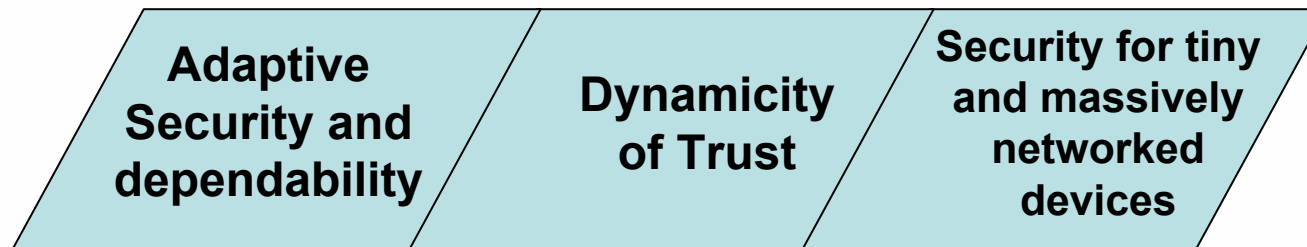
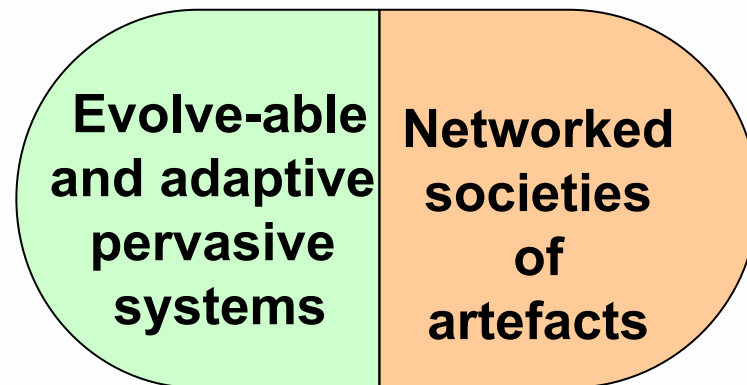


- **New community**

- Building on contributions from software intensive systems, security dependability and trust, pervasive computing
- Links too several other areas (**sociology, biology, HCI, complex adaptive systems (CAS), ...**)

- **Expectation:**

- 2 to 3 IPs
- 3 to 4 STREPs
- 1 CA



Pervasive Adaptation

pervasive information and communication systems



- **Role of CAs**

- Organisation of events, support of cooperation
- Community building
- Coordination of research agendas, preparation of research roadmaps
- Identification of drivers for future research
- Identification of criteria to assess research results
- Facilitation of coordination of National/Regional programmes – ERA
- International cooperation: development of strategies and actual cooperations



Pervasive Adaptation

pervasive information and communication systems



- Use the latest, correct version of the Guide for Applicants (IP, Strep or CA)
- This contains information on:
 - Proposal format (sections, length)
 - How to submit a proposal
 - Pre-proposal checks for FET
 - ... and much else

– Essential reading before submitting a proposal!
- February 1st, Köln for all ICT Call 1:
http://ec.europa.eu/information_society/events/koln_2007/index_en.htm
- (google: "koeln info day")



Pervasive Adaptation



- **Expected Impact:**

- Scalable systems with fundamental capacity for self-controlled adaptation and organisation
- Reduce management and maintenance costs
- Ensure security, privacy and trust in pervasive applications

- **Indicative** budget ~ 20 M €¹

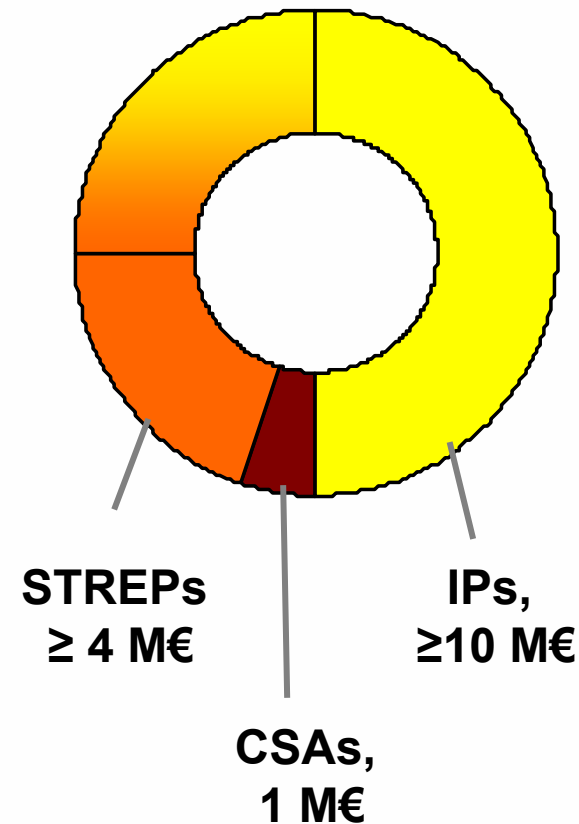
- **Close of call:** 8 May 2007

CONTACT POINT:

Wide.Hogenhout@ec.europa.eu

1: amount to be confirmed after the Commission decision on the 2008 budget proposal

Total: ~20 M€



European Commission
Information Society and Media

