

# Empowering Romanian Research on Intelligent Information Technologies

Project in FP7-REGPOT-2010-1

Faculty of Automatic Control and Computers

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# Beneficiary

## **Faculty of Automatic Control and Computers (A&C) in UPB**

- National Center for Information Technology (NCIT)
- Center for Research in Industrial Informatics, Materials Engineering and Robotics (CIMR)
- Center of Automatics, Process Control and Computers (APCC)

# UPB – NCIT: National Center for Information Technology

- Distributed Systems and Grids
- CoLaborator
- Artificial Intelligence and Multi-Agent Systems
- Collaborative Computer-Based Knowledge Construction
- Academic Center for Distributed Informatics
  
- E-Business Academy Laboratory (IBM)
- E-Government Laboratory (IBM)
- Innovation Center (Microsoft)
- Oracle Technologies and Solutions (Oracle)
- Computers Network Laboratory (CISCO, HP)
- Advanced Compiling Techniques Laboratory (Freescale)

Home page <http://hpc.pub.ro>

# Foreign Partners

- Free University of Amsterdam, Nederland
- INRIA, France
- Technical University Delft, Nederland
- Fokus Gmd, Germany
- L3S Research Center, Universität Hannover, Germany
- Caltech, USA
- Rutgers University, USA
- Maryland University, USA
- George Mason University, USA
- HPCC Edinburgh, UK
- Institut National Polytechnique de Grenoble, France
- Université de Marseille, France
- Politecnico di Torino, Italy

# Projects

- CHANGE - Enabling Innovation in the Internet Architecture through Flexible Flow-Processing Extensions – FP7 Project 2010 - 2013
- P2P- NEXT NEXT GENERATION PEER-TO-PEER, FP7 NR 216217, 2008 – 2010
- Sensei - FP7 Project, 2008-2011
- LTFLL - FP7 LANGUAGE TECHNOLOGIES FOR LIFELONG LEARNING, 2008 - 2011
- **EU-NCIT leading to EU IST excellency FP6 "Integrating and Strengthening the European Research Area, Contract INCO-CT-2005-017101**
- SEE GRID SCI - South Eastern European GRid-enabled eInfrastructure Development SCI, FP7, 2008
- EGEE III – Enabling Grids for the E-science in Europe, FP7, 2008
- DEPSYS – MODELS AND TECHNIQUES FOR ENSURING RELIABILITY, SAFETY, AVAILABILITY AND SECURITY OF LARGE SCALE DISTRIBUTED SYSTEMS,
- SEE GRID2 - South Eastern European GRid-enabled eInfrastructure Development
- EGEE 2 – Enabling Grids for the E-science in Europe
- Resource management and task scheduling in distributed systems based on Grid technologies, Research Contract nr GR 139/02.06.2006, Code CNCSIS 288
- COOPER - Collaborative Open Environment for Project-Centered Learning, Contract no. 027073, FP6, 2005

# EU-NCIT - NCIT leading to EU-IST Excellency (FP6)

- Strategic objective
  - ▶ The reinforcement of the S&T potential to provide know-how and experience in elaborating and coordination proposals and projects related to several ICT research areas within the Romanian National Center for Information Technology.
- Actions
  - ▶ train the researchers of the NCIT in order to enhance skills in project development methodologies
  - ▶ enhance the collaboration with foreign partners and participate to common proposals
  - ▶ create the entrepreneurship skills that are very important for research and technological innovation
  - ▶ update the NCIT's infrastructure

# Products

- MonALISA
- Monarc 2
- DIOGENES
- VNSim
- Traffic View
- SINTEC
- Mobile LOTO
- ...

# Needs for FP7, FP8,...

- Improving the content and context of research
  - ▶ Strategic plan
  - ▶ Research topics identification
  - ▶ People → full time researchers
  - ▶ Strengthen cooperation in research
  - ▶ New equipment and software

# ERRIC Project

## Empowering Romanian Research on Intelligent Information Technologies

Project number: **264207, FP7-REGPOT-2010-1**

- *FP7 Capacities Work Programme: **Research Potential***
- Funding scheme: **Coordination and support action**
- *Area: 4.1. **Unlocking and developing the Research Potential of research entities established in the EU's Convergence Regions and Outermost regions***
- Project duration: **36 months**
- Start date: 1 September 2010
- Total cost: 2,994,404 Euro
- EC contribution: 2,670,010.00 Euro

# ERRIC context: Area 4.1

## *Research Potential Objectives*

- Stimulating the realisation of the **full research potential** of the enlarged Union by **unlocking and developing existing or emerging excellence** in the EU's convergence regions and outermost regions \*
- Enhance the capacity of their researchers to successfully participate in research activities at EU level.

\* a per capita gross domestic product (GDP) of less than 75 % of the average GDP of the EU-25.

# ERRIC context: Area 4.1

## *Research Potential Actions*

**"Brain gain"** through:

- networking with other European world class research players and industry
- upgrading of relevant RTD infrastructure
- recruitment of experienced researchers
- institutional mobilization
- dynamic contribution to the regional or European sustainable socio-economic development

# ERRIC context: Area 4.1

## *Research Potential Requirements*

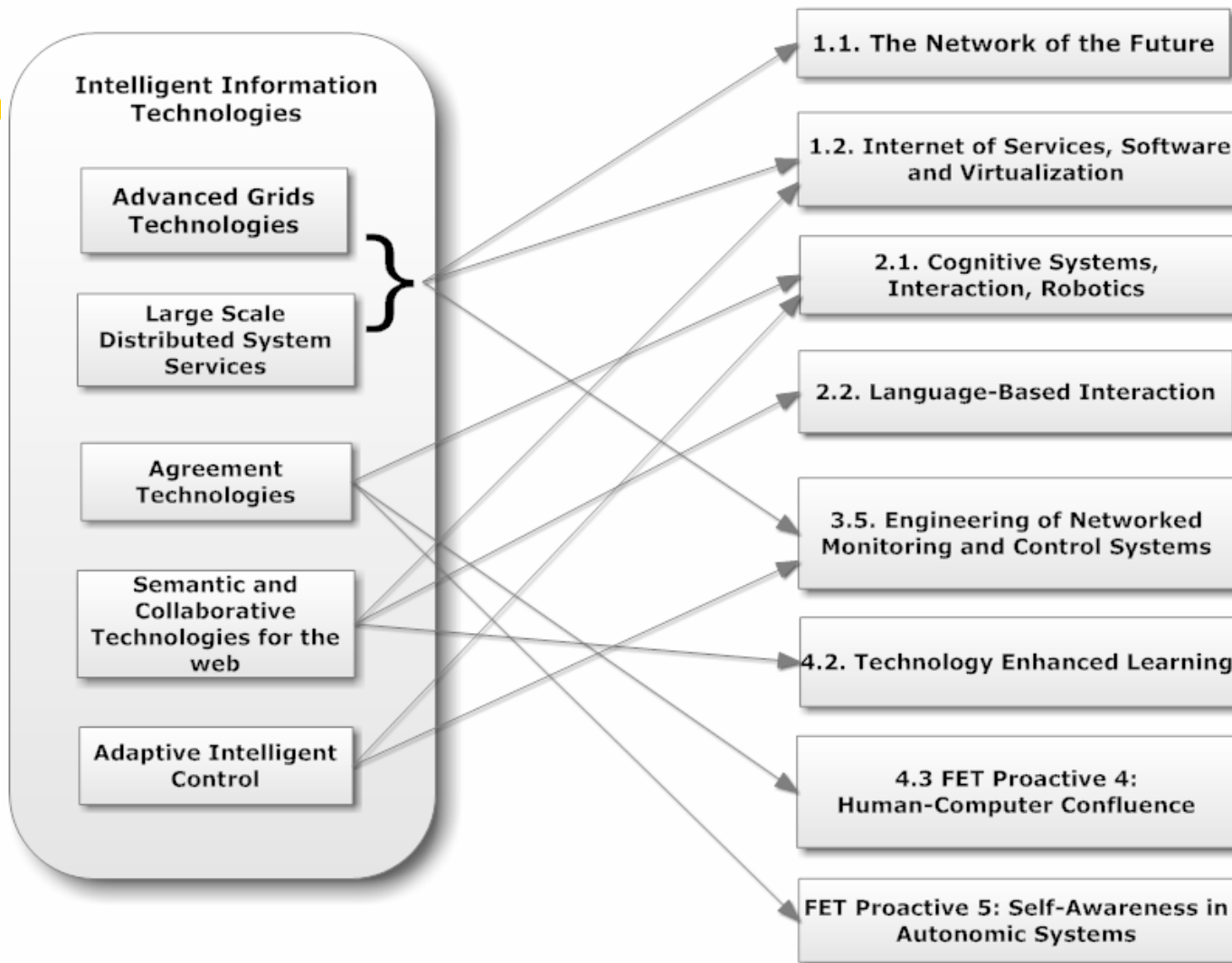
- Research Potential focused on **high quality research entities of significant scientific size** to ensure the highest impact of the Community intervention.
- These research entities should demonstrate a high quality of human, material and organisational capacity
- Their research potential increase will be realized in close cooperation with **at least 3 European outstanding research ‘partnering organizations’**, established in at least 3 different Member States or Associated Countries

# ERRIC: Aim

- Leverage, support and further develop the existing high quality human and material resources of A&C with the goal of achieving international recognition for the Faculty as an outstanding unit of research excellence in selected areas of **Intelligent Information Technologies**:
  - ▶ **large scale distributed system services**
  - ▶ **advanced grid & cloud technologies**
  - ▶ **agreement technologies**
  - ▶ **semantic and collaborative technologies for the web**
  - ▶ **adaptive intelligent control**

## A&C Competences

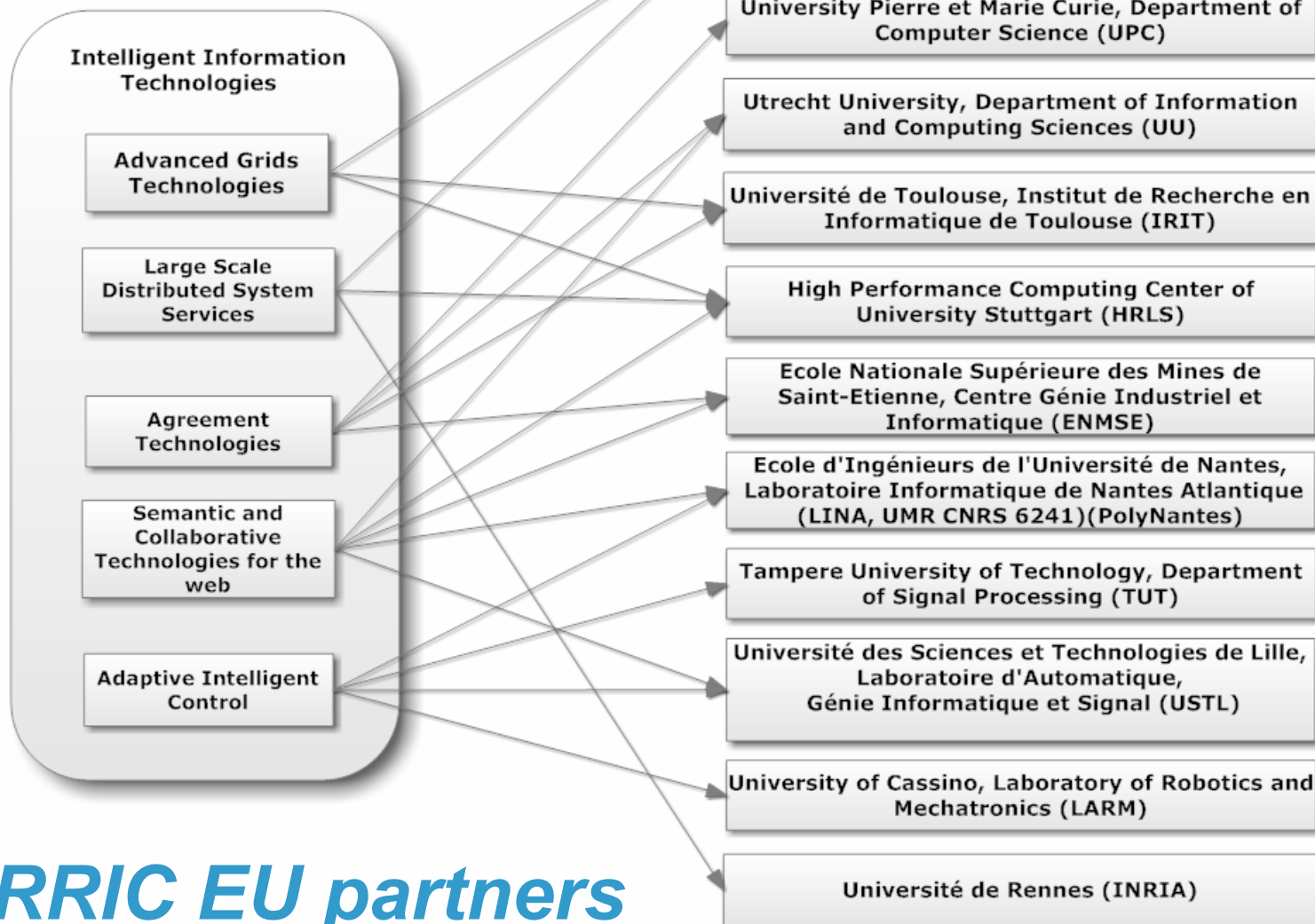
## FP7 Challenges and Objectives



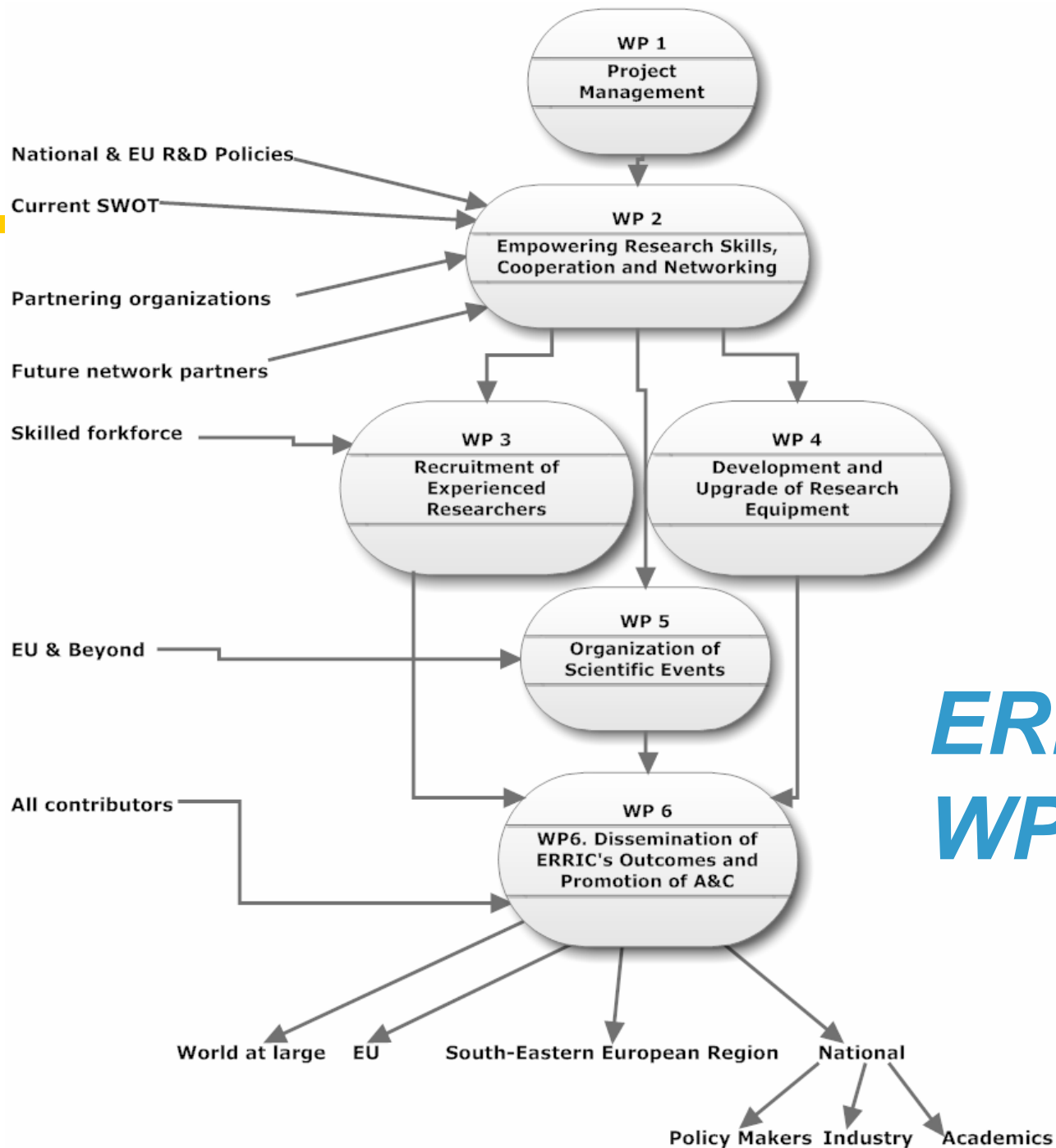
*ERRIC areas of research excellence in connection with FP7 Challenges and Objectives*

## ERRIC Areas of Research Excellence

## EU Partnering Organisations of ERRIC



# ERRIC EU partners



# *ERRIC*

## *WPs*

# WP2 Empowering Research Skills, Cooperation, and Networking

Strengthen research skills and develop guidelines for future research and innovation

- Roadmap for A&C Research, Technology, Development and Innovation: **directions** for the next 5 - 10 years.
- **Survey** in Intelligent Information Technologies focussed on the selected priority areas of FP7

# Exploit our competences

- **Research topics** that will be supported towards increasing our research excellence:
  - ▶ Large scale systems, intelligent deployment of tasks and services, societal services, intelligent service discovery
  - ▶ Semantic Web, Web intelligence, ontology alignment, Web 3.0
  - ▶ Agent models, semantics, interactions, organizations Semantic grid, intelligent grid
  - ▶ Intelligent control

# Participation of A&C staff to scientific events

- **Valorization** of research results
  - ▶ **36 persons \* 1 week** will attend scientific events
  - ▶ **Scientific papers** presented at high quality scientific events (more than **60 high quality scientific papers** )
  - ▶ **Products** built in collaboration with **high tech companies**

## Set up a detailed plan for the partnering program

- Establish **strategic partnerships** with high excellence research units
  - ▶ Collaborate on currently identified common research topics
  - ▶ Explore new partnering opportunities with EU partners.

# Example: DataCloud@Work

- INRIA "Associate Teams" Programme
  - ▶ Autonomic Storage for Cloud Services
- Partners
  - ▶ Kerdata (Gabriel Antoniu)
  - ▶ Equipe-projet PARIS (Christine Morin)
  - ▶ NCIT (Valentin Cristea)
- Goal
  - ▶ explore how to build an efficient, secure and reliable storage service for data intensive distributed applications running in *cloud environments* by enabling an *autonomic behavior*

# Directions and tasks

- Directions
  - ▶ Using BlobSeer for sharing application data in a IaaS
  - ▶ Using BlobSeer as a cost-effective storage service built on top of multiple IaaS'es
  - ▶ Using BlobSeer for VM management to build a highly-available IaaS
- Tasks (2011)
  - ▶ Adaptive security management in BlobSeer
  - ▶ Autonomic Behavior in BlobSeer based on Introspection
  - ▶ BlobSeer-based data management for scientific applications
  - ▶ Federation of Cloud Computing Infrastructures
  - ▶ Efficient Virtual Machine management in Clouds

# Achieve two-ways secondments for research staff

**Common work** with researchers from partnering organizations during secondments

- ▶ 132 trans-national two-way secondments with 11 partnering organizations from 5 EU countries

**Develop a national and European network of excellence and partnership in IIT**

- ▶ Initially, 11 EU partners plus Romanian partners
- ▶ Evolution towards building a strong community of research and innovation in Intelligent Information Technology

# eUPB Platform

- Develop an ensemble of integrated services to support the collaborative research and academic activities of the UPB community
  - ▶ Collaboration
  - ▶ Virtual 3-D representation and virtual interaction
  - ▶ Information extraction from digital documents
  - ▶ Information retrieval and aggregation
  - ▶ Communication for heterogeneous networks
  - ▶ Contextual information sensing and processing
  - ▶ Environment monitoring and control

# E-UPB Scientific objectives

- Service orientation (Internet of Services)
  - ▶ SOA
  - ▶ Semantic based processing
  - ▶ Producer-consumer interaction models
- User-centered design (Internet of people)
  - ▶ User profile management
  - ▶ Service adaptation to user profile
- Integrating real world objects (Internet of things)
  - ▶ Object identification, interaction , access
- Production and use of multimedia content
- Autonomic, robust, interoperable, secure, mobile, reliable, extensible

# Develop the ERRIC's Knowledge e-Environment (KEE)

## Intelligent search and retrieval of scientific information

- research papers of faculty staff in the network,
- research reports and PhD theses
- IIT relevant national, European and international projects,
- pointers to companies doing relevant research in the domain
- Etc.

# WP3 Human resources

- Aim - strengthen the human resources by hiring international experienced researchers or gifted Romanian researchers (e.g., who have left the country)

Establish a Plan for personnel recruitment and hire personnel

Improve research efficiency by hiring an experienced research manager

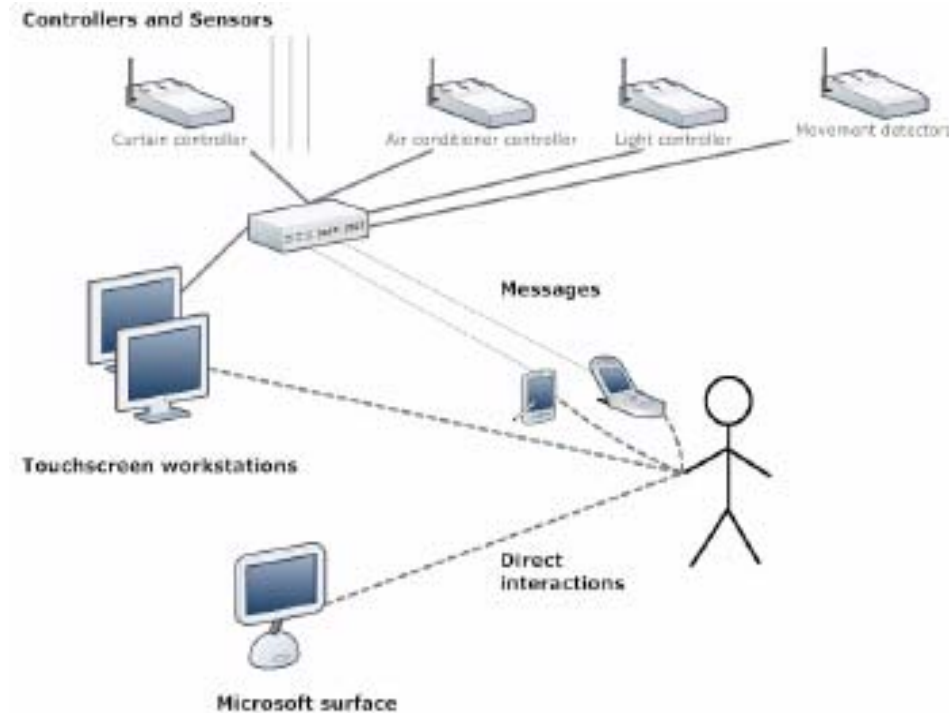
- ▶ 1 part time research manager = 10 pers months

# Hiring experts

- Hiring 5 experts (M13 - M36) in the following topics
  - Aml technologies for social interaction and learning
  - **Organizational teamwork and change for dynamic agreements**
  - **Autonomic Storage for Cloud Services**
  - **Intelligent traffic monitoring and control**
  - Cognitive and collaborative information technologies in robotics and quality inspection
- Hiring 1 expert (M25 - M36) in
  - Trust in semantic alignments and mappings of ontologies

# WP4 research equipment

- Develop, maintain and upgrade the research equipment
  - ▶ develop a new **Laboratory of Ambient Intelligence**
  - ▶ **upgrade the HPC resources** to reach an estimated performance in benchmarking of 2 TFlops.



# WP5: Scientific events

- Organize **18 quality scientific events**
- **HIPERGRID** – International Workshop on High Performance Grid Middleware (*annual*)
- **DEPSYS** – Workshop on Dependable Distributed Systems (*new, bi-annual from Y2*)
- **GRIFI** International Workshop on Grids for the Future Internet (*new, annual from Y2*)
- **MASTS** – The International Workshop on Multi-Agent Systems Technology and Semantics (*annual*)
- **K-Teams** - Knowledge Construction in Virtual Teams Workshop (*new, bi-annual*)
- **AgTAmI** - International Symposium on Agreement technologies for Aml (*new, annual from Y2*)

# WP6 Dissemination of ERRIC's Outcomes

- Develop ERRIC digital visibility portal
- Disseminate project's concepts and results
- Promote A&C scientific excellence – 4 dissemination events such as
  - A&C Alumni Symposium
  - A&C Brokering event
- Valorization and exploitation of project results

# Challenges

- Find the best experienced researchers to be hired
- Ensure high quality and consistent participation to organized scientific events
- Enhance and enlarge networking with R&D entities in Romania and EU
- Build a strong international scientific community in IIT based on ERRIC outcomes and results
- Leverage the existing scientific and technical cooperation with well known companies working in the domain of ICT and advanced control, and achieve innovation and technological transfer

# ERRIC Management Team

- Prof. **Adina Magda Florea** – Project Coordinator & WP1 Leader
- Prof. **Valentin Cristea** – WP2 Leader
- Prof. **Radu Dobrescu** – WP3 Leader
- Prof. **Nicolae Țăpuș**– WP4 Leader & Head of the project Advisory Board
- Prof. **Florin Rădulescu** – WP5 Leader
- Prof. **Dumitru Popescu** – WP6 Leader
- Prof. **Theodor Borangiu** – Head of the Task Force Committee
- Prof. **Ștefan Traușan-Matu**– Scientific Coordinator
- Prof. **Marc Demage** – Marc Demage, professor at ESSEC Business School, Director of ESSEC Business School Romania Foundation in Bucharest – Research Manager
- Ec. **Dorina Adamescu** – Finance Officer
- Dr. **Doina Pătrășcoiu** – Project Administrator