

Empowering Romanian Research on Intelligent Information Technologies

Project in FP7-REGPOT-2010-1

Faculty of Automatic Control and Computers

University POLITEHNICA of Bucharest

Prof. Valentin CRISTEA



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

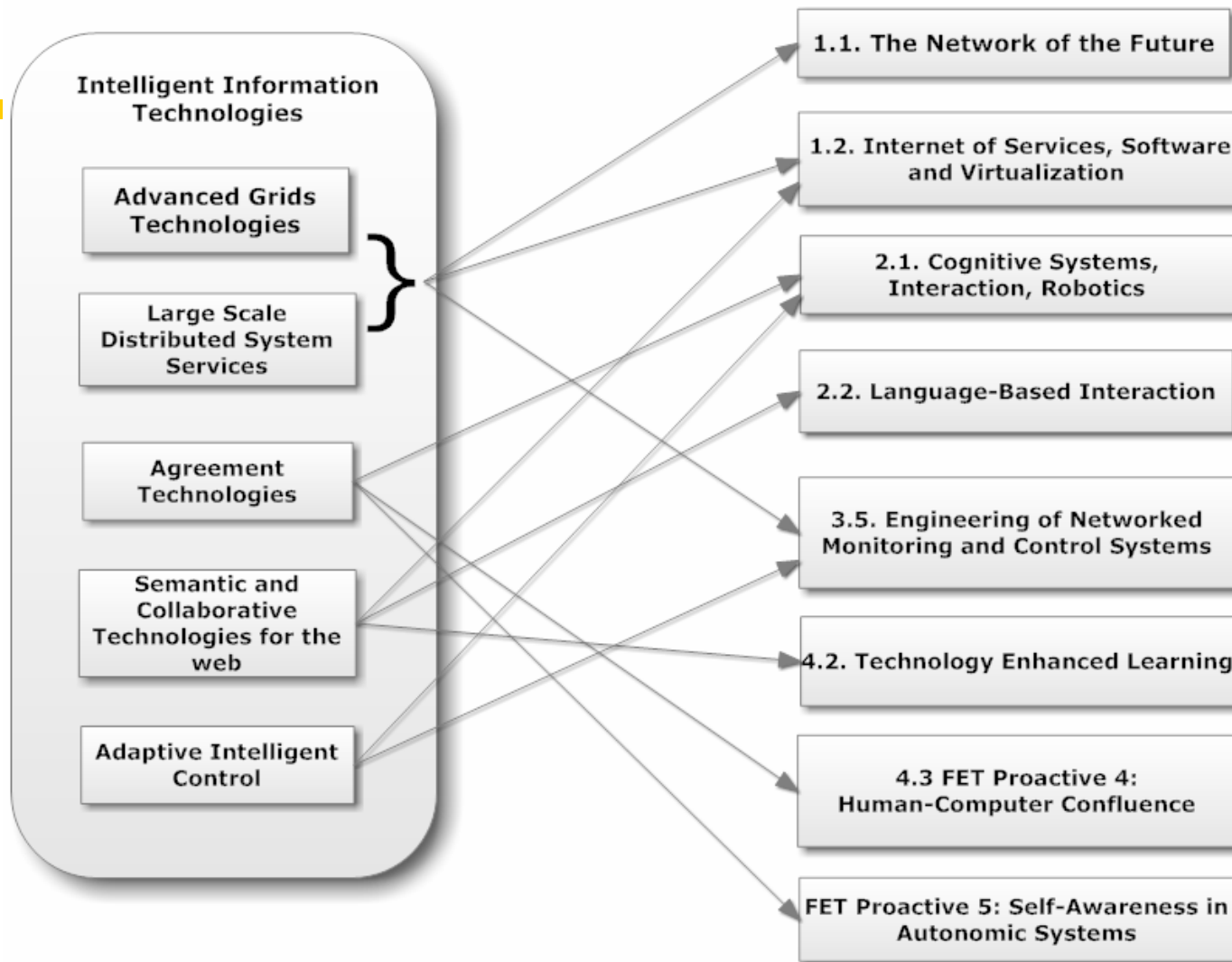
- Research Potential focused on **high quality research entities of significant scientific size** to ensure the highest impact of the Community intervention.
- These research entities should demonstrate a high quality of human, material and organisational capacity
- Their research potential increase 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

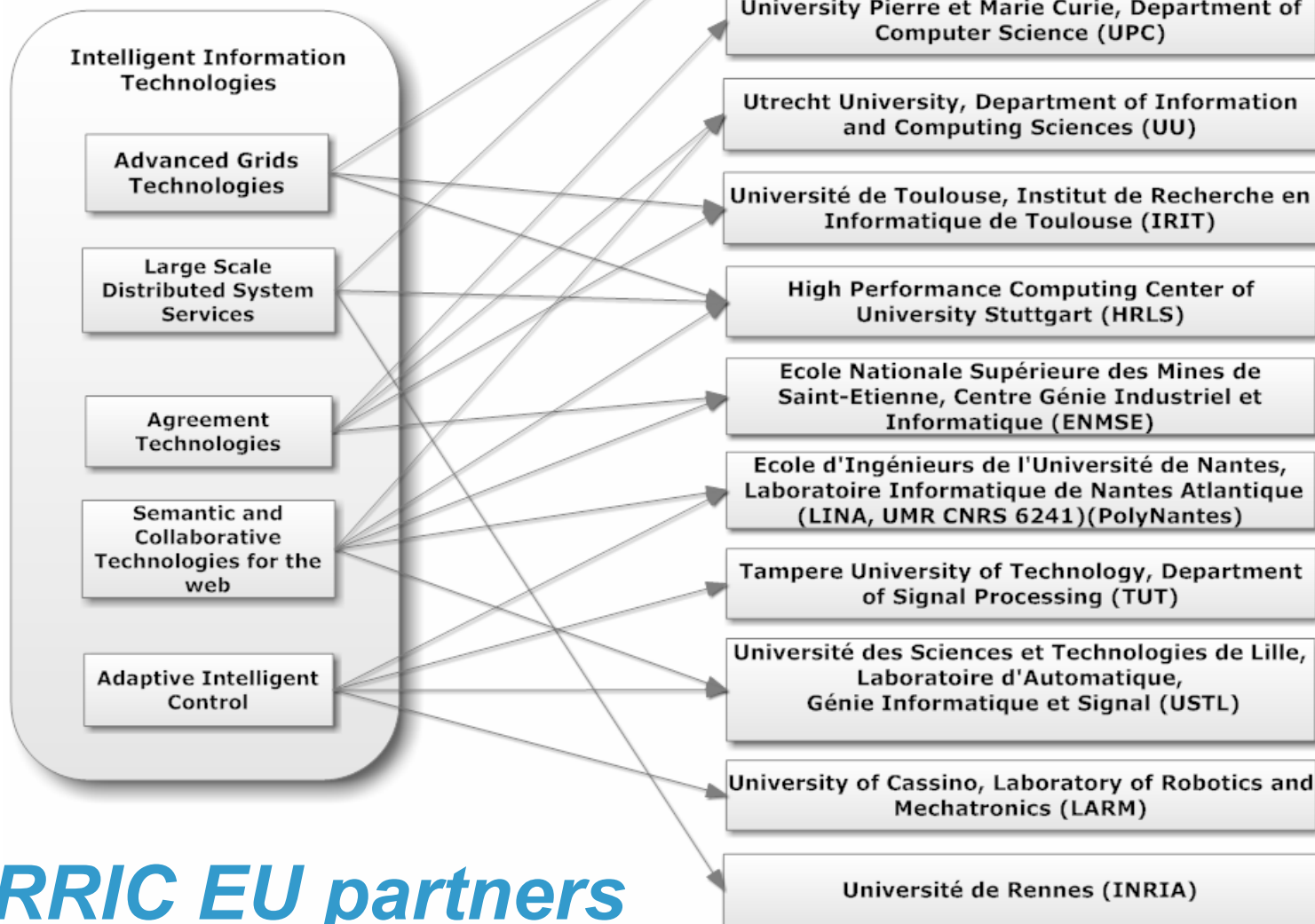
FP7 Challenges and Objectives



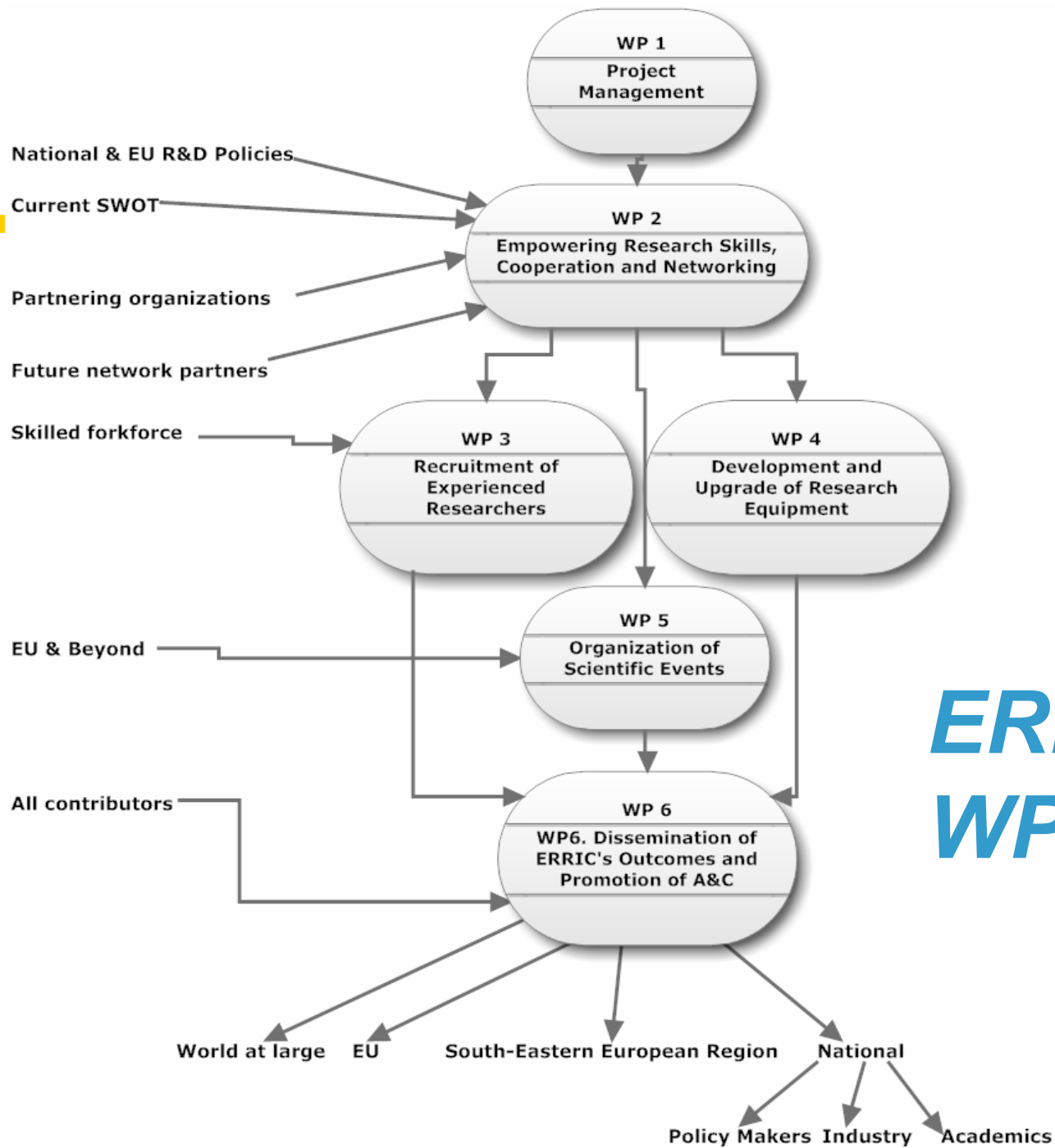
ERRIC areas of research excellence in connection with FP7 Challenges and Objectives

ERRIC Areas of Research Excellence

EU Partnering Organisations of ERRIC



ERRIC EU partners



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

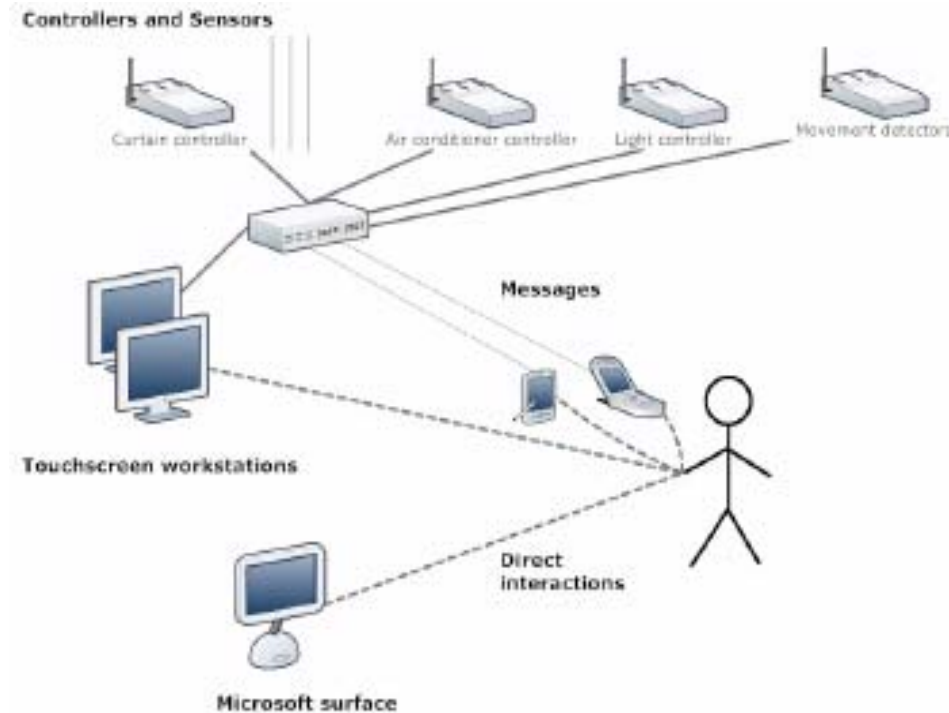
- ▶ 1 part time research manager = 10 pers months

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