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# Romanian Research Priorities for Integration into ERA

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## RD&I System and Policies in Romania

- From a fragmented RDI system; to the Romanian Research Area part of the ERA.
  - Ageing of human resources
  - From chronic, long term *under-financing* to a significant increase in public expenditure in RD
    - *From 0.18% public RD expenditure of GDP in 2004 to 1% in 2010*
    - *absorption capacity?*
    - *private RD expenditures?*
    - *GERD of 2.5% of GDP in 2013 ?*
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## **RDI Strategy and Plan 2007-2013**

**The National Strategy and Plan for Research, Development and Innovation for 2007-2013 were developed following a process of national consultation, within the framework of the first national foresight exercise in Science and Technology ( 1000 persons in direct meetings: panels, workshops, conferences; over 6000 persons consulted online).**

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## **RDI Strategy and Plan 2007-2013**

**Correlation between the priorities and the funding instruments of the National Plan for Research, Development and Innovation for 2007-2013 and the specific priority axes for Structural Funds;**

**Strong competition: over 80% of public funds for research and development are allocated by competition;**

**Competition open both for public and private actors;**

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## **RDI Strategy 2007-2013**

### **Strategic objectives:**

**Knowledge creation**

**Economic competitiveness**

**Social quality**

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## Specific objectives for 2013

- **Performance Improvement;**
  - **Development of the System's Resources;**
  - **Private Sector Involvement;**
  - **Develop the *Institutional Capacity*;**
  - ***Extend the International Cooperation.***
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## **Specific objectives for 2013**

- **Improve the position of Romania in ISI publication ranking from 48<sup>th</sup> to 35<sup>th</sup>;**
  - **Ten times increase in the number of EPO patents;**
  - **Three times increase in the number of national patents;**
  - **Double the share of innovative companies;**
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## Specific objectives for 2013

- **Three times increase in the number of researchers; researchers' age average under 40 years;**
  - Improve the research carrier attractiveness;
  - **Three times increase in the number of doctoral students;**
  - Focus on excellence by attracting the best researchers,
  - *Use the talent and expertise of scientific Diaspora for speeding up the quality improvement process;*
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## **RDI Strategy and Plan 2007-2013 (1)**

**Public investment is mainly oriented towards:**

- **developing human capital;**
  - **obtaining scientific results of international value;**
  - **satisfying the socio-economic needs of Romania by financing projects in priority domains, proposed by public/private consortia;**
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## **RDI Strategy and Plan 2007-2013 (2)**

**Public investment is mainly oriented towards:**

- **developing innovation by co-financing projects proposed by the private sector;**
  - **developing research infrastructure (pan-european, regional, national or in the development regions)**
  - **development of scientific international collaboration;**
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## Funding Programmes:

1. Investing in **Human Resources**
  2. Develop **Capacities**
  3. Exploratory and frontier research for new **Ideas**
  4. **Partnership** in Socio Economic Priorities of Public Investment
  5. **Innovation**
  6. Support for the **Institutional Performance**
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## **Investing in Human Resources**

- **Support for professional career development;**
    - **PhD fellowships**
    - **Post doc funding schemes**
    - **Return grants**
    - **Researchers mobility (inter and intra sectorial)**
  
  - **Attract the best researchers to locate their research group in Romania**
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## Investing in Human Resources

- Investment in human capital;
  - Support for full-time research positions, in all financed projects;
  - **PhD grants, of which 12,000 grants from structural funds (2009-2013), each with a minimum 6 months stage abroad;**
  - Inter- and intra-sectoral mobility grants;
  - Repatriation grants, both for young PhDs and for senior researchers;
  - Internationalization of Romanian research, by ensuring also the equal access of foreign researchers;
  - Competitive salaries.
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## **Exploratory and frontier research for new Ideas**

- **Support for relevant projects, encouraging international cooperation;**
  - **Support for the international mobility of Romanian researchers;**
  - **Support for internationally relevant Romanian scientific journals;**
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## HUMAN RESOURCES

## IDEAS

- Small grants for PhD students
- Short term mobility for PhD students
- Return grants – post doc;
- First post-doc individual grant
- First post-doc as research team coordinator
  
- Support actions
  - Conferences participation
  - Reward for publishing in ISI journals and for patenting

- *Exploratory Research Projects*

- Researchers of excellence
  
- Co-funding research fellowships programs already internationally funded

- Complex Exploratory Research Projects
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- Exploratory Workshops
- Joint Research Projects:
  - DFG;
  - NSF;

## **Partnership in Socio Economic Priorities of Public Investment**

**26 priorities clustered in 8+1 domains:**

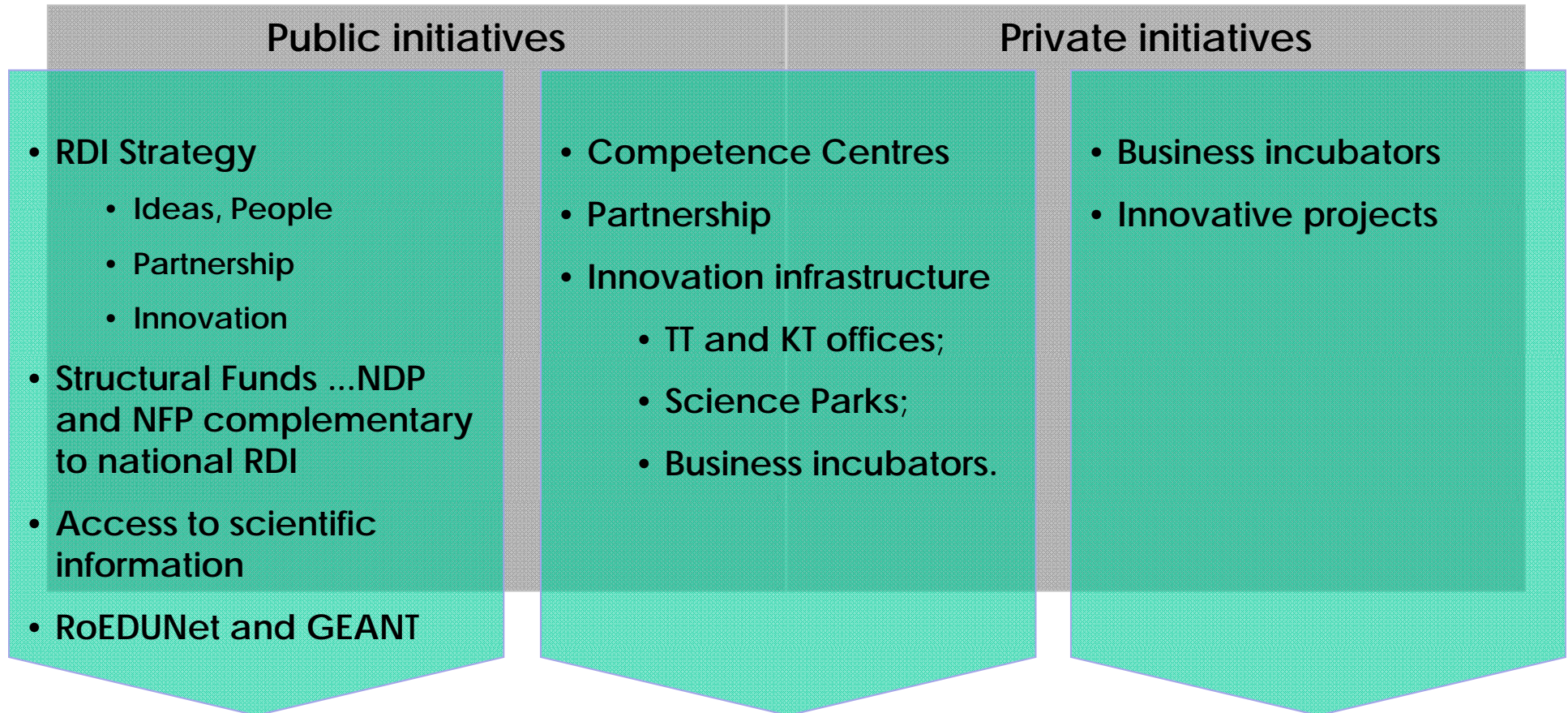
- Information Society Technologies**
  - Energy**
  - Environment**
  - Health**
  - Agriculture, food security and safety**
  - Biotechnologies**
  - Innovative materials, processes and goods**
  - Social and economic research**
  - Space and security**
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- **Finance and co-finance complex, interdisciplinary RD projects with well-defined thematic inside national priorities;**
  - **Encourage the concentration of resources and the development of centers of excellence;**
  - **Support for collaborative interdisciplinary networks.**
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# Innovation

- **Co-finance of precompetitive research, product oriented, initiated by the business sector;**
  - **Develop the innovation infrastructure;**
  - **Support for inter-sectorial mobility of RDI staff;**
  - **Fiscal incentives for private RDI investment.**
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**Working together to bridge the Knowledge and Innovation gap**

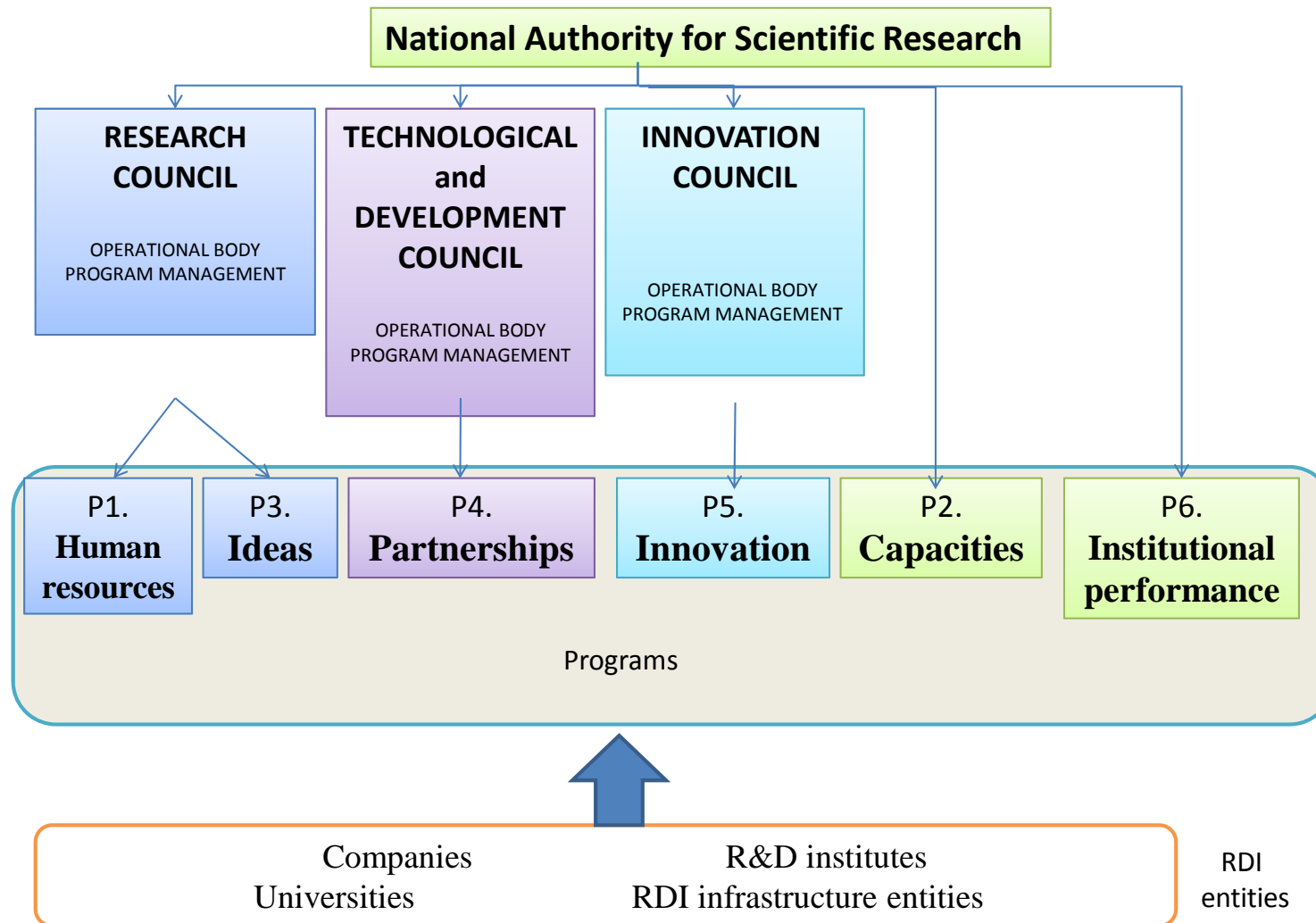


**A comprehensive approach to invest in human capital, research, development and innovation for knowledge development, competitiveness and social quality**

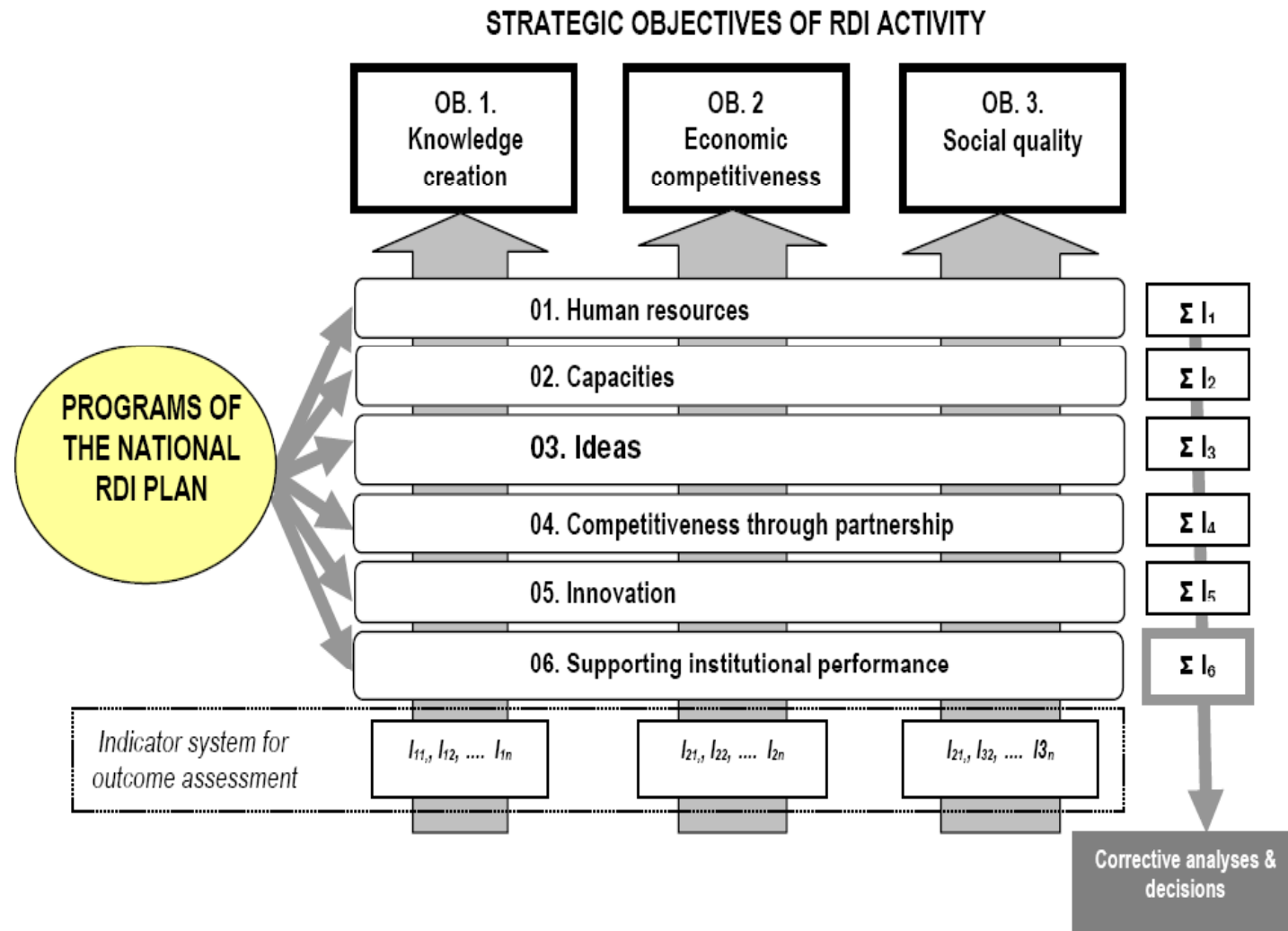
## Implementation

	<b>Parliament</b>					
<b>Policy-makers</b>	<b>Government</b>					
	<i><b>National Council for Science Policy and Technology</b></i>					
	<b>Ministry of Education, Research and Youth</b> <i><b>National Authority for Scientific Research</b></i>				<b>Ministry of Economy and Finance, other line ministries (8)</b>	
<b>Financing</b>	<b>Research Council</b>	<b>Technology Development Council</b>	<b>Innovation Council</b>	<b>Romanian Academy</b>	<b>Academy for Agriculture Sciences</b>	<b>Academy for Medical Sciences</b>
<b>Operators</b>	<b>Universities</b>		<b>National Research Institutes</b>	<b>Research Institutes</b>	<b>Research Institutes</b>	
<b>Private sector</b>	<b>Enterprises</b>		<b>Research Institutes</b>	<b>Foundations</b>		<b>Others</b>

## New institutional settings



# Investment Model



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**POLITEHNICA University of Bucharest**  
**since 1818**

**Automantion and Computers Faculty**  
**since 1967**

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**UNIVERSITY POLITEHNICA OF BUCHAREST**  
**FACULTY OF AUTOMATIC CONTROL AND COMPUTER SCIENCE**  
**DEPARTMENT OF AUTOMATIC CONTROL AND SYSTEMS ENGINEERING**

**SCIENTIFIC RESEARCH DIMENSION**

**Group of Numerical Calculus**

**Research Directions**

- Numerical Calculus in Automatics;
  - Numerical Methods for systems analysis and synthesis;
  - Advanced Signal processing;
  - Numerical Algorithms and semi definite programming
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**SCIENTIFIC RESEARCH DIMENSION**

**Group of Dynamic Systems and Optimizations**

**Research Directions:**

- Robust Stability of the dead time systems;
  - Extension of the Riccati general theory of Popov type to the non-symmetric case, with applications in the differential game theory
  - Riccati generalized theory to the continuous case variable in time;
  - Theory of descriptor systems and factorizing techniques;
  - Singular  $H_{\infty}$  Problems
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## **Group of Systems Modeling and Signal Processing**

### **Research Directions:**

- Signal Processing;
- Systems Modeling and simulation;
- Communication Systems for the industrial environment.

## **Group of Automation and Advanced Control Structures**

### **Research Directions:**

- Data Acquisition and Processing;
  - Systems Identification and Control;
  - Supervision, control decisions and process diagnose;
  - Informatics and communications for the industrial environment;
  - CAD Software;
  - Real Time Control Applications.
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**Group of  
Intelligent Control Systems and Bioengineering  
Research Directions(1):**

- Intelligent hybrid systems;
  - Advanced architectures for autonomous and hybrid control systems;
  - Predictive-adaptive control techniques;
  - Movement intelligent control with applications for mobile robots control and electric drives;
  - Cooperative intelligent agents;
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**Group of  
Intelligent Control Systems and Bioengineering  
Research Directions (2):**

- Modeling of biologic processes;
  - Intelligent decision and diagnose techniques with applications in medicine;
  - Technologies and algorithms for processes control, evolved algorithms of
  - Numerical programming;
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## **SCIENTIFIC RESEARCH CENTERS**

**Center for Intelligent Control and Bioengineering**

**Center for Process Control and Computers**

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**CENTER FOR AUTOMATICS, PROCESSES CONTROL AND COMPUTERS  
(U.P.B. - A.C.P.C.)**

**Fundamental research for the following fields of interest :**

Systems Identification;  
Advanced Control;  
Evolving control Architectures.

**Applicative research in the following fields :**

Data acquisition and processing;  
CAD for control systems;  
Numerical control for industrial processes;  
SCADA Systems;  
Software systems for real time control applications.

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**Thank you !**

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