


INESCTEC
TECHNOLOGY & SCIENCE
| ASSOCIATE LABORATORY

COORDINATED BY
INESCPORTO
PORTUGAL



FROM KNOWLEDGE GENERATION TO SCIENCE-BASED INNOVATION

Research and Technological Development

Technology Transfer and Valorisation

Advanced Training

Consulting

Pre-incubation of Technology-based Companies

GOALS:

Internationally competitive R&D

+

An effective interface between the academic world and society

RESULTS:

Better science in Portugal

&

A more competitive business fabric



INESC Porto: the core institution

- Private non-profit association
- Public Interest Institution since 2001
- Associate Laboratory statute awarded in 2002 by the Portuguese Ministry of Science
- Awarded the level of Excellent by an international evaluation board of the Ministry of Science

MAIN FIGURES

Capital = 1.25 M€

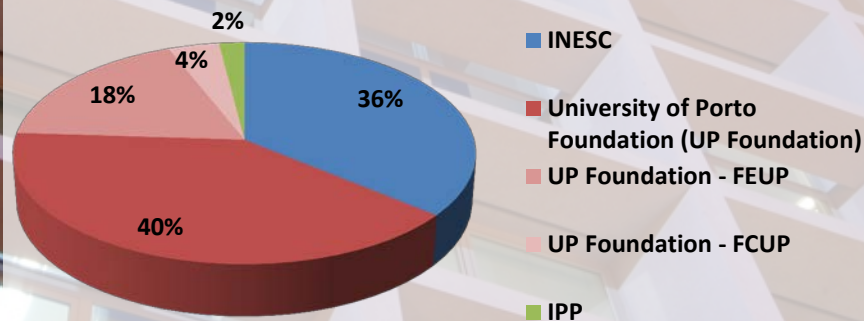
Turnover = 11.8 M€

R&D Units = 13

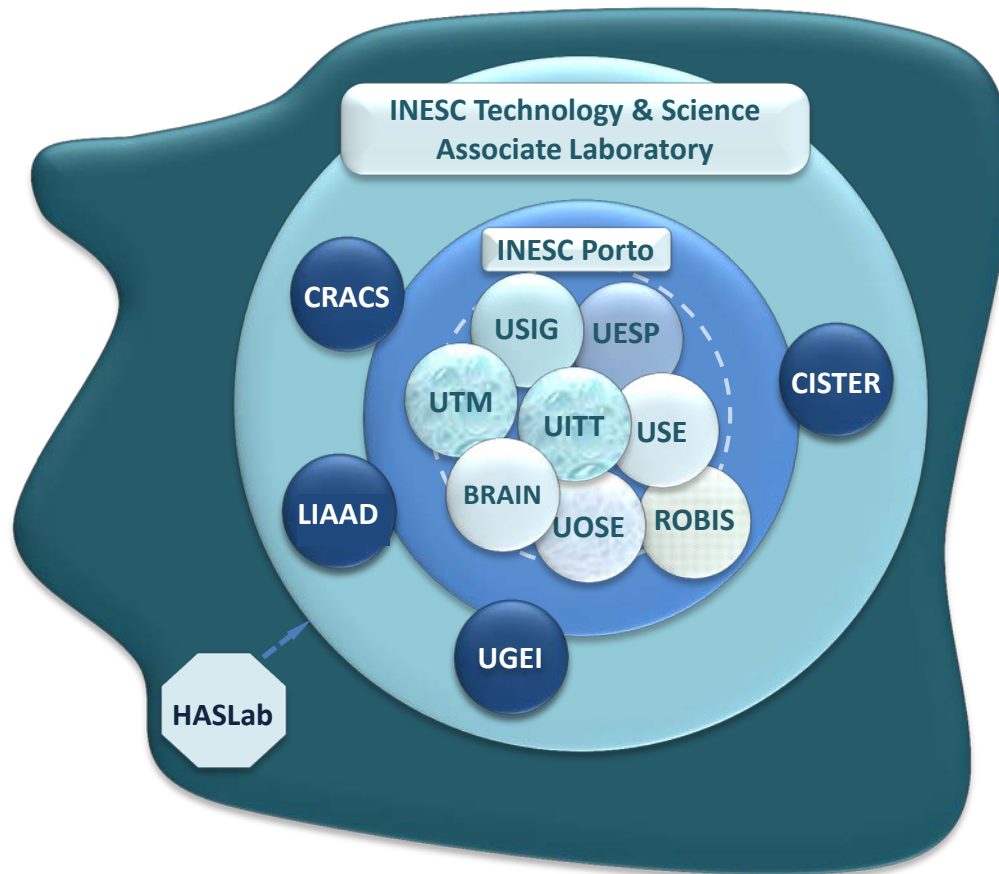
Collaborators = 770

- *R&D = 546 (PhD = 240)*

- *Support Services = 57*



INESC TEC (INESC TECHNOLOGY & SCIENCE) – coordinated by INESC Porto



- UOSE** – Optoelectronics & Electronic Systems Unit
- USE** – Power Systems Unit
- UTM** – Telecommunications & Multimedia Unit
- UESP** – Manufacturing Systems Engineering Unit
- USIG** – Information & Comp. Graphic Systems Unit
- UITE** – Innovation & Tech Transfer Unit
- ROBIS** – Robotics and Intelligent Systems Unit
- CBER** – Biomedical Research and Innovation Group
- LIAAD** – Laboratory of Artificial Intelligence and Decision Support
- CRACS** – Center for Research in Advanced Computing Systems
- UGEI** – Unit of Industrial Management and Engineering
- CISTER** – Research Centre in Real-Time and Embedded Computing Systems
- HASLab** – High-Assurance Software Laboratory

Our Associates: Our Strength



INSTITUTO
POLITÉCNICO DO PORTO



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and Privileged Partners:



Universidade do Minho



Timeline

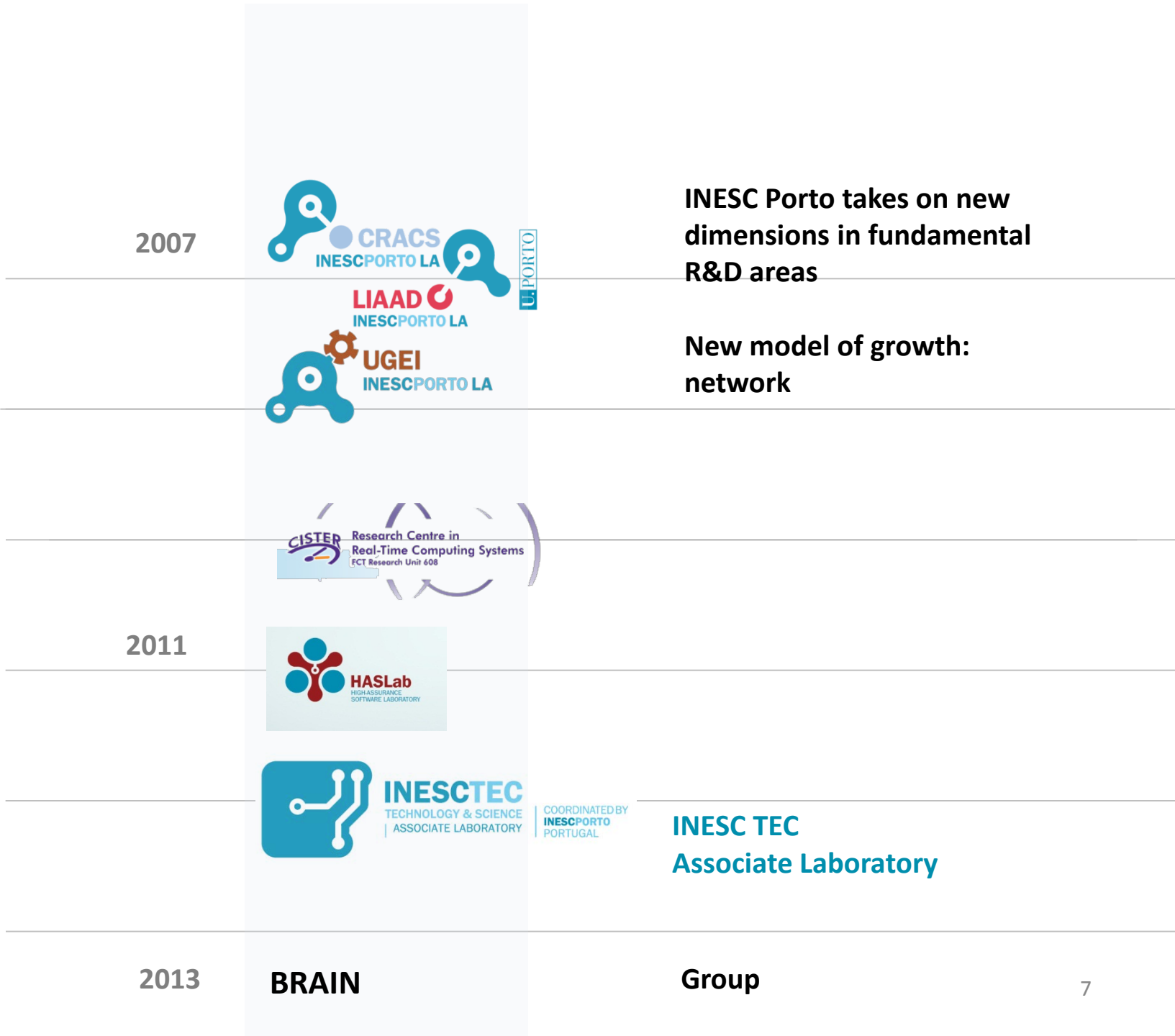
1980		INESC formed in Lisbon
1985		INESC Norte in Porto
1996 - 1998 Dec. 1998		INESC in Norte, progressive autonomy INESC Porto founded
2002		INESC Porto – Associate Laboratory

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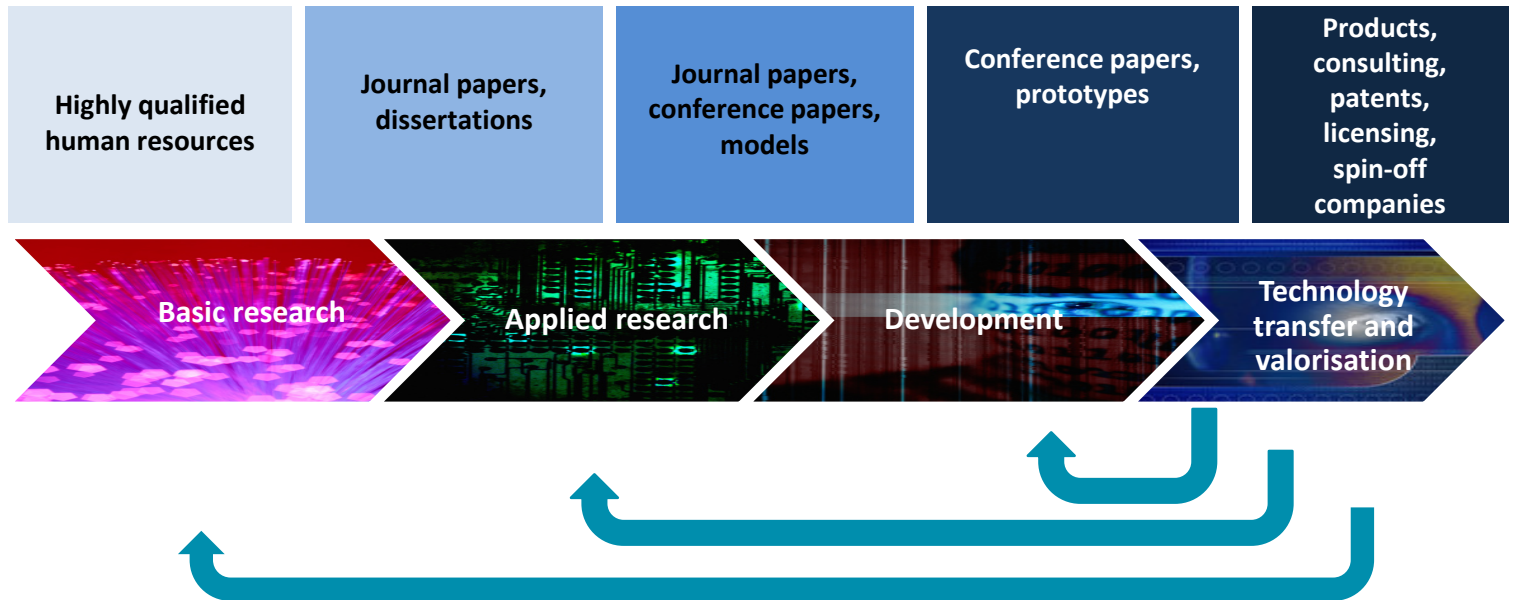


Timeline



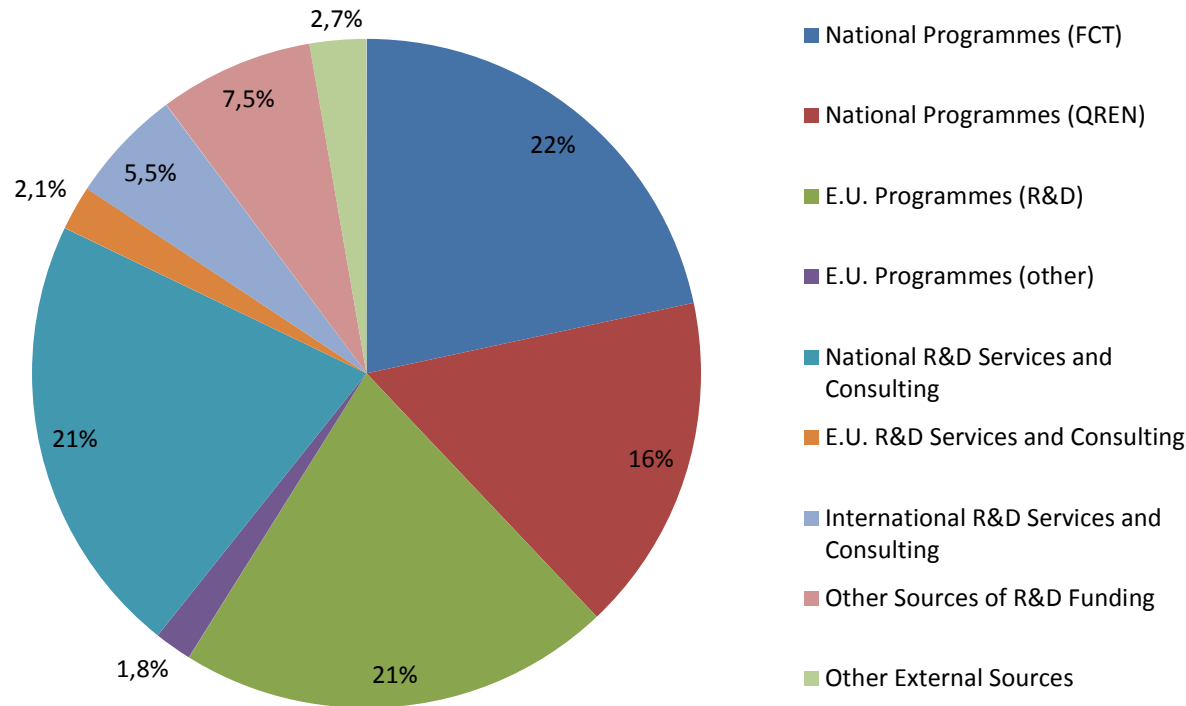
Profile of activities in the value chain

The metaphor of the production chain of knowledge-value:
we make it a reality



Sources of Funding: diversity is key

SOURCES OF INCOME (%)



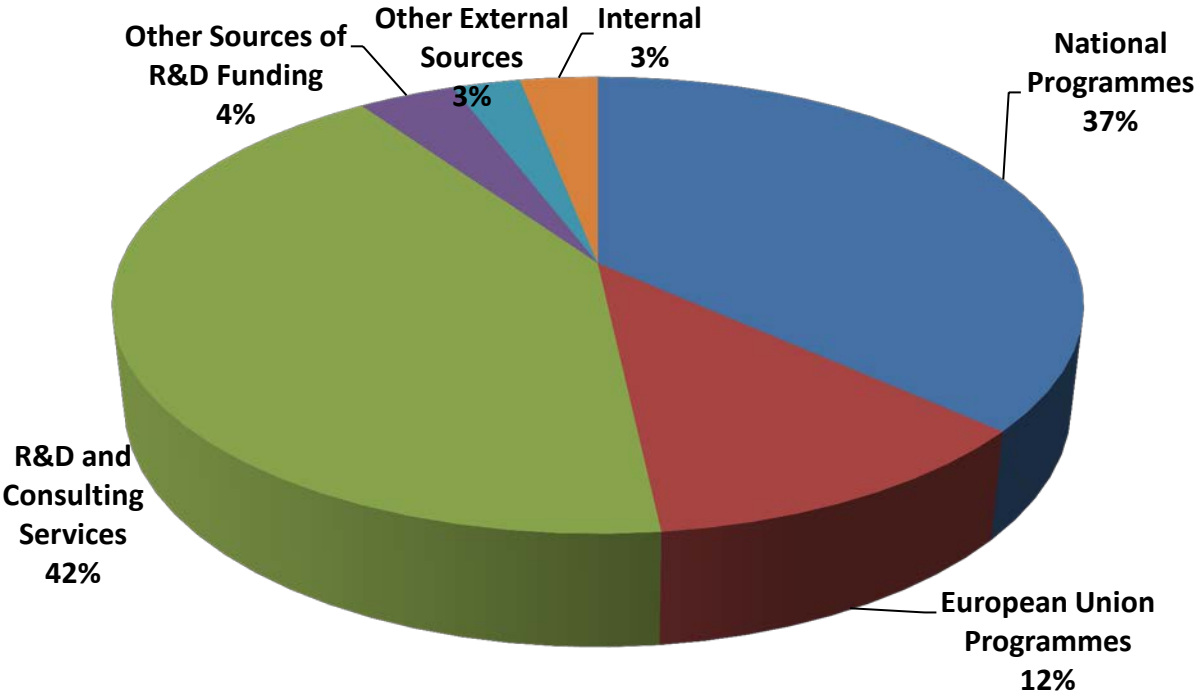
Data from 2012

R&D Services and Consulting secure 37% of funding
International activities represent 30% of funding



Sources of Funding: diversity is key

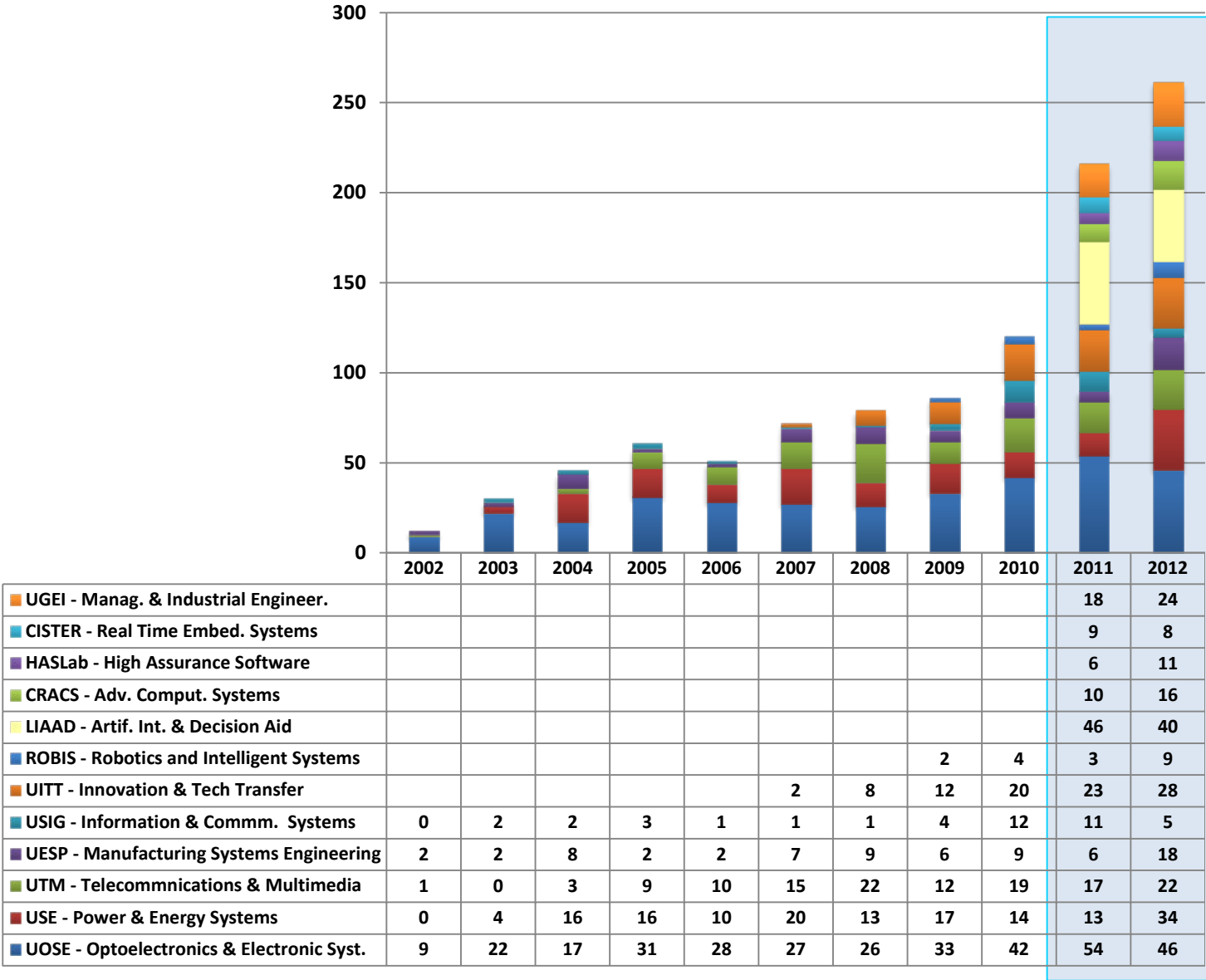
NUMBER OF PROJECTS



Data from 2012



Papers published in international journals



Computer Science cluster

Areas of Activity

Machine learning

Decision support systems:

- Data mining
- Forecasting
- Adaptive modelling and optimisation

Applications:

- Marketing
- Financial services
- Process scheduling
- Health
- Text information retrieval



Areas of Activity

- High Level Programming Languages
- Parallel and Distributed Computing
- Mobile Computing and Sensor Networks
- Information mining and Applications
- Pattern Recognition in Genomics and Proteomics
 - Analysis of Gene Expression Data
 - Understanding Cellular Pathways
 - Clinical Analysis
 - Intrusion detection systems
 - SPAM classification
- Web-based systems
 - Semantic Digital Libraries
 - E-learning Environments and Tools



Areas of Activity

- High-assurance software
- Formal verification of real-time and user-computer interaction systems
- Safety-critical embedded systems
- Secure cryptographic schemes and protocols
- Tools for the mechanical verification of cryptographic implementations and security proofs
- Dependable distributed systems
- Large-scale dependable data management
- Elastic high-performance transactional systems



Areas of Activity

- Computer Graphics and Virtual Environments
 - Image Synthesis and Visual Perception
 - Geospatial Systems, Virtual Environments and Serious Games
- Software Engineering
 - Software architectures for complex systems
 - Agile process engineering
 - Knowledge management in software projects
 - Software quality, testing, verification and certification
- Information Management and Systems
 - Information Systems
 - Information Retrieval
 - Digital Repositories and Preservation

Keywords

CRACS

Programming Languages

Scalable Computing

Security and Privacy

Information Mining

CSIG

Computer graphics

Information management

Software engineering

Reconfigurable computing

HASLab

Software Engineering

Distributed Systems

Cryptography

Information Security

LIAAD

Data Mining

Statistics

Modeling

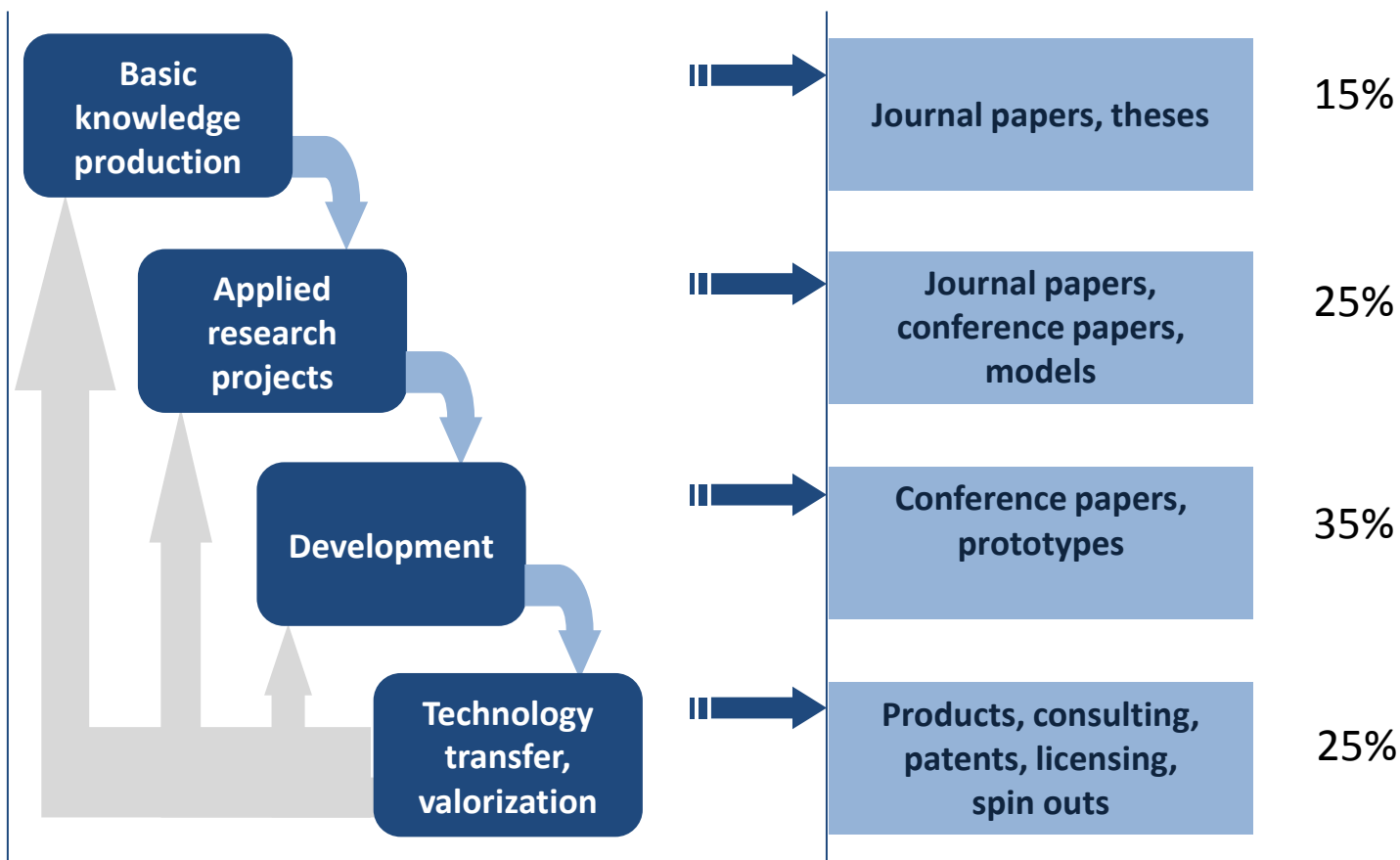
Decision Support





THE KNOWLEDGE-TO-VALUE PRODUCTION CHAIN

How to position USIG?



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COMPUTER GRAPHICS AND VIRTUAL ENVIRONMENTS

Augusto Sousa (coordinator), Alexandre Carvalho, António Coelho, Ângelo Martins, Leonel Morgado, Luís Magalhães, Maximino Bessa

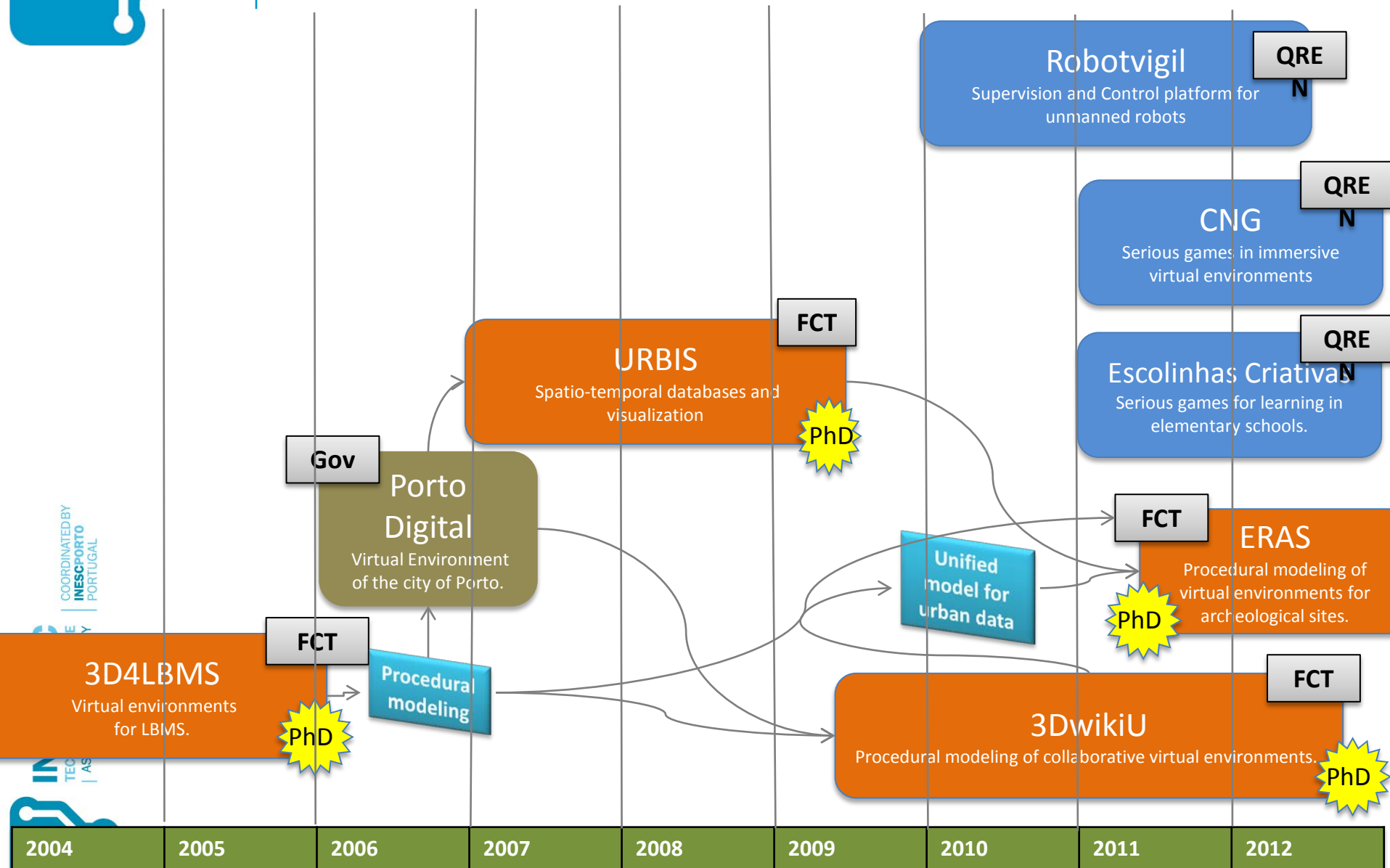
- Large/complex 3D Virtual Environments
 - Modeling and visualization using Geo-Spatial L-Systems
 - Application to historical building, specially monuments
- Serious Games
 - Procedural content generation
 - Game based learning
 - Training and supervision of unmanned UAVs
- Spatio-Temporal Information Representation and Visualization
 - Develop methodologies to visualize objects simultaneously in space and in time.
 - Apply to historical buildings



- New Metaphors in Interaction
 - Develop new metaphors in interactive and immersive environments
 - MASSIVE project on the study of multimodal, multi-sensorial virtual environments
- Mobile Augmented/Virtual Reality Applications
 - applications on urban environments, and
 - interaction techniques based on augmented and mixed reality for open spaces
- HDR Image Synthesis
 - devise new visualization and image synthesis techniques based on human image perception.



COMPUTER GRAPHICS AND VIRTUAL ENVIRONMENTS





Cristina Ribeiro (coordinator), Gabriel David, Hugo Paredes, José Benjamin Fonseca, João Barroso, João Correia Lopes, Ramiro Gonçalves, Sérgio Nunes

Information management, retrieval and processing

- Cultural heritage and digital libraries
- Multimedia retrieval
- Health information retrieval
- Dynamic features of document collections

Digital preservation

- Database preservation
- Management of research data

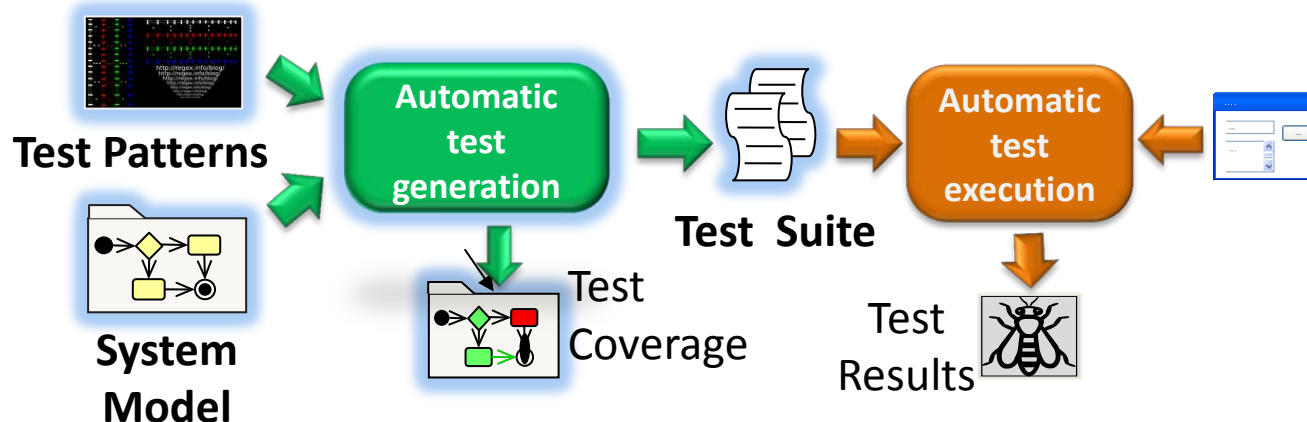
Large-scale information systems

- Interoperability, authentication, access authorisation, and auditability
- Data warehouses for monitoring and decision support systems
- Georeferenced multisensory information

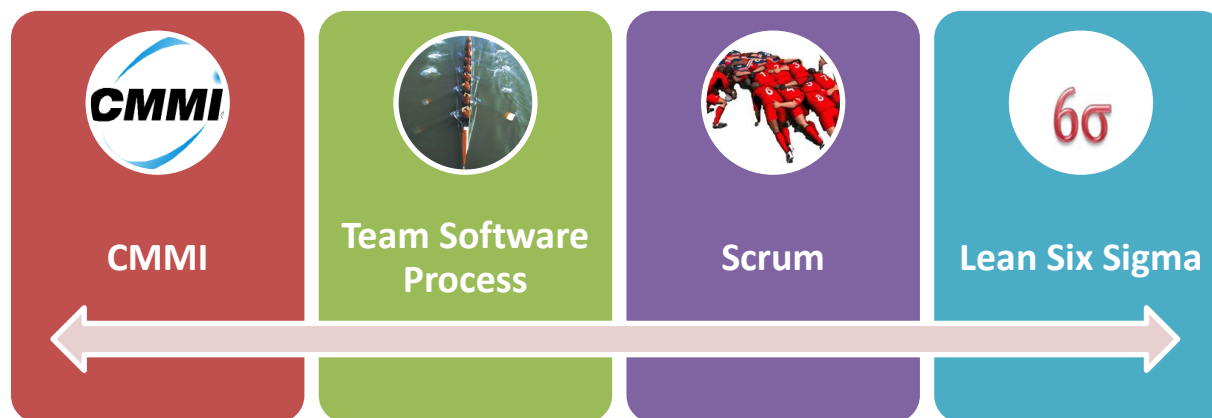


João Pascoal Faria (coordinator), Ademar Aguiar, Ângelo Martins, João Cardoso, Ana Paiva

SOFTWARE TESTING AND ANALYSIS

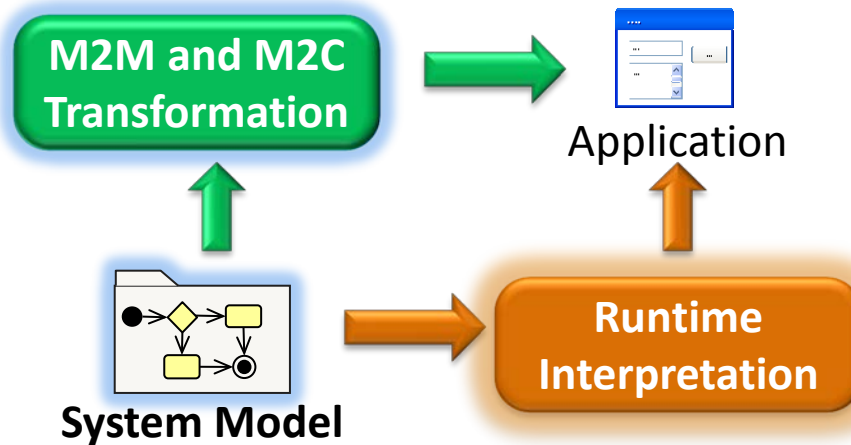


SOFTWARE PROCESS IMPROVEMENT





- **MODEL-DRIVEN SOFTWARE ENGINEERING**



- **RECONFIGURABLE COMPUTING ARCHITECTURE**

- Languages to capture non-functional requirements from applications
- Compilation into high-performance embedded systems
- Domain-specific language (DSL) to program loop-critical hardware accelerators targeting FPGAs



OPPORTUNITIES OF COLLABORATION

- **Master and PhD student hosting**
- **Basic research (FCT projects, European projects)**
- **Applied research (QREN)**
- **Technology transfer (contracts with companies and Administration)**
- **Consultancy**
- **Advanced training**
- **Multidisciplinary environment**
- **National and international partnerships**
- **Support in application preparation, project management, science communication**

INESC TEC supports public policies and other public interest issues

INESC TEC

- Advising the NSRF and the FCT on Programme regulations, eligible expenses, etc.
- Supporting the FCT in the creation of Fraunhofer Portugal
- Consulting for the Regional Coordination and Development Commissions: CCDR-N (Northern Portugal) and CCDR-LVT (Lisbon and Tejo Valley)
- Consulting for the MEI (Ministry of Economy and Innovation) in public tenders (e.g.: on Wind Energy Concessions in Portugal)
- Technical support for the creation of legislation in Madeira/Azores
- Contributing to the development of new organisational models for the University of Porto
- Participating in the Areas of Competitiveness and Technology (Health, ICT, Sea, Forest, Energy, Sustainable Manufacturing, Fashion Industries, Creative Industries)

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