



TÉCNICO LISBOA

# Projectos Europeus e Horizon 2020

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## ***OUTLINE***

- *A experiência como investigador*
  - *Exemplos*
  - *Mitos*
  - *Lições aprendidas*
- *A experiência institucional*
  - *Erasmus Mundus*
  - *KIC Innoenergy*
  - *Outros*



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
FP6-MIRROR	█	█	█	█	█	█	█	█	█	█	█	█	█	█
FP6-CAVIAR	█	█	█	█	█	█	█	█	█	█	█	█	█	█
FP6-CONTACT	█	█	█	█	█	█	█	█	█	█	█	█	█	█
FP6-URUS	█	█	█	█	█	█	█	█	█	█	█	█	█	█
FP6-ROBOTCUB	█	█	█	█	█	█	█	█	█	█	█	█	█	█
FP7-ROBOSOM	█	█	█	█	█	█	█	█	█	█	█	█	█	█
FP7-HANDLE	█	█	█	█	█	█	█	█	█	█	█	█	█	█
FP7-DICORES	█	█	█	█	█	█	█	█	█	█	█	█	█	█
FP7-FIRST-MM	█	█	█	█	█	█	█	█	█	█	█	█	█	█
FP7-POETICON	█	█	█	█	█	█	█	█	█	█	█	█	█	█

*10 projects; approx 3.5M€ funding*



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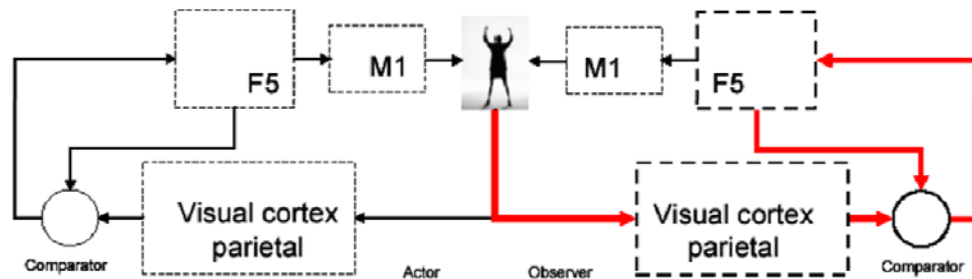
# The MIRROR Project

Mirror Neurons for Recognition (EU-FP5-FET-2000-28159), 2001— 2004



**Partners:**

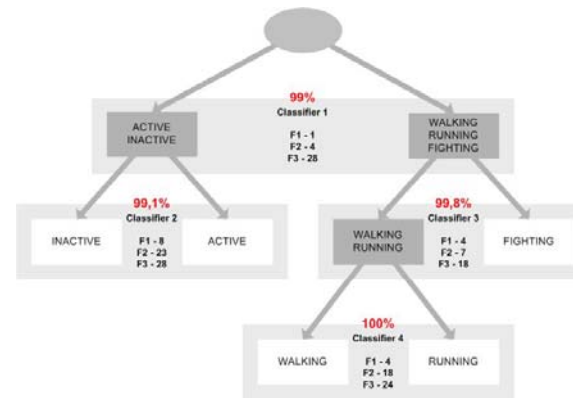
IST/ISR (P), DIST-Univ. of Genova (I),  
Univ. Ferrara (I), Univ. of Uppsala (SE)



The MIRROR project objectives are: (i) 1) to realize an artificial system that learns to communicate with humans by means of body gestures and (ii) to study the mechanisms used by the brain to learn and represent gestures. The biological base is the existence in primates pre-motor cortex of a motor resonant system, called mirror neurons, activated both during execution of goal directed actions and during observation of similar actions performed by others. This unified representation may sub serve the learning of goal directed actions during development and the recognition of motor acts, when visually perceived. In MIRROR we investigate this ontogenetic pathway by realizing a system that learns to move AND to understand movements on the basis of the visually perceived motion and the associated motor commands.

# The CAVIAR Project

Context Aware Vision using Image-based Active Recognition  
(EU-FP6-IST-2001-37540), 2002— 2005



**Partners:**  
IST/ISR (P), INRIA/INPG  
(F), Univ. Edimburgh (UK.)

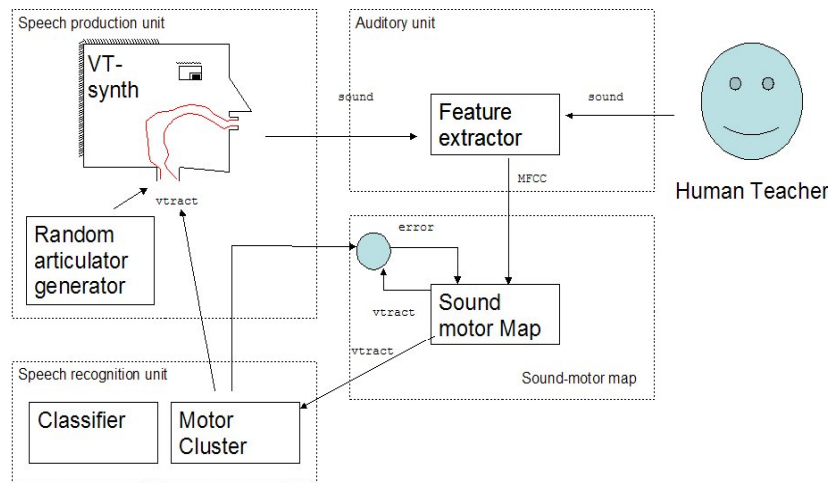
The main objective is to develop the theory of context-aware visual recognition systems. We will implement the theory in a complete closed-loop vision system, and apply it to two applications (city street surveillance and customer behaviour analysis). To achieve these objectives, we will develop new feature grouping, attention and appearance-based recognition processes. This will also require development of new techniques for acquiring, representing and using visual context and situation knowledge.

The work developed at Vislab consisted mainly in two main areas: (i) the use of Gabor filters for the detection of interest points and for the representation of local image regions for posterior recognition and (ii) feature selection and classifier design for the recognition of human activities from video.



# The CONTACT Project

Learning and Development of Contextual Action (EU-FP6-NEST-5010), 2005 – 2009



## Partners:

IST/ISR (P), DIST-Univ. of Genova (I),  
Univ. Ferrara (I), Univ. of Uppsala  
(SE), Univ. of Stockholm (SE).

By spontaneously generating and also observing and imitating manipulative gestures, infants quickly learn how to interact with their environment. At the same time, communicative abilities develop leading to a more and more complex use of speech. Are these motor abilities developing independently? Or are there fundamentally similar mechanisms in the development of perception and production, for both speech and manipulation? We believe that the later is the case.

This project represents an ambitious attempt to investigate this parallel development of manipulatory and speech related “gestures” from a multi-disciplinary perspective. Experts in Robotics, Neuroscience, and Child-Development will tightly collaborate to build an artifact (an embodied system) which will develop its motor capabilities both in manipulation and speech, finally leading to a system that learns to: (i) perceive and produce simple manipulatory gestures; (ii) perceive and produce a simple vocabulary of words and (iii) Infer the “goal” of the gestures, and the meaning/context of the words.



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# The URUS Project

Ubiquitous Robots for Urban Settings (FP6-EU-IST-045062), 2006 – 2009



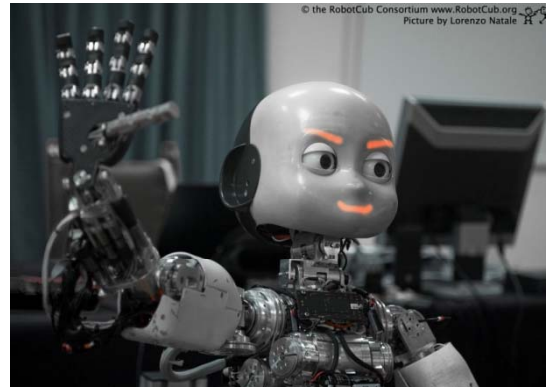
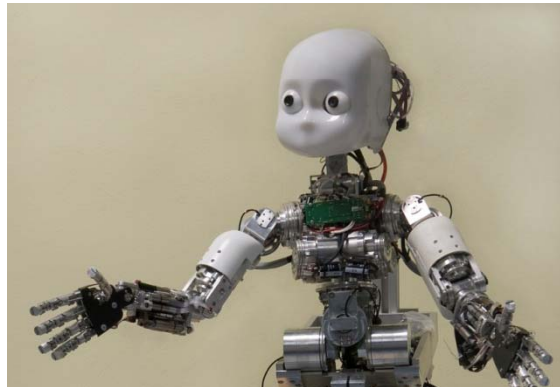
**Partners:** IST/ISR, UPC (Barcelona), AICIA (Seville), UniS (Surrey), LAAS (Toulouse), UniZar (Saragoza), SSSA (Pisa), ETHZ (Zurich), UbEc (Ecologia Urbana - Barcelona), Telefonica I+D (Telefonica – Barcelona), RoboTech (Italy)

European ancient cities are becoming difficult places to live due to noise, pollution, lack of quality facilities and security. Moreover, the average age of people living in large European cities is growing and in a short period of time there will be an important community of elderly people. City Halls are becoming conscious of this problem and are studying solutions, for example by reducing the areas of free circulation of cars. Free car areas imply a revolution in the planning of urban settings, for example, by imposing new means for transportation of goods to the stores, security issues, new ways of human assistance, etc. In this project we want to analyze and test the idea of incorporating a network of robots (which include humans, robots, intelligent sensors, intelligent devices and communications) in order to improve quality of life in such urban areas.



# The ROBOTCUB Project

Robotic Open-architecture Technology for Cognition, Understanding and Behaviour (EU-FP6-IST-2004-004370), 2004 – 2009.



## Partners:

IST/ISR (P), Univ. of Zurich (CH), Univ. of Ferrara (I), Univ. of Uppsala (SE), Univ. of Genova (I), EPFL (CH), European Brain Research Institute (I), Scuola Superiore S. Anna (I), Telerobot Srl (I), Univ. of Hertfordshire (UK), Univ. of Salford (UK)

The main goals of RobotCub are:

- (1) to create an open robotic platform for embodied research that can be taken up and used by the research community at large to further their particular approach to the development of humanoid-based cognitive systems
- (2) to advance our understanding of several key issues in cognition by exploiting this platform in the investigation of cognitive capabilities.

The scientific objective of RobotCub is, therefore, to jointly design the mindware and the hardware of a humanoid platform to be used to investigate human cognition and human-machine interaction. We call this platform CUB or Cognitive Universal Body. It is worth remarking that the results of RobotCub will be fully open and consequently licensed following a General Public (GP) license to the scientific community.





## The First-MM Project

Flexible Skill Acquisition and Intuitive Robot Tasking for Mobile Manipulation, (FP7-ICT-248258). 2010 – 2013



### Partners:

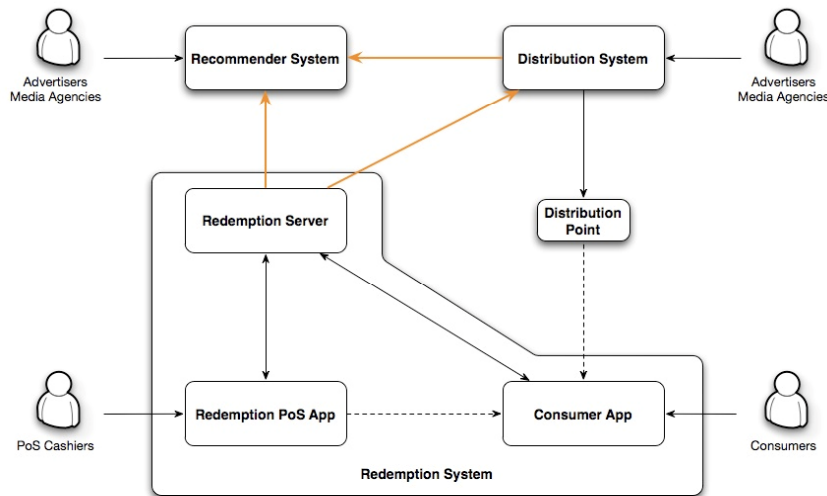
IST/ISR (P), University of Freiburg (DE).  
Foundation for Research and Technology -  
(FORTH) (EL) - Katholieke Universiteit (KU)  
Leuven - (B), Fraunhofer Institute for  
Intelligent Analysis and Information  
Systems (DE). EPFL - Learning Algorithms  
and Systems Laboratory (CH). TU Berlin  
(DE); KUKA Laboratories GmbH (DE)

First-MM aims to build the basis for a new generation of autonomous mobile manipulation robots that can flexibly be instructed to perform complex manipulation and transportation tasks. The project will develop a novel robot programming environment that allows even non-expert users to specify complex manipulation tasks in real-world environments. In addition to a task specification language, the environment includes concepts for probabilistic inference and for learning manipulation skills from demonstration and from experience. The project will build upon and extend recent results in robot programming, navigation, manipulation, perception, learning by instruction, and statistical relational learning to develop advanced technology for mobile manipulation robots that can flexibly be instructed even by non-expert users to perform challenging manipulation tasks in real-world environments in order to provide various services to users including guidance, delivery, and transportation.



# The DICORES Project

Discount coupon and recommendation and redemption system, (FP7-EU-ICT-248366), FP7 – Capacities: Research for the Benefit of SME’s. 2009 – 2013



### Partners:

IST/ISR (P), Observit (PT), Nextstage, Barcelona Media (ES); Aitek (IT), Nova Ventus

[3 SME’s + 3 RTD’s from 3 countries (PT+ES+IT)]

Electronic commerce platform with:

- Intelligent product recommendation from user profiles and demographics.

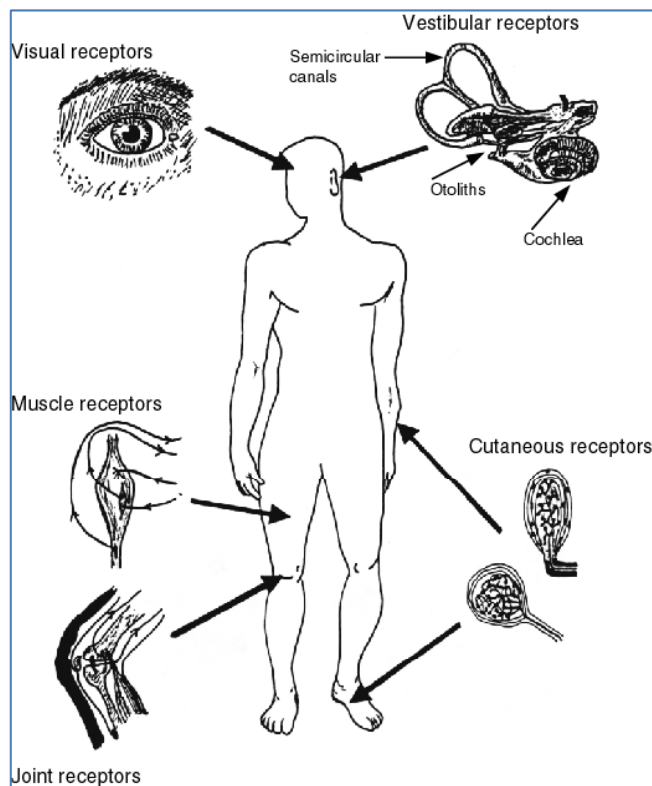
- Multiplatform networked distribution system.
- Web based acquisition and redemption system from user mobile infrastructure.
- Integration with social networks and mobile apps.





# The ROBOSOM Project

Robotic Sense of Movement, (FP7-EU-ICT-248366), 2009 – 2013



## Partners:

IST/ISR (P), Scuola Superiore di Sant'Anna (IT), Collège de France, (FR), Waseda University (Japan)

In humans the sense of movement is given by the integration of a variety of sensory signals, mostly proprioceptive, and the vestibular system that provides perception of the head movements and postures relative to space plays a key role.

Two main ideas related to the concept of sense of movement are relevant to Humanoid Robotics:

- Vestibular unified reference frame
- Expected Perception (EP)



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## The HANDLE Project

Developmental pathway towards autonomy and dexterity in robot in-hand manipulation, (FP7-EU-ICT-231640), 2009 – 2013



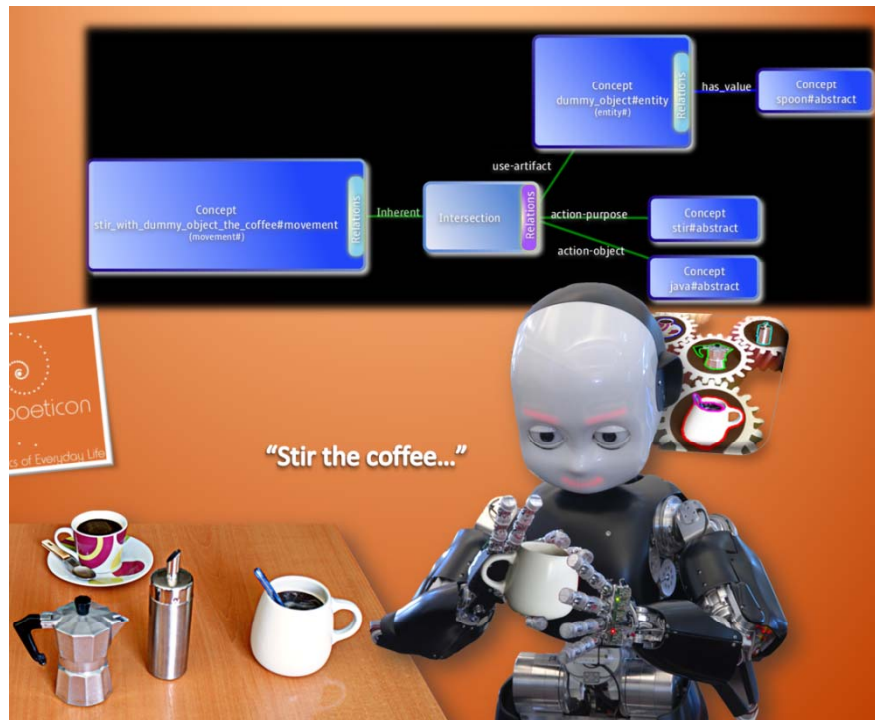
### Partners:

IST/ISR (P), Univ. Pierre et Marie Curie (F), Shadow Robot Company LTD (UK), Univ. Carlos III de Madrid (E), Univ. Coimbra (P), King's College London (UK), Orebro Univ. (SE), Univ. Hamburg (DE), Commissariat à l'énergie atomique (F).

The HANDLE project aims at understanding how humans perform the manipulation of objects in order to replicate grasping and skilled in-hand movements with an anthropomorphic artificial hand, and thereby move robot grippers from current best practice towards more autonomous, natural and effective articulated hands. This project will focus on technological developments and, in addition, research fundamental multidisciplinary research aspects in order to endow the proposed robotic hand with advanced perception capabilities, high level feedback control and elements of intelligence that allow recognition of objects and context, reasoning about actions and a high degree of recovery from failure during the execution of dexterous tasks.

# The POETICON++ Project

Robots need Language: A computational mechanism for generalisation and generation of new behaviours in robots, (FP7-EU-ICT-248366), 2012 – 20153



## Partners:

IST/ISR (P), Italian Instit. of Technology (IT), Univ. of Maryland (USA), Univ. of Plymouth (UK), ATHENA Research Center, Institute for Language and Speech Processing (GR); CSRI: Cognitive Systems Research Institute Embodied Language Processing Group (GR)

Handling novel situations beyond learned schemas or set behaviours is still a quest in engineering cognitive and embodied systems. As sensorimotor experiences in real world are non-finite, powerful generalisation mechanisms are necessary for any agent to operate effectively in real-world environments. POETICON++ suggests that natural language can be used as a learning tool for:

- generalisation of learned behaviours and perceptual experiences, and
- generation of new behaviours and experiences.



## *Experiência de 10 projectos*

- *Variedade de temas*
- *Investigação fundamental/aplicada*
- *Importância do network*
- *Projectos com grande dimensão / impacto*
- *Interacção com parceiros (e desafios)*
- *Visibilidade*
- *Exigência (reviews, deliverables, demos, etc)*



## *Alguns “mitos” .....*

- *Não há projectos na minha área .....*
- *A avaliação está controlada por lobbies*
- *Os projectos são pouco interessantes cientificamente*
- *No FP7 (10 calls, envolvimento em ~20 propostas )*

## ***HORIZON 2020 (desafios ...)***

- *Projectos grande dimensão (IPs, Flagships) .. !*
- *Mais complicado envolvimento parceiros PT*



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  - *Outros*





## ***O PROGRAMA ERASMUS MUNDUS***

- *ERASMUS MUNDUS I (2004-2008)*
  - *Não foi considerado estratégico no IST*
  - *Envolvimento em projectos: 0*
  - *Lições aprendidas (qualidade, visibilidade, etc)*
  
- *ERASMUS MUNDUS II (2009-2013)*
  - *Estratégico*
  - *Preparação grupo de trabalho*
  - *15 projectos em curso ! (~7M€ funding)*
  - *Visibilidade, recrutamento talento, networking*



Joint Programmes

Partnerships for Student Mobility

External Cooperation & Promotion of European HE

MASTER

Systems Biology  
**(euSYSBIO)**

Distributed Computing  
**(EMDC)**

Functional Materials  
**(IDS-FunMat)**

Distributed Computing  
**(JDDC)**

Plasma Physics  
**(Fusion DC)**

Sustainable Energy  
**(SELECT+)**

Computational Mechanics  
**(SEED)**

**EUBrazil Start!up**  
(Brazil)

**WELCOME**  
(Egypt, Lebanon)

**ARCO-IRIS**  
(Argentina)

**HERITAGE**  
(India)

**ANGLE**  
(Africa, Caribbean, Pacific)

**EUROEAST**  
(Eastern Europe)

**NAMASTE**  
(India)

**ADDE SALEM**  
(Argentina, Brazil, Chile,  
Colombia)

DOCTORATE



## ***EIT - EUROPEAN INSTITUTE OF INNOVATION & TECHNOLOGY***

- *Ideia lançada em 2005*
- *Reuniões em Bruxelas (2006)*
- *Knowledge triangle (training, research, innovation)*
- *Pilot Projects (Success, Green Transportation): 2007/2008*
  
- *EIT formalmente criado em 2008*
- *Call for KICs deadline – Agosto 2009*
- *Hearing / decision December 2009*
- *KIC Innoenergy starts 2010*
  - *Key players em energia*
  - *IST único formal partner Português (em qualquer KIC)*
  - *EDP Associate partner*



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eit Knowledge & Innovation Community  
KIC InnoEnergy

# KIC InnoEnergy Boosting innovation for sustainable energy

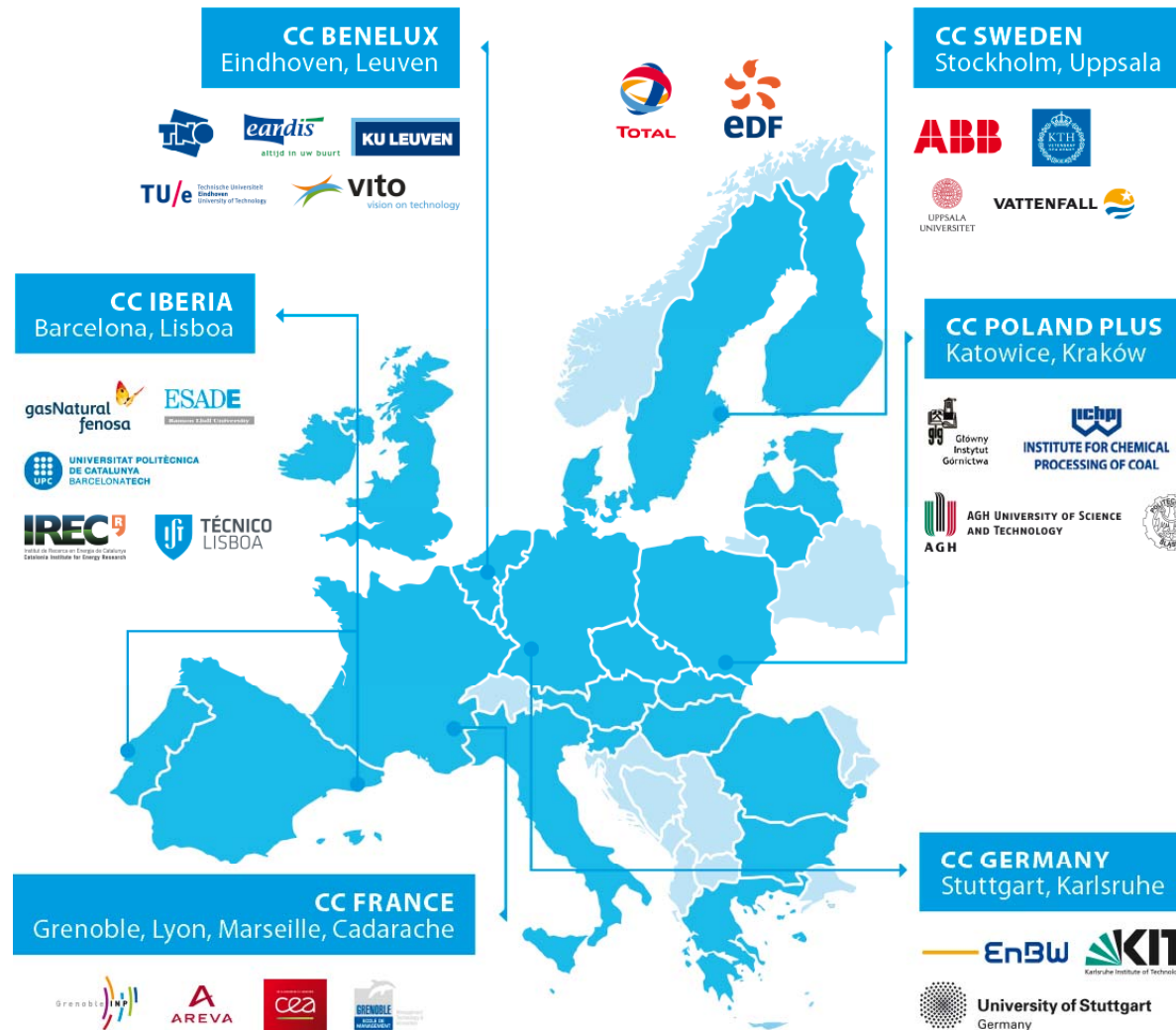




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## KIC InnoEnergy – A European Company with Relevant Shareholders

### Leading Engine of Innovation in Sustainable Energy





## ***EIT - EUROPEAN INSTITUTE OF INNOVATION & TECHNOLOGY***

### *Participação do IST*

- *Contribuição do IST: 1M€/ano (100K€ cash)*
- *Funding 2010-2012 (120K, 770K, 780K)*

### *Actividades*

- *Doctoral school (Sustainable Energy) – coordination*
- *Master Programmes (RENE, CleanCoal, SELECT, ENTECH)*
- *Projects: 8 (?)*
- *Business development*
- *Governance: KIC SE (sup board) and  
CC levels (board directors)*



## ***INICIATIVAS em CURSO NO IST***

- *Sessões informação (info-days com GPPQ)*
- *Coaching (ERC, KIC)*
- *Contactos regulares em Bruxelas (DGs, MEPs, ERC)*
- *Sensibilização para importância participação em projectos*



## ***FUTURO .....***

### ***HORIZON 2020***

- *Novas regras*
- *Simplificação custos, IVA elegível*
- *Pilares (Excellence, Industry and Societal Challenges)*
- *Dimensão dos projectos*
- *Lições aprendidas*

### ***ERASMUS +***

- *Novas regras Mundus (PhD junto com Marie Curie)*
- *Knowledge alliances*
- *LLPs*



***HORIZON 2020***





*This is...*



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