



# EU-funded activities in robotics research and innovation:

## From FP7 towards Horizon 2020

**Libor Král, Head of Unit**

Unit A2 - Robotics

DG Communication Networks, Content and Technology

European Commission

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# Key issues – research challenges

- *Millions of robots in the world today – many more tomorrow*
- *Not just on the factory floor, but also in services sectors*
- *Can we afford to have a lot of dumb machines running around?*









# How do we address today's issues

- *A dedicated unit created nine years ago*
- *More than 100 ongoing projects today with over 700 partners*
- *70-80 M€ funding of new projects per year*
- *Usually 1 Call/year with up to 200 proposals*
- *20 new projects launched every year*
- *Not the only robotics activity...*

# Starting point: Robotics in FP7

APPLICATION SCENARIOS ▶	ROBOTIC WORKERS	ROBOTIC CO-WORKERS	LOGISTICS ROBOTS	ROBOTS FOR SURVEILLANCE & INTERVENTION	ROBOTS FOR EXPLORATION & INSPECTION	EDUTAINMENT ROBOTS
SECTORS ▼						
INDUSTRIAL	<p><b>Portfolio of 120 projects, ~ 500 M€ funding</b></p>					
PROFESSIONAL SERVICE						
DOMESTIC SERVICE						
SECURITY						
SPACE						

## Cognitive Systems and Robotics in FP7 (2007-2013)

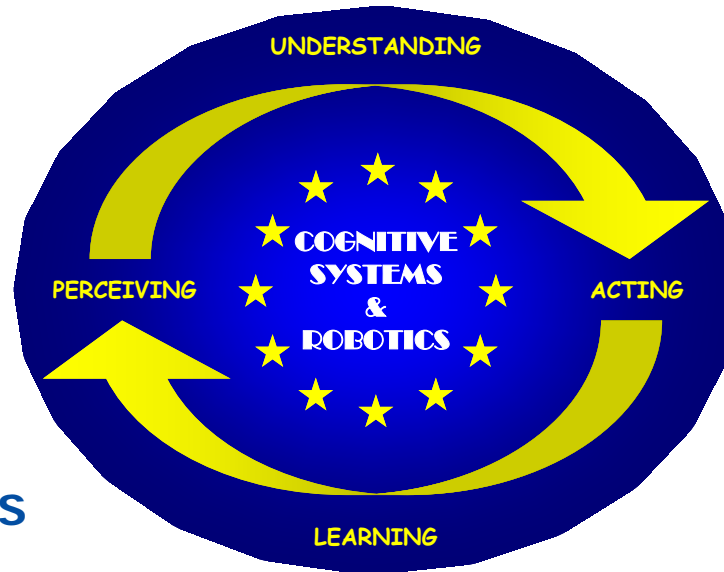
<b>Work Programme</b>	<b>Objective</b>	<b>Call (Evaluation)</b>	<b>Budget</b>	<b>Projects: ACS &amp; Robotics (total)</b>
<b>2007-2008</b>	<i>Cognitive Systems, Interaction, Robotics</i>	<i>ICT Call 1 (2007)</i>	<b>96 M€</b>	17 (27)
		<i>ICT Call 3 (2008)</i>	<b>97 M€</b>	17 (23)
<b>2009-2010</b>	<i>Cognitive Systems and Robotics *)</i>	<i>ICT Call 4 (2009)</i>	<b>73 M€</b>	19
		<i>ICT Call 6 (2010)</i>	<b>80 M€</b>	22
	<i>Factories of the Future</i>	<i>NMP-ICT-FoF (2010)</i>	<b>35 M€</b>	3 (8)
<b>2011-2012</b>	<i>Cognitive Systems and Robotics</i>	<i>ICT Call 7 (2011)</i>	<b>73 M€</b>	16
		<i>ICT Call 9 (2012)</i>	<b>82 M€</b>	17
	<i>Factories of the Future</i>	<i>NMP-ICT-FoF (2012)</i>	<b>40 M€</b>	4 (12)
<b>2013</b>	<i>Cognitive Systems and Robotics</i>	<i>ICT Call 10 (2013)</i>	<b>90 M€</b>	20 (24)
	<i>Factories of the Future</i>	<i>NMP-ICT-FoF (2012)</i>	<b>35 M€</b>	1 (5)

\*) No more interaction since 2009 - language-based interaction in a separate objective with its own budget

# Project Portfolio

## PERCEIVING

- Touching
- Seeing
- Hearing
- Advanced sensing



## APPLICATION AREAS

- Aerial
- Underwater
- Industry and manufacturing
- Professional & domestic
- Medical and rehabilitation
- Monitoring and surveillance

## UNDERSTANDING

- Recognising
- Interpreting
- Adapting
- Modelling
- Cognitive architectures

## ACTING

- Manipulating
- Navigating
- Interacting
- Collaborating
- Monitoring

# Community - building

- **EUROP** - *European Robotics Technology Platform*
- **EURON** - *EUropean RObotics research Network*
  - Network formerly funded by EC – now self-sustaining
- **euRobotics** - *European Robotics Coordination Action*
- **EUCogIII** - *Advancement of Artificial Cognitive Systems, Interaction and Robotics*
- **ECHORD** - *European Clearing House for Open Robotics Development*
- **European Robotics Forum**





# Impact of the EU effort

- *Largest public funded programme in the world (civil)*
- *Substantial **addition to the body of knowledge** (hundreds if not thousands of publications, papers, presentations etc)*
- *Catching **public imagination** (e.g. London Science Museum, European robotics weeks)*
- *Uses can be envisaged in **serious areas** e.g. search & rescue*
- *Progressing towards **socio-economic aspects***

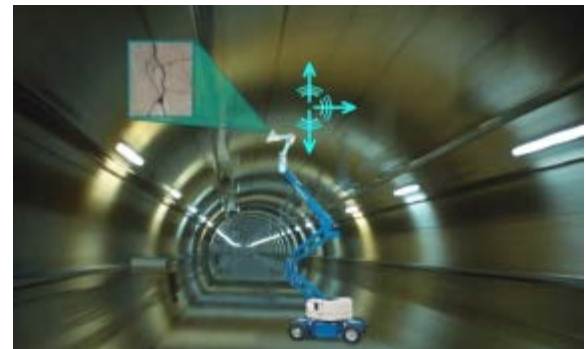
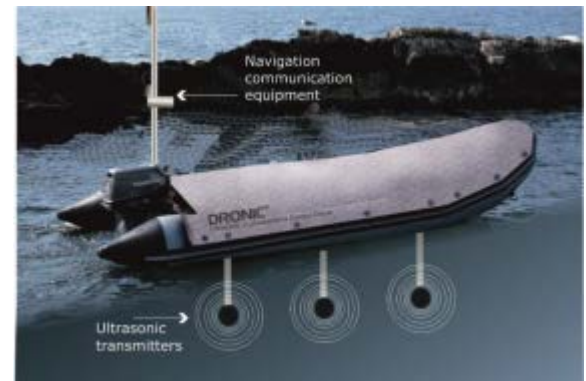


# Call 10 – last robotics call in FP7

- *Work Programme 2013: transition to Horizon 2020*
- *Several RTD challenges*
  - **Robotics**
  - **Cognitive systems**
  - **Smart Spaces**
  - **Human-machine interaction**
- *New dimensions*
  - **Innovation and take-up**
  - **Socio-economic aspects**
  - **International cooperation**

# FP7 Call 10: Use cases

- ***6 highly innovative projects selected for negotiations with overall budget 19 M€***
- ***Various application areas***
  - telediagnosics with semi-autonomous robots
  - USV based solution for monitoring and treatment of blue-green algae blooms in lakes
  - UGV to monitor vineyard to improve wine quality and reduce input of water and pesticides,
  - mobile robotic manipulators in automotive assembly,
  - robot inspection technologies in the oil-, gas and petrochemical markets,
  - robots for inspections of tunnels for detecting cracks in the walls



# What's new in Horizon 2020?

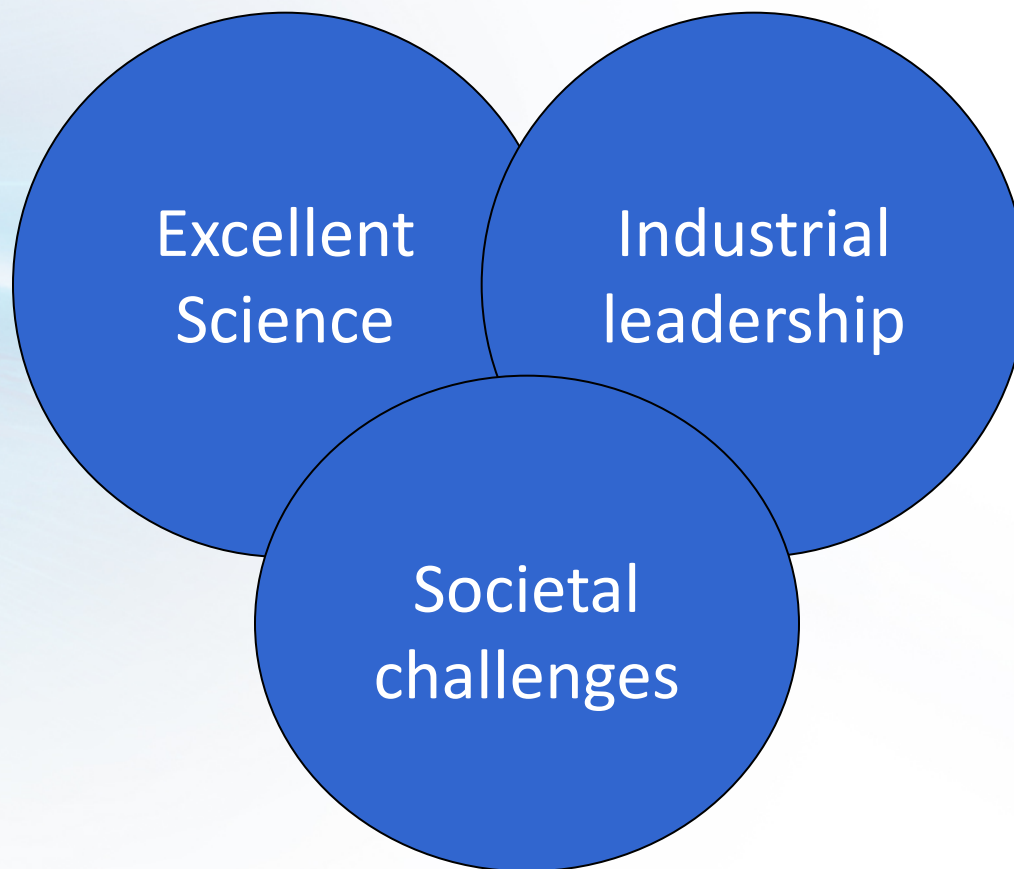
- **A single programme** bringing together three separate programmes/initiatives\*
- **Coupling research to innovation** – from research to commercialisation, all forms of innovation
- **Simplified access**, for all companies, universities, institutes in all EU countries and beyond.



HORIZON 2020

\*The 7th Research Framework Programme (FP7), innovation aspects of Competitiveness and Innovation Framework Programme (CIP), EU contribution to the European Institute of Innovation and Technology (EIT)

# A stronger, clearer focus





# Horizon 2020: Three priorities

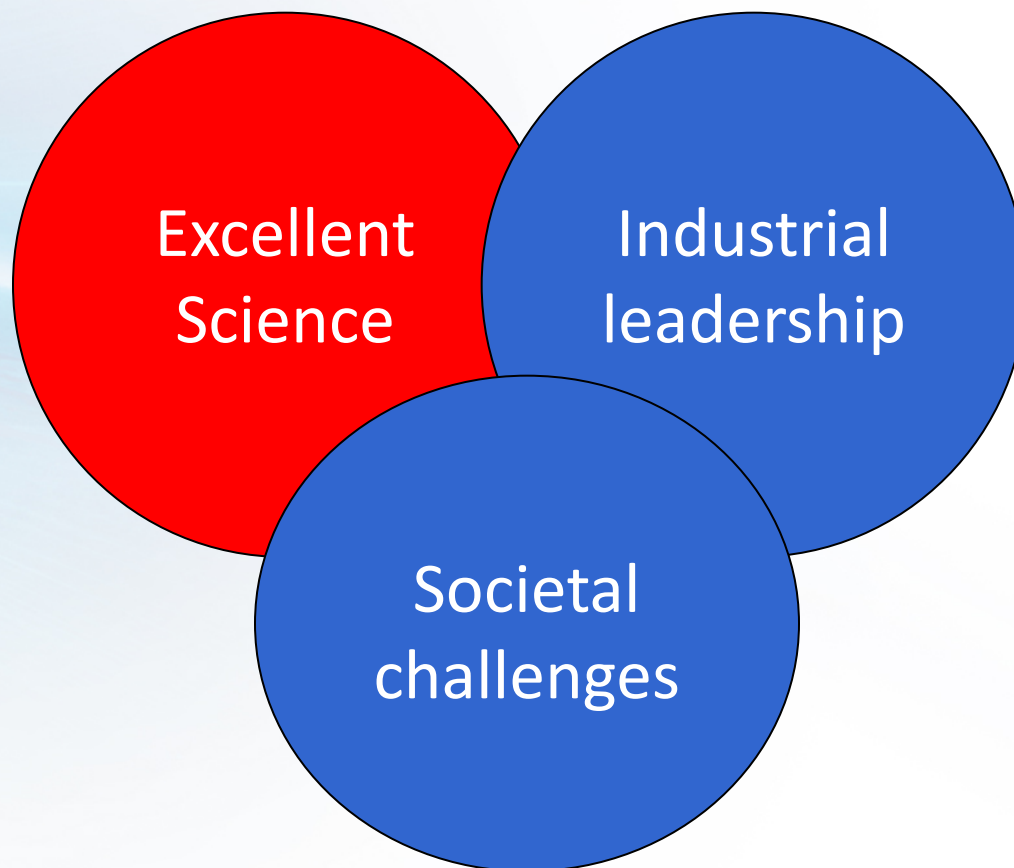
- **Excellent science**
  - *raising the level of excellence in Europe's science base and ensuring a steady stream of world-class research to secure Europe's long-term competitiveness*
- **Industrial leadership**
  - *making Europe a more attractive location for R&I by promoting activities where businesses set the agenda.*
- **Societal challenges**
  - *reflecting the policy priorities of the Europe 2020 strategy and addressing major concerns shared by European citizens*



# Simplification in Horizon 2020

- **Single set of simpler & more coherent participation rules**
- New **balance between trust and control**
- Moving from several **funding rates** to just two:
  - *Maximum of 100% of the total eligible costs for R&D*
  - *Maximum 70 % for actions close to market*
- Indirect costs: a **single flat rate, 20% of eligible costs**
- Major simplification under the **forthcoming financial regulation**
- **Successful applicants to get working more quickly:**
  - *reduction of average time to grant by 100 days (~350 in FP7)*

# H2020



# ROBOTICS AND COGNITIVE SYSTEMS IN Part I - Excellent Science

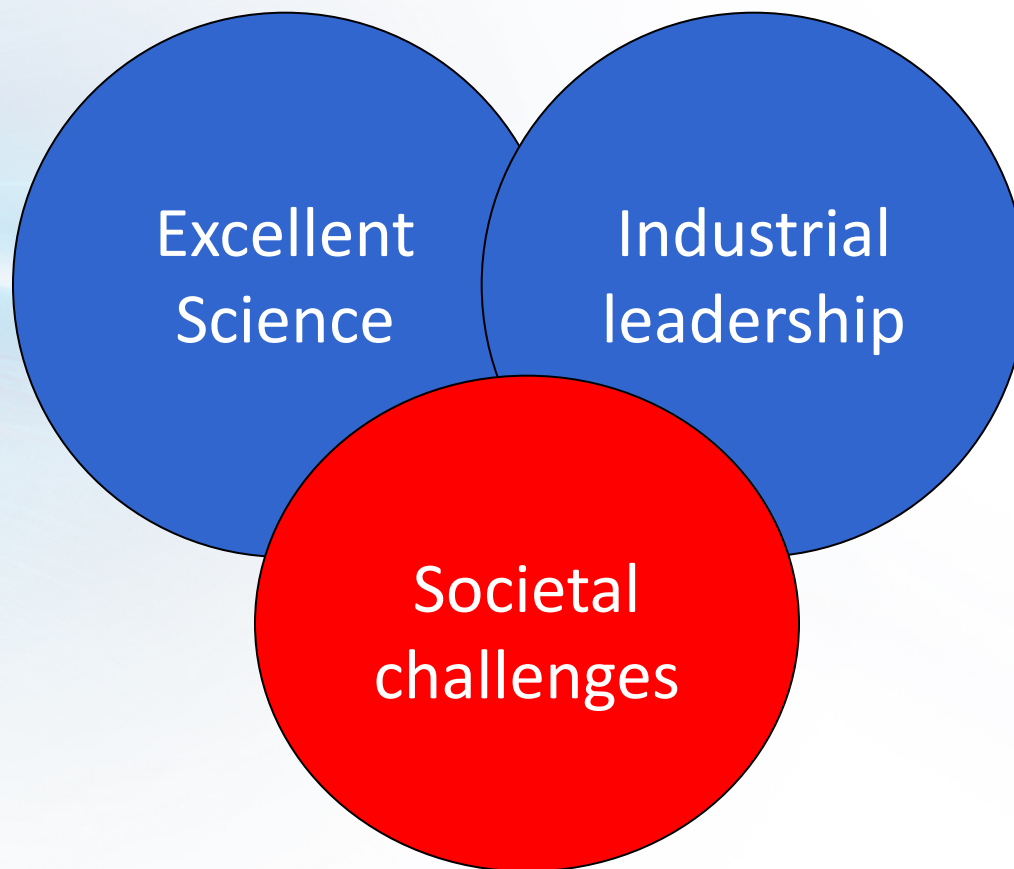
## Topic 5: Knowing, doing and being

- Foundational research on **future artificial cognitive systems and robots**
- **Multidisciplinary**: knowledge, cognition and related issues (including embodiment, thinking, development)
- Takes artificial cognitive systems **beyond the level of dull task execution**

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# H2020



# ICT in Societal Challenges

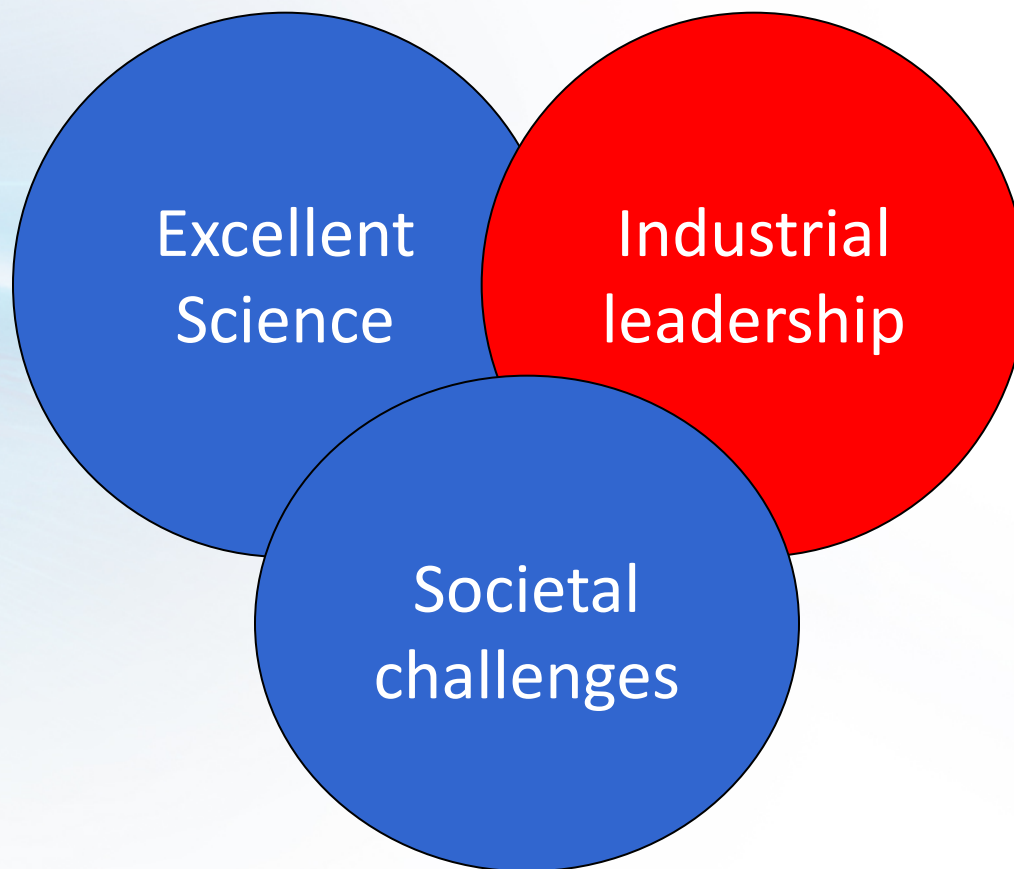
3.5 b€?

- Health, demographic change & wellbeing;
- Secure, clean and efficient energy;
- Smart, green and integrated transport;
- Food security, sustainable agriculture, marine and maritime research & the bioeconomy
- Climate action, resource efficiency and raw materials
- Inclusive, innovative and reflective societies
- Secure societies

**ROBOTICS**

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# H2020



# ICT in Industrial Leadership

1. Components and systems
2. Next generation computing
3. Future Internet
4. Content technologies and information management
5. **ROBOTICS**
6. Key Enabling Technologies: Micro- nano-electronics and photonics

7 b€?

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# Robotics in H2020: PPP

## What is a PPP?

- "...a government service or private business venture which is funded and operated through a partnership of government and one or more private sector organisations."
- PPP stands for **P**ublic-**P**rivate **P**artnership
  - Public side = European Commission
  - Private side = Companies, universities (which can be public bodies), research organisations, NGOs
- Goal: To strengthen the competitive position of Europe in a particular business sector
  - Mutual development of research strategy & commitment to invest in a sector
  - Not limited to research, also looking at other areas such as regulation, policy, trade, non-technical barriers, etc.



# Vision and mission of the PPP in Robotics

- Vision: A higher quality of life for everyone through robotics.
  - **The European robotics community will lead the world in robotics by creating, designing, developing, innovating, manufacturing and distributing robotic product and services: thereby meeting many societal needs of EU citizens.**
- Mission: Creating and deploying robotic products and services for high quality work and personal life.
  - **society shall benefit**
  - **better living inside and outside factories**
  - **improve quality of life directly and indirectly**
  - **strategic coordination of pre-competitive R&D&I activities**



# Specific goals of the PPP in Robotics

- Develop strategic goals of European robotics and foster their implementation
- Improve industrial competitiveness of EU through innovative robotic technologies
- Position robotics as a key enabler for solving Europe's societal challenges
- Strengthen networking activities of the European robotics community
- Promote European robotics
- Reach out to new users and markets
- Contribute to policy development and addressing ethical, legal and societal issues

## Private side of the PPP

- Not-for-profit organisation eurobotics aisbl founded under Belgian law in September 2012
- President, Vice-Presidents and Board of Directors recently elected
- Memorandum of Understanding signed between the EC (VP Neelie Kroes) and eurobotics aisbl on 18 September 2012





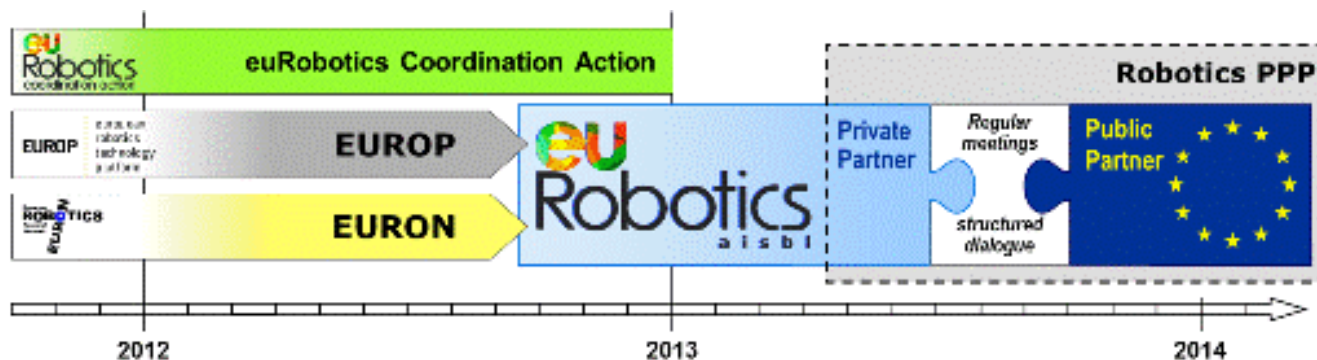
## Outreach to new sectors

- Going beyond the usual players in robotics (industrial robotics)
- Robotic technologies can play a role in many areas such as healthcare, agriculture, mining, etc.



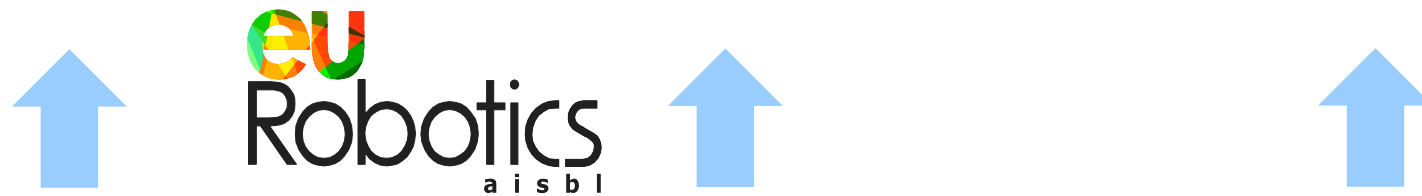
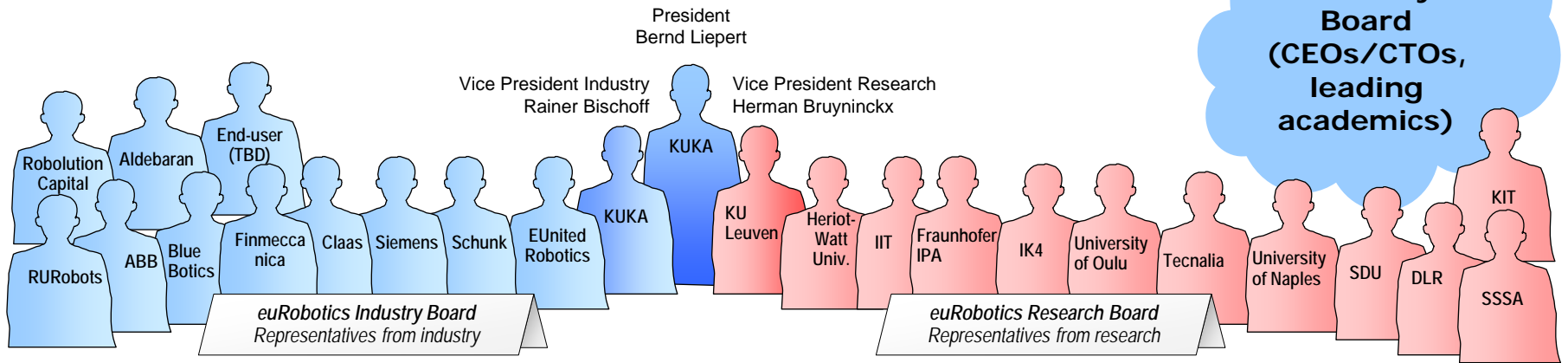
# PPP Contractual Agreement

- The European Commission (=public side) and eurobotics aisbl (=private side) will sign a contractual agreement
- Contractual agreement will cover:
  - the objectives of the partnership
  - the commitments of the partners
  - key performance indicators
  - outputs to be delivered
  - the governance structure
  - appropriate actions in case of breach of the agreement





# Governance structure of the PPP in Robotics



**General Assembly**

**BoD communicates with the EC**



# Status of the robotics PPP

- **Private stakeholders submitted PPP application to the EC mid-June**
- **Assessment of application by external experts took place**
- **Assessment to be communicated probably only after summer break**
  
- **Membership of euRobotics aisbl has grown to 125 (65% academia, 35% industry)**
- **21 Task Forces have been installed dealing with all kinds of organisational matters (branding, IT environment, etc.)**
- **Call for Topic Groups launched**
- **euRobotics aisbl secretariat recruiting more staff**
- **RockEU Coordination Action under negotiations (supporting the PPP operations in the ramp-up phase)**

# Update of Strategic Research Agenda

- Strategic Research Agenda is key document
  - Defines research priorities, technologies to be developed, sectors to be incorporated
  - Builds on SRA from 2009, but will be heavily updated
  - EC will use SRA as a basis to develop work programmes, calls for proposals
- Drafting has started in Sept 2012, full version ready by mid 2013
- **Wide participation essential!**



# ROBOTICS in Industrial Leadership

## CHALLENGE 5: Robotics

5.1: Roadmap-based R&D&I in Robotics - 1<sup>st</sup> Call

Publication: December 2013

Deadline Spring 2014 (indicative)

### Content

- a. RTD to advance key technologies relevant for industrial and service robotics
- b. Technology transfer - Robotics use cases
- c. Pre-commercial procurement in robotics
- d. Shared resources and assessment

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# ROBOTICS in Industrial Leadership

## CHALLENGE 5: Robotics

5.2: Roadmap-based R&D&I in Robotics - 2<sup>nd</sup> Call

Publication: December 2014 (tentative)

Deadline Spring 2015 (tentative)

### Content

- a. RTD to advance key technologies relevant for industrial and service robotics
- b. Technology transfer - Industry-academia cross-fertilisation
- c. Technology transfer - Robotics use cases
- d. Pre-commercial procurement in robotics
- e. Community building and Robotic competitions

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# ROBOTICS in Industrial Leadership

Specific Call for Manufacturing, FoF

Modernising Europe's Manufacturing Capabilities

**FOCUS: ICT Innovation for Manufacturing SMEs (I4MS)**

Four areas of technologies are targeted for adoption:

1. Highly flexible and near-autonomous **robotics systems**.

**Application Experiments** bring together all actors of the value chain and experts necessary to equip new users with novel products or services and assist them in customising and applying these in their respective environments.

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# ROBOTICS in Industrial Leadership

## ICT Horizontal and Cross-Cutting Activities

### CC.1 - Platforms for **Connected Smart Objects**

- Integrating the future generation of devices, network technologies and other evolving ICT advances
- **Smart Environments** enriched through the deployment of **wearable** hardware and the **next generation of robots**, in particular consumer and domestic service robots.
- For citizens at home, at work and while on the move and for new services

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## More information...

- EU funded activities including information about current projects:  
<http://cordis.europa.eu/fp7/ict/robotics/>
- News:  
<http://twitter.com/RoboticsEU>  
<http://www.facebook.com/RoboticsEU>
- eurobotics aisbl:
  - Industry: Rainer Bischoff ([rainer.bischoff@kuka.com](mailto:rainer.bischoff@kuka.com) )
  - Academia: Herman Bruyninckx ([herman.bruyninckx@mech.kuleuven.be](mailto:herman.bruyninckx@mech.kuleuven.be))
- PPP Website:
  - <http://www.eurobotics-project.eu/robotics-ppp/about-robotics-ppp.html>



**Thank you!**