EUROP

european
robotics
technology
platform

ECHORD information day
Deutsches Museum, Munich – 4th September 2009

www.robotics-platform.eu

ECHORD

Point of view of the European robotics industry

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Agenda

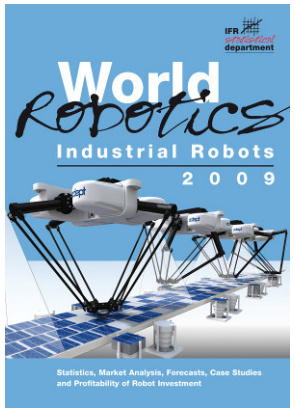
1. Background
2. EUROP – the European Robotics Technology Platform
3. Robotics Visions to 2020 and beyond - The Strategic Research Agenda for robotics in Europe
4. The way ahead: Challenges & Opportunities

On a Global level

- ISR – International Symposium on Robotics
  - annual symposium on industrial and service robotics
  - since 1970

ISR 2010
International Symposium on Robotics
Visions are Reality.

- World Robotics
  - annual statistics of (industrial) robotics
  - since 1985



- IFR – International Federation of Robotics
  - established in 1987

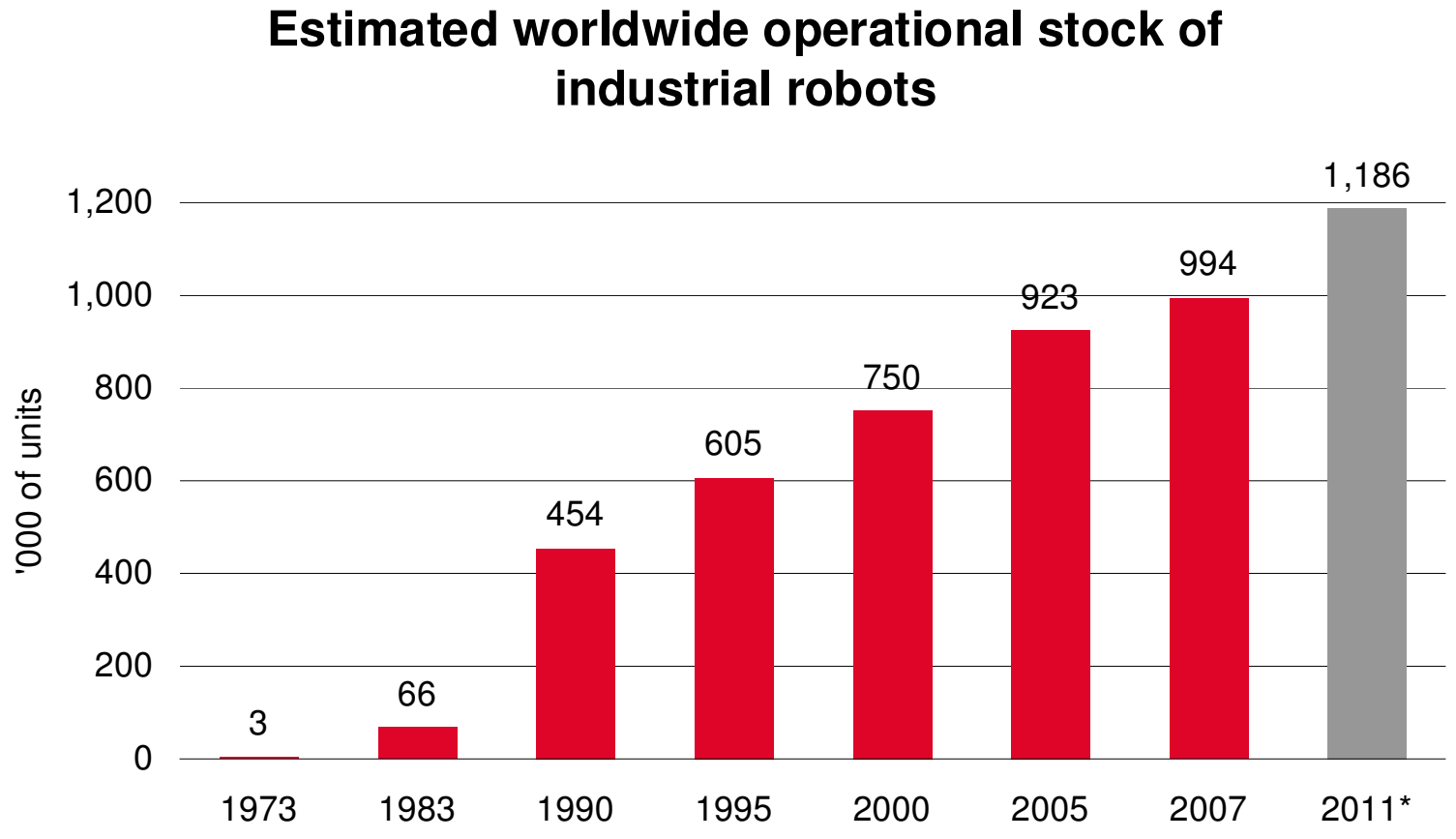
IFR International Federation of Robotics

EUROP european robotics technology platform

EUnited Robotics the European part of IFR

- EUnited Robotics
  - European Robotics Association
  - Founded in 2004
  - Voice of the European robotics industries
  - Important steps to set up EUROP:
    - *Building the ETP European Robotics Platform – EUROP*
    - *Sectorial Report on Industrial Robot Automation*
- October 2005: foundation of EUROP

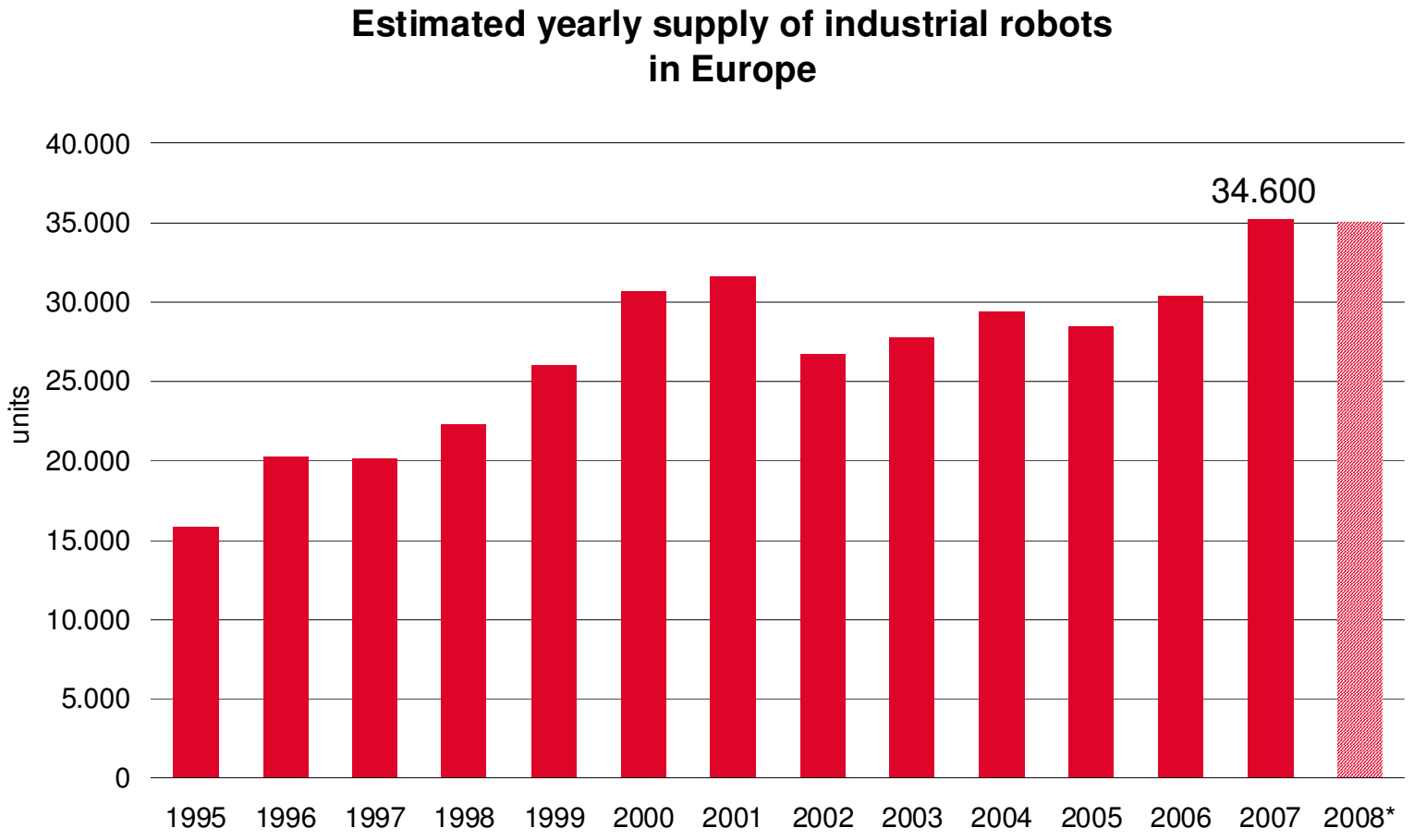
Robotics is a growing Industry
1.2 million industrial robots in 2011



* forecast

Source: World Robotics 2008

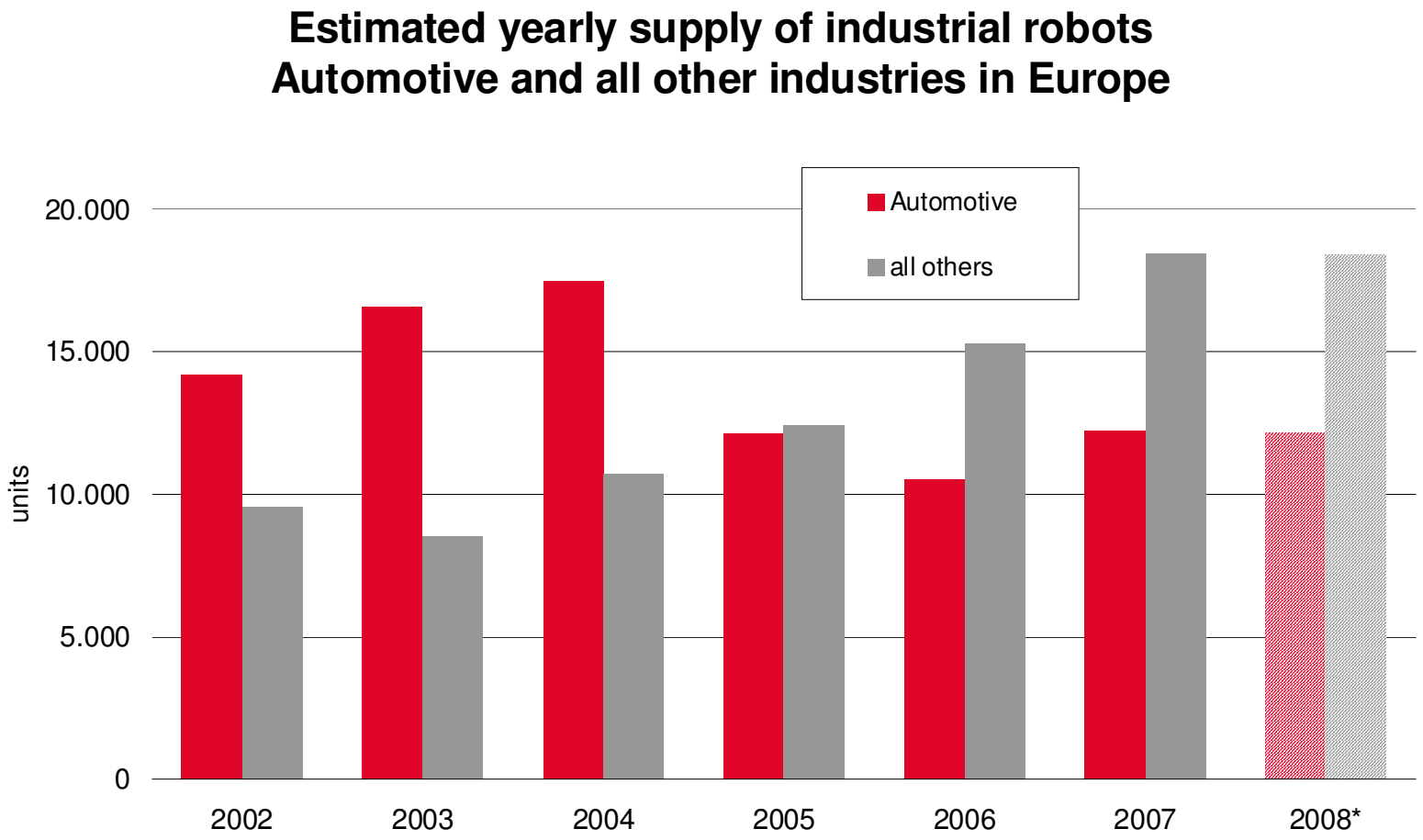
Europe has a strong base
Every third robot is installed in Europe



*preliminary results

Source: IFR

General Industry applications growing



*Preliminary results

Source: IFR

Service Robotics

The market is moving….
New products and applications

Sales up to 2007

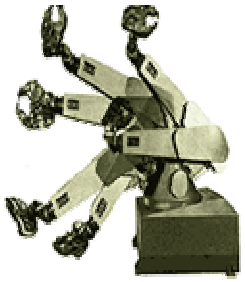
- 49,000 service robots for professional use installed
- about 3.5 million domestic service robots
- 2.0 million entertainment and leisure robots

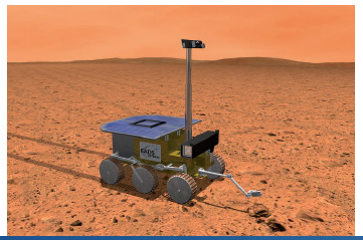
Forecast 2007 - 2010

- another 35,000 service robots for professional use
- another 3.6 million service robots for private use



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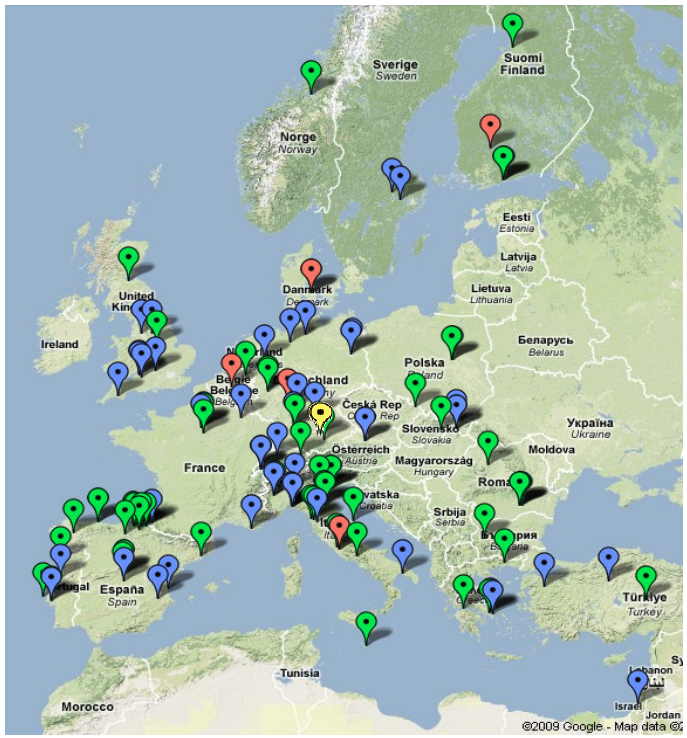
European **Ro**botics Technology **P**latform

- An industry driven framework for the European robotics stakeholders
- Founded in October 2005, as one of several European Technology Platforms, supported by the European Commission

- Bringing together the main stakeholders
  - to agree on a common vision for the technology
  - to identify common research and development goals of industrial relevance

- 119 dedicated members & cooperation partners
  - industrial and research organisations active in industrial, professional service, domestic service, security and space robotics
  - From all over Europe



EUROP european robotics technology platform

EUROP - Vision & Goals

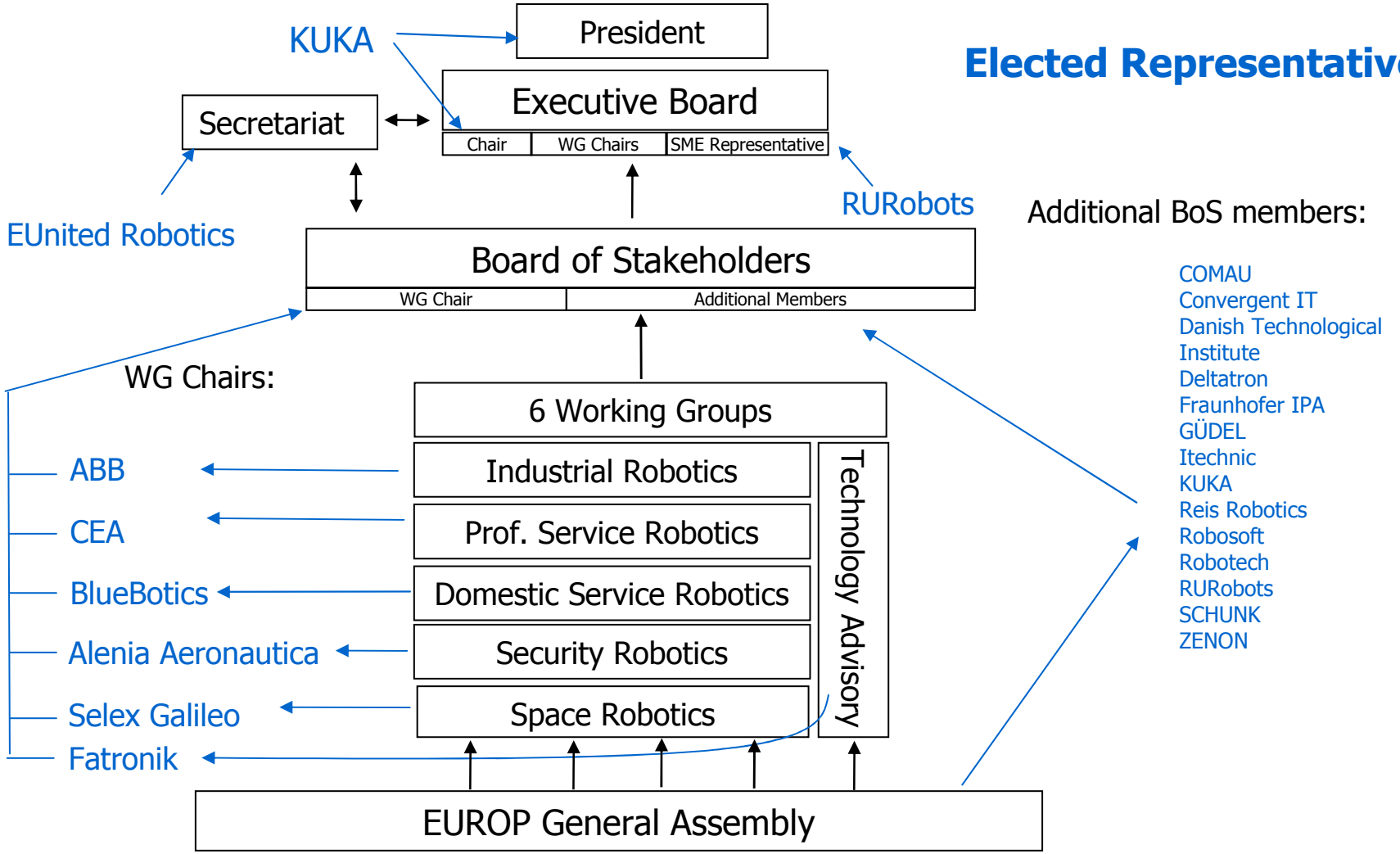
Vision

- Maintain leadership in industrial robotics
- Take the lead in service and security markets
- Develop a European robotics supply chain
- Ensure public and personal security
- Improve quality of life and expand scientific endeavours

Goals

- Promote European Robotics
- Provide networking support for the European robotics community
- Develop the Strategic Research Agenda of European Robotics and ensure its high quality and endorsement

EUROP - Governance Structure



EUROP - Activities

- Networking & Community building:
  regular meetings, publications, newsletters, etc.
- Enhance the dialogue:
  - Between & across robotics domains
  - Between academia & industry
- Promote European robotics
- Identify & communicate challenges and needs
  of the European robotics industry

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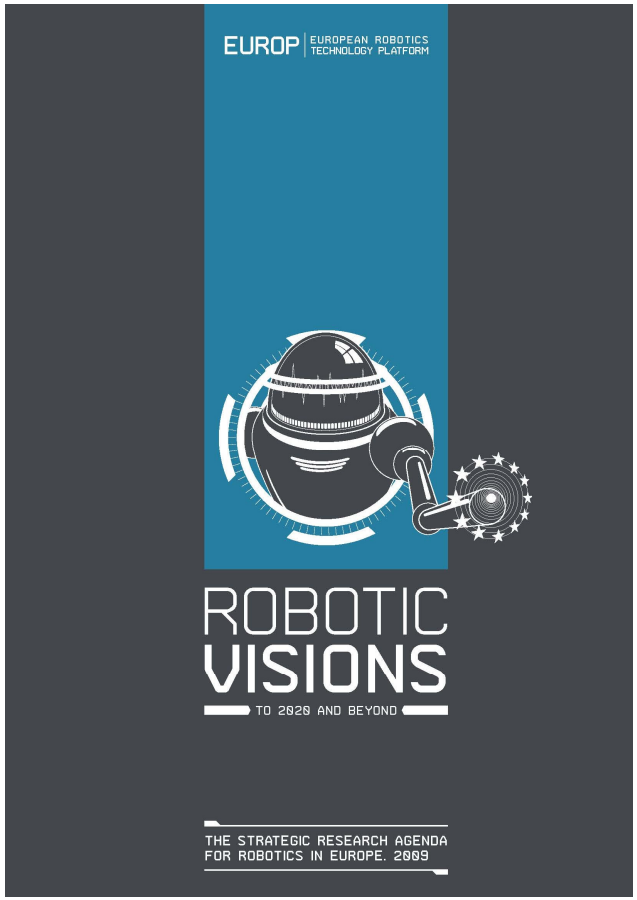
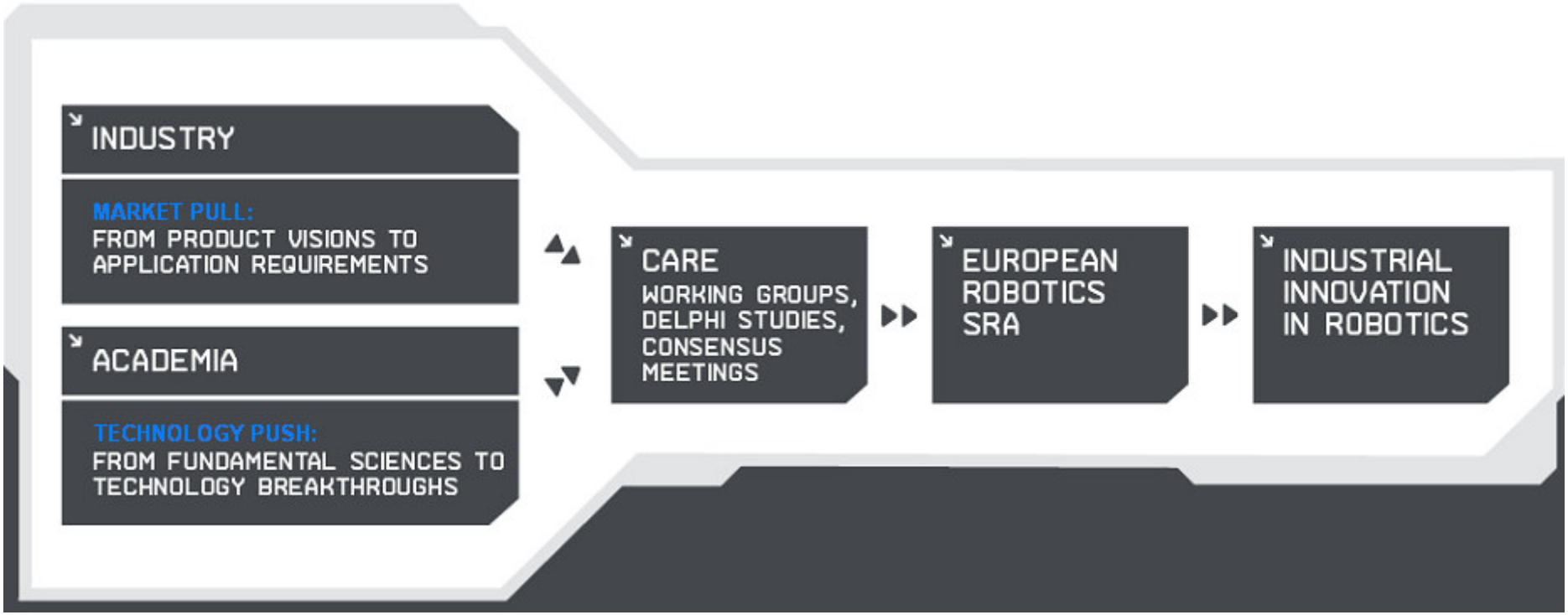
The new EUROP SRA

- Robotic Visions to 2020 and beyond –
  The Strategic Research Agenda
  for robotics in EUROP
- Presented on July 7th, 2009 in Brussels
- Industry-driven vision, identifying:
  - Future Product Visions of all robotics domains
  - Opportunities
  - Technology Roadmap
  - Challenges and needs ahead

  => The implementation of the SRA will lead to industrial innovation in robotics
- *http://www.robotics-platform.eu*



Setting up a joint Research Agenda for robotics in Europe



Roadmapping methodology

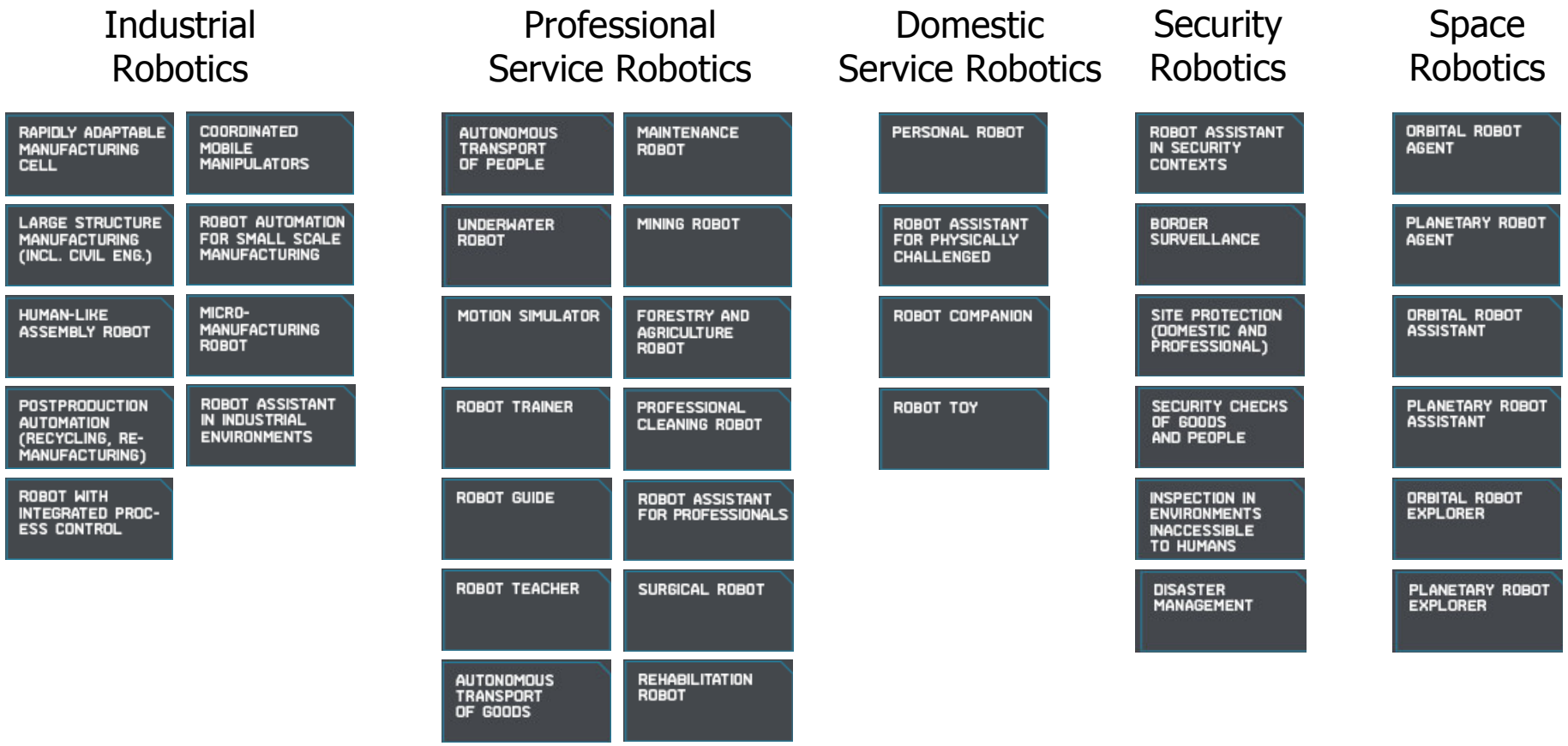
Step 1: Identified 39 Product Visions

Step 2: What level of performance is needed to make these reality? → Application Requirements

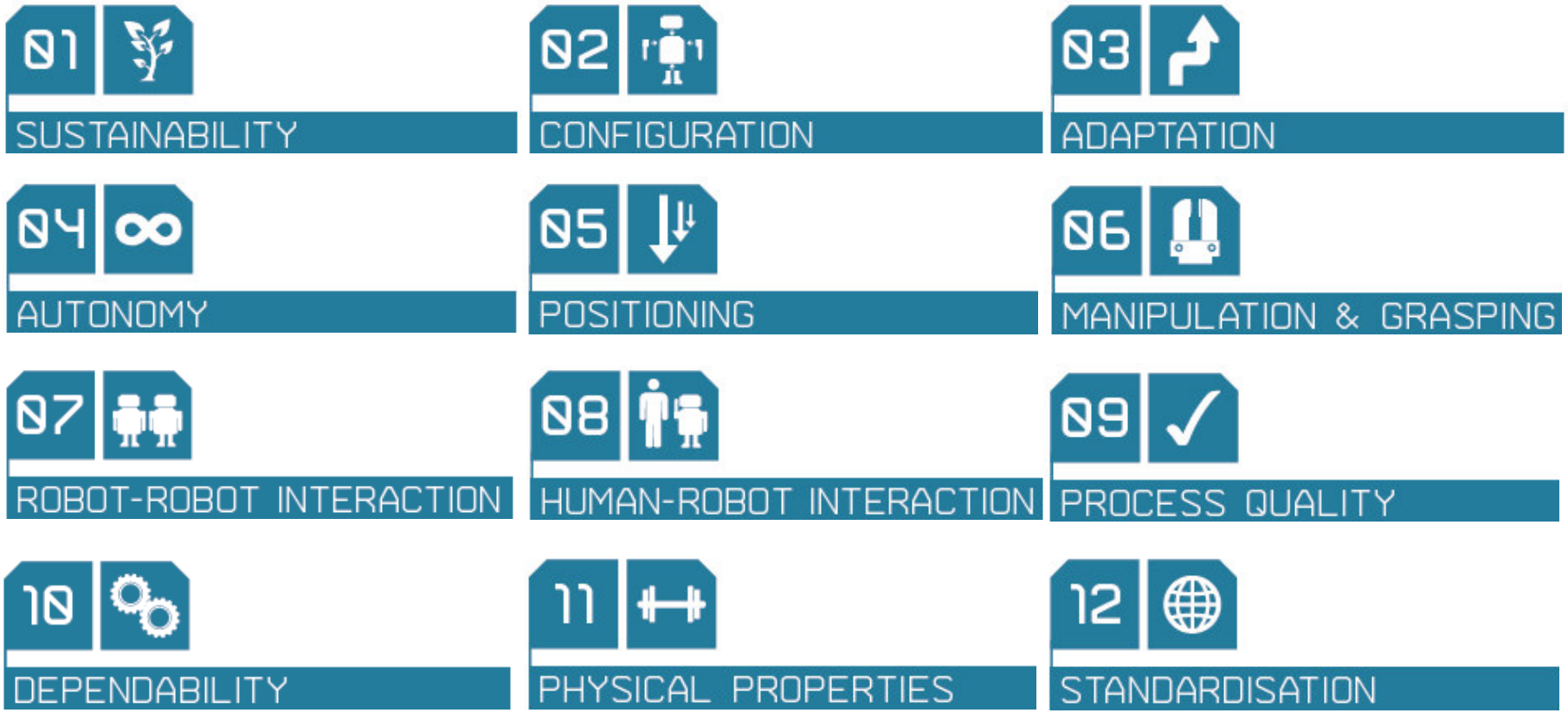
Step 3: Compare Application Requirements of all Product Visions
→ grouping into Application Scenarios

Step 4: Identify Technologies able to fulfil the Application Requirements

Step 1: Product visions from all sectors…



Step 2: …result in 12 Application Requirements…



Step 3: … leading to Application Scenarios…

Worker

- LARGE STRUCTURE MANUFACTURING (INCL. CIVIL ENG.)
- RAPIDLY ADAPTABLE MANUFACTURING CELL
- HUMAN-LIKE ASSEMBLY ROBOT
- POSTPRODUCTION AUTOMATION (RECYCLING, RE-MANUFACTURING)
- MAINTENANCE ROBOT
- MINING ROBOT
- ORBITAL ROBOT AGENT
- ROBOT WITH INTEGRATED PROCESS CONTROL
- COORDINATED MOBILE MANIPULATORS
- ROBOT AUTOMATION FOR SMALL SCALE MANUFACTURING
- MICRO-MANUFACTURING ROBOT
- FORESTRY AND AGRICULTURE ROBOT
- PROFESSIONAL CLEANING ROBOT
- PLANETARY ROBOT AGENT

Co-worker

- ROBOT ASSISTANT IN INDUSTRIAL ENVIRONMENTS
- ROBOT ASSISTANT FOR PROFESSIONALS
- SURGICAL ROBOT
- REHABILITATION ROBOT
- PERSONAL ROBOT
- ROBOT ASSISTANT FOR PHYSICALLY CHALLENGED
- ROBOT ASSISTANT IN SECURITY CONTEXTS
- ORBITAL ROBOT ASSISTANT
- PLANETARY ROBOT ASSISTANT

Logistics

- AUTONOMOUS TRANSPORT OF GOODS
- AUTONOMOUS TRANSPORT OF PEOPLE

Surveillance & intervention

- BORDER SURVEILLANCE
- SITE PROTECTION (DOMESTIC AND PROFESSIONAL)
- SECURITY CHECKS OF GOODS AND PEOPLE

Exploration & inspection

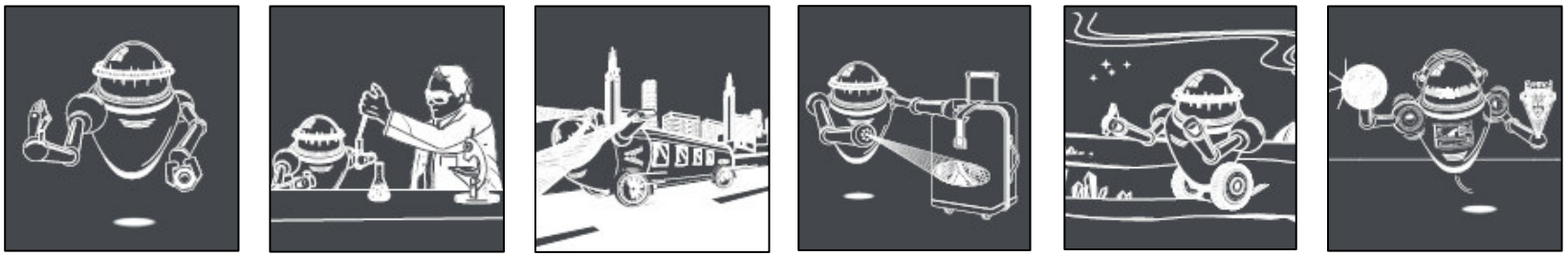
- INSPECTION IN ENVIRONMENTS INACCESSIBLE TO HUMANS
- UNDERWATER ROBOT
- DISASTER MANAGEMENT
- ORBITAL ROBOT EXPLORER
- PLANETARY ROBOT EXPLORER

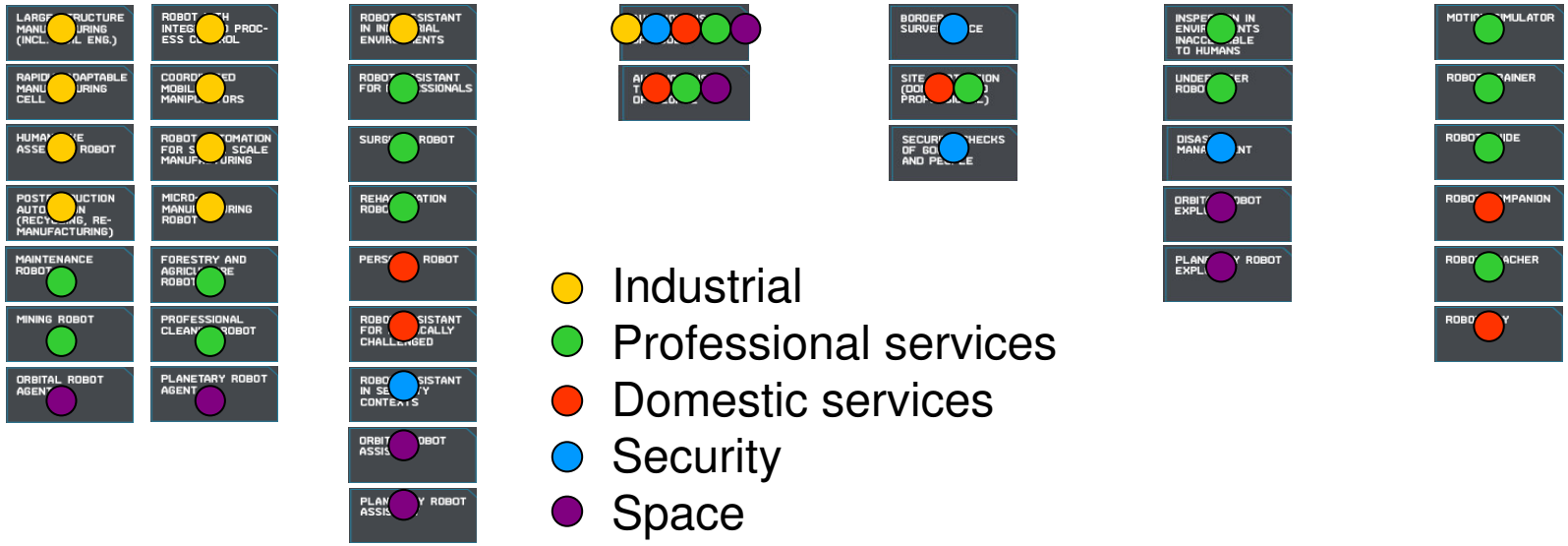
Edutainment

- MOTION SIMULATOR
- ROBOT TRAINER
- ROBOT GUIDE
- ROBOT COMPANION
- ROBOT TEACHER
- ROBOT TOY

Step 3: … covering all market sectors…

Worker | Co-worker | Logistics | Surveillance & intervention | Exploration & inspection | Edutainment



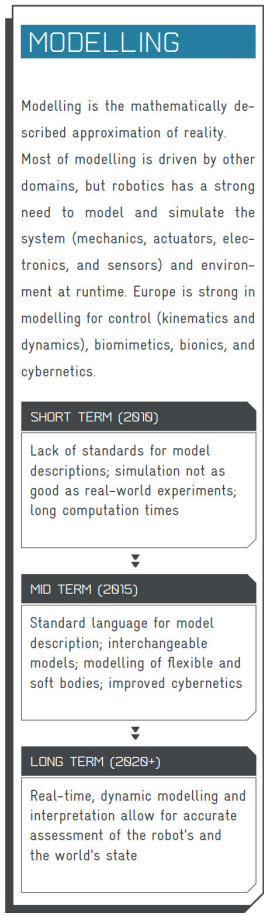


- Industrial
- Professional services
- Domestic services
- Security
- Space

Step 4:
18 Technologies fulfil Application Requirements

Mostly driven by others	Driven by robotics and others		Mostly driven by robotics
SYSTEM ARCHITECTURE	(REAL-TIME) COMMUNICATION	MATERIALS	COOPERATING ROBOTS & AMBIENT INTELLIGENCE
POWER MANAGEMENT	HUMAN-MACHINE INTERFACE	PLANNING CONTROL	
SYSTEM ENGINEERING	SAFETY	LEARNING	END EFFECTORS
TOOLS	ACTUATION	SENSORS	NAVIGATION
MODELLING	LOCOMOTION	SENSING & PERCEPTION	

Technologies in the SRA



← Definition

← Drivers of the technology

← European strengths and weaknesses

← 2010: state of the art / short term development

← 2015: mid term development

← 2020+: long term goals

Ethical, legal, and societal issues

- Ethical issues
  - Robot or robotic device does “wrong”
  - Robot or robotic device is applied inappropriately
- Legal issues
  - Who takes responsibility for the robot’s/devices’ actions?
- Societal issues
  - Changing labour profiles
  - Social division

→ potential barriers to market

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Bridge gap between industry and academia

- Excellent European research exists in all areas related to robotics, but:
  - Sometimes, there is a big gap between today's industrial needs and academic offerings.
  - Academia has a small scope, component-level focus, working towards just proofs-of-concepts.
  - Research topics are (sometimes) too far directed towards future needs
  - Industry needs system-level applications, with focus on robustness and maintainability.
  - Sometimes industry does not know about useful academic results

⇒ Know-how transfer – enhance communication:

- from industry -> academia
- from academia -> industry

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Shift this into an Opportunity

Opportunities

Inspired by the European Commission join forces in Europe to further grow European Robotics industry

Tools:

- The SRA
- The refinement of the SRA as lessons are learned
- Framework programs
- EUROP and EURON networks
- National Research programs
- etc

What industry hopes and expects from ECHORD….

- Bring a lot of latest state-of-the art equipment to robotics labs
- Stimulate academia to solve the research challenges listed in the EUROP SRA
- Practical outcomes of the experiments
- Know-how transfer
- Realise new products / solutions
- Build on existing networks:
  Work with EUROP and EURON towards the implementation of the SRA

The EUROP community

Welcome ECHORD

Look forward to a fruitful cooperation!

EUROP

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Download the SRA
www.robotics-platform.eu/sra