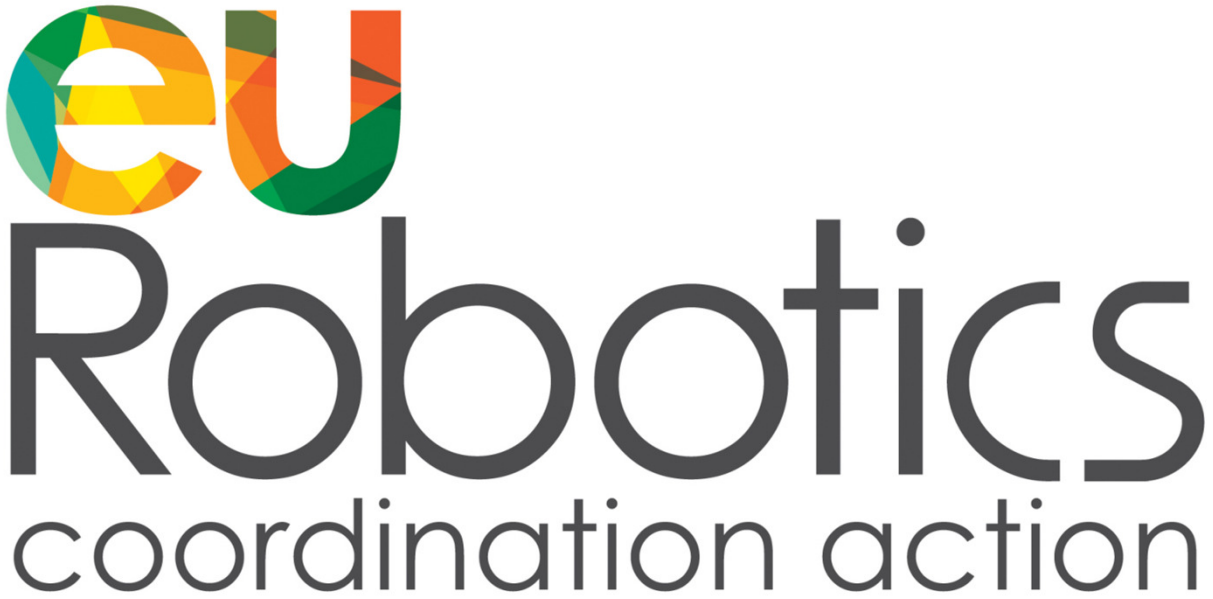
PLEASE SIT WHEREVER YOU LIKE

THE SIGNS ARE FOR LATER

Technical Gaps workshop



Dr. Tim Guhl
KUKA Laboratories GmbH

Technical Gaps WS, European Robotics Forum, Västerås, 07/04/2011

Overview

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- Introduction
- Instructions
- Groupwork
  - Feedback on identified technical gaps
  - Determine additional technical gaps
- Disscussion involving everyone
  - How to prioritise the technical gaps
  - How to bridge the technical gaps

Gaps between the sectors

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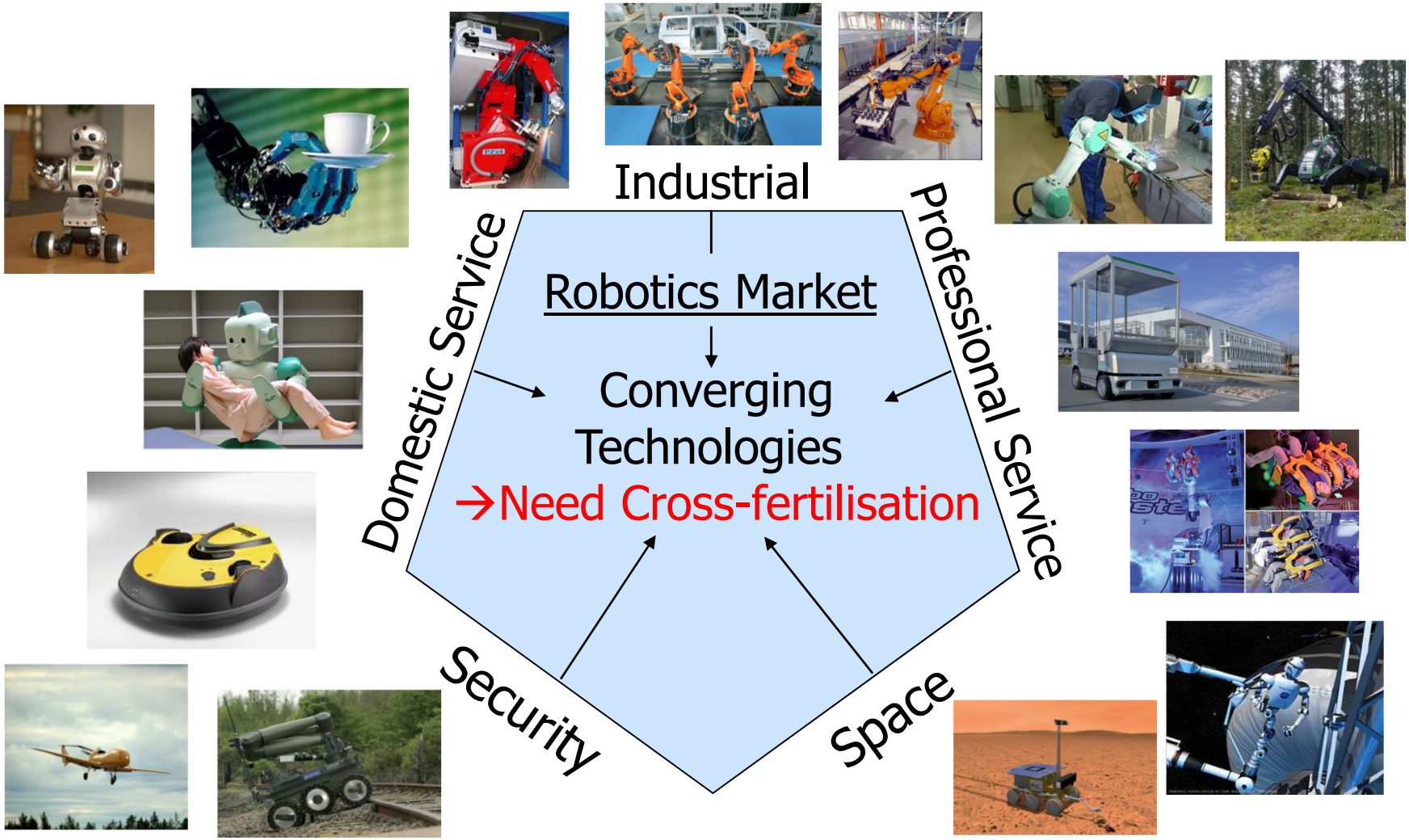

Gaps between Industry and Academia

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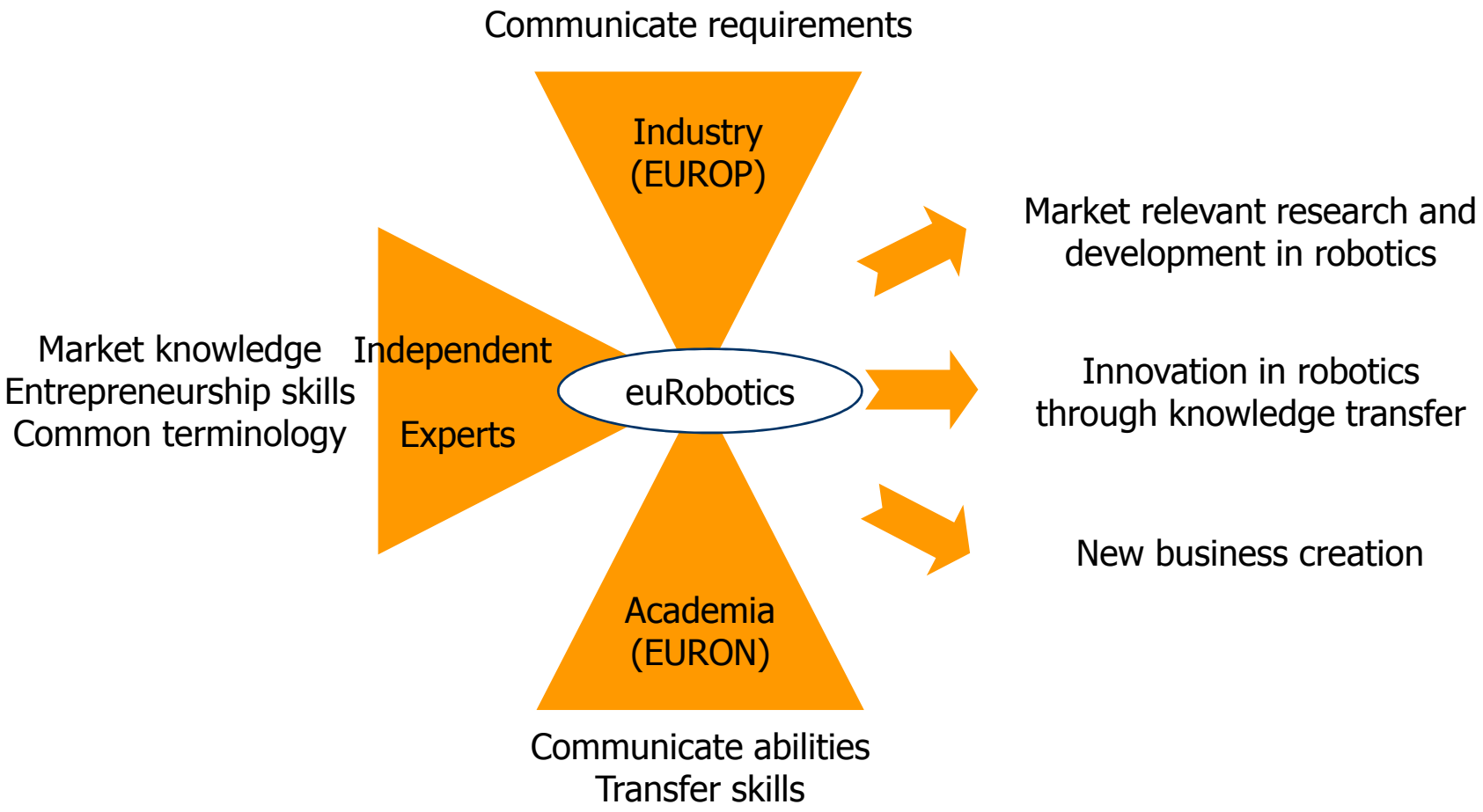
- European research in all areas related to robotics, but:
  - Solutions provided by academia may not fulfil (all) industrial performance requirements
  - “blue sky research”
  - Research is often not aware of the first two points!

Closing the Gaps



Work done so far…

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- Key technologies were extracted from the SRA
- Investigation into the current status of these key technologies → list of possible gaps
- First descriptions of gaps developed
- Expert consultation
  - Current status in academia and industry
  - Reason for the gap
  - Advantages of this technology
  - Suggestions on how to bridge the gaps were asked
- Revised description of gaps

Next steps…

- Goals at European Robotics Forum
  - Complete list of gaps
  - Accurate descriptions of the gaps
  - Progress regarding the gap prioristation methodology
  - Suggestions on how to bridge the gaps
  - List of academic and industrial experts on each gap
- Develop strategy to overcome gaps
- Put strategy into action
- Further expert consultations as required

Course of events at this workshop

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- Industrial and academic experts discuss in small groups → much more accurate description of the gap
  - Talk about supplied gap descriptions and make them better
  - Tell us about gaps in your technology area we missed (i.e., areas, where you know that academic results are not used in products)
  - List experts for every gap (including yourself where applicable)
- Pleary discussion on
  - How to priorise gaps
  - How to bridge gaps

Description of gaps

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- Description
  - Describe the technology and how is it used
  - Describe strengths, weaknesses, opportunities and threats (SWOT)
- Situation
  - Hightlight differences between state of the art in academia & industry
- Categorisation of gap according to 6 criteria

Types of gaps

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- Not used in industry
  - The results achieved in academia have not found their way into industry (e.g., no prototypes or products using this technology).
- Industrial Prototypes
  - Some prototypes but no products developed in industry use this technology.
- Performance
  - The technology is widely used in industrial products, but there is a difference in performance between industry and academia.
- Partly used in industry
  - This means that this technology is used only by a minority of the manufacturers in robotics.

Reasons for gaps

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- Misunderstanding, e.g.,
  - “Mature, academic solution is unknown to industry”
  - “Academic solutions incorrectly assumed to be fit for industry”.
- Technical
  - The academic solution does not meet industrial requirements.
- Economical
  - The technology is available, but too expensive for realistic products.
- Market
  - There is no market for products that require this technology.

Technology drivers

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- Mainly driven
  - Robotics is the main field where this technology is currently applied and can hence influence what is developed next.
- Partly driven
  - Robotics is one of the major fields in which this technology is used. It is, however, it is not the only one.
- Not driven
  - Robotics is not one of the key users of this technology.

Substitutability of technology

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- Without substitution
  - There is no substitution for this technology.
- Limited substitution
  - The technology can be substituted by other technologies, but this one has advantages over the other technologies.
- Widely substitutable
  - This technology is one of the many possibilities.

Expected market

- High return rate
  - The application of this technology may bring large profits.
- Moderate return
  - The technology will only bring a moderate profit to industry.
- Low return rate
  - Low return rate is expected for this technology.

Relevance for European robotics

- Highly Relevant, e.g.,
  - “Europe is currently a leader in this field”
  - “Europe needs to develop skills in this area to remain competitive”
- Relevant
  - Related to European robotics.
- Marginally Relevant, e.g.,
  - „Currently not used in Europe and there is no need to start doing so“.

Split into groups

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- Mixed industrial and academic groups were possible
- Groups of two or three – split larger groups

- 1 System Architecture
- 2 System Engineering & Deployment Tools
- 3 Cooperating Robots & Ambient Intelligence
- 4 (Real-time) Communication
- 5 Human-Machine Interface
- 6 Safety
- 7 Actuation
- 8 End Effector for Handling Purposes
- 9 Locomotion
- 10 Materials
- 11Navigation
- 12 Planning
- 13 Power management
- 14 Control
- 15 Learning
- 16 Modelling
- 17 Sensors
- 18 Sensing & perception

Prioritisation of the technical gaps

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- One suggestion:
  - Every category is given a weight
  - Every evaluation is given a score
  - To calculate the priority of gaps:
    - First calculate the score in each category be multiplying the score by the weight
    - Then sum the scores
- Other ideas?

Bridging the technical gaps

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- What are your ideas?

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Backup slides

euRobotics WP 1: Bridging the gap between academia and industry

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- Objectives
  - Identify, bridge and close the gap between industry needs and academic offerings
  - Bring together, promote and strengthen links between industry and academia
- Tasks
  - Identify hindering gaps
  - Monitor, adapt and enable the implementation of the SRA
  - Improve education and training (PhD Schools, industry training)
  - Develop common terminology and the “robotics semantic web”
  - Develop SRA Grand Challenges

euRobotics WP 3: Facilitating exploitation of European robotics R&D

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- Objectives
  - Foster technology transfer
  - Promote the creation of new robotics business
  - Pinpoint ELS issues obstructing the development of robotics technology (including standardisation issues)
  - Assess market requirements
- Tasks
  - Fostering and promoting entrepreneurship
  - Analyse ELS issues
  - Carry out market studies
  - Push standardisation activities

Conclusions

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- What was the goal?
  - Feedback on gaps already identified
  - Information about gaps we missed
  - Discussion of gap priortisation methodology
  - Brainstorm about ways to close the gaps
- Results of the workshop
  - Over 40 forms with information about new and known gaps
  - Prioritisation is tricky but we have a few more ideas
  - Prioritisation only useful in certain circumstances
  - Each gap has to be closed in a way appropriate to it
  - Main way to close the gaps is to get people to talk and work together