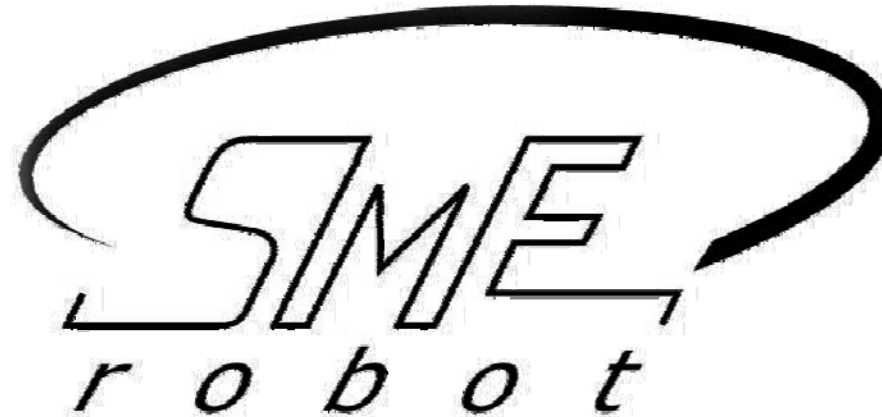


Final Project Workshop



The European Robot Initiative for
Strengthening the Competitiveness of
SMEs in Manufacturing

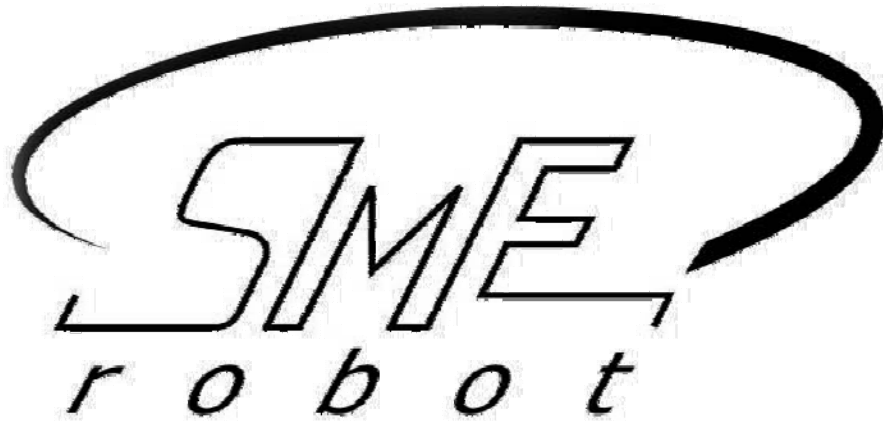


SIXTH FRAMEWORK PROGRAMME

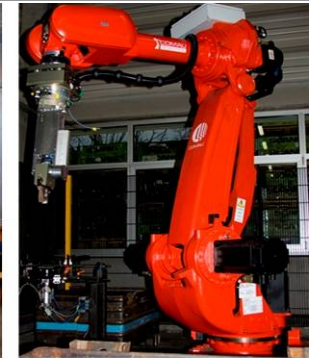


1st EUROPEAN
SME WEEK '09

SMALL BUSINESS, BIG IDEAS



The European Robot Initiative for
Strengthening the Competitiveness of
SMEs in Manufacturing



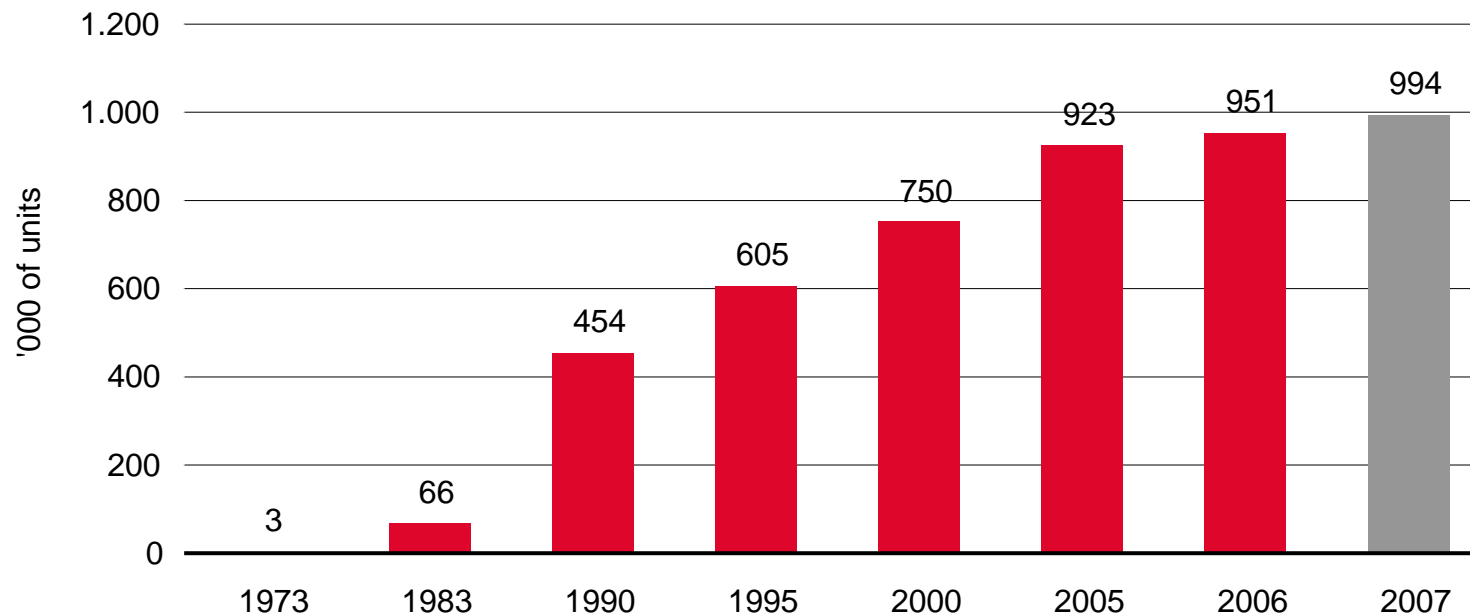
Introduction

Martin Hägele
Fraunhofer IPA

World Robotics 2008 – First results

World: 1 million industrial robots operating

Estimated worldwide operational stock of industrial robots



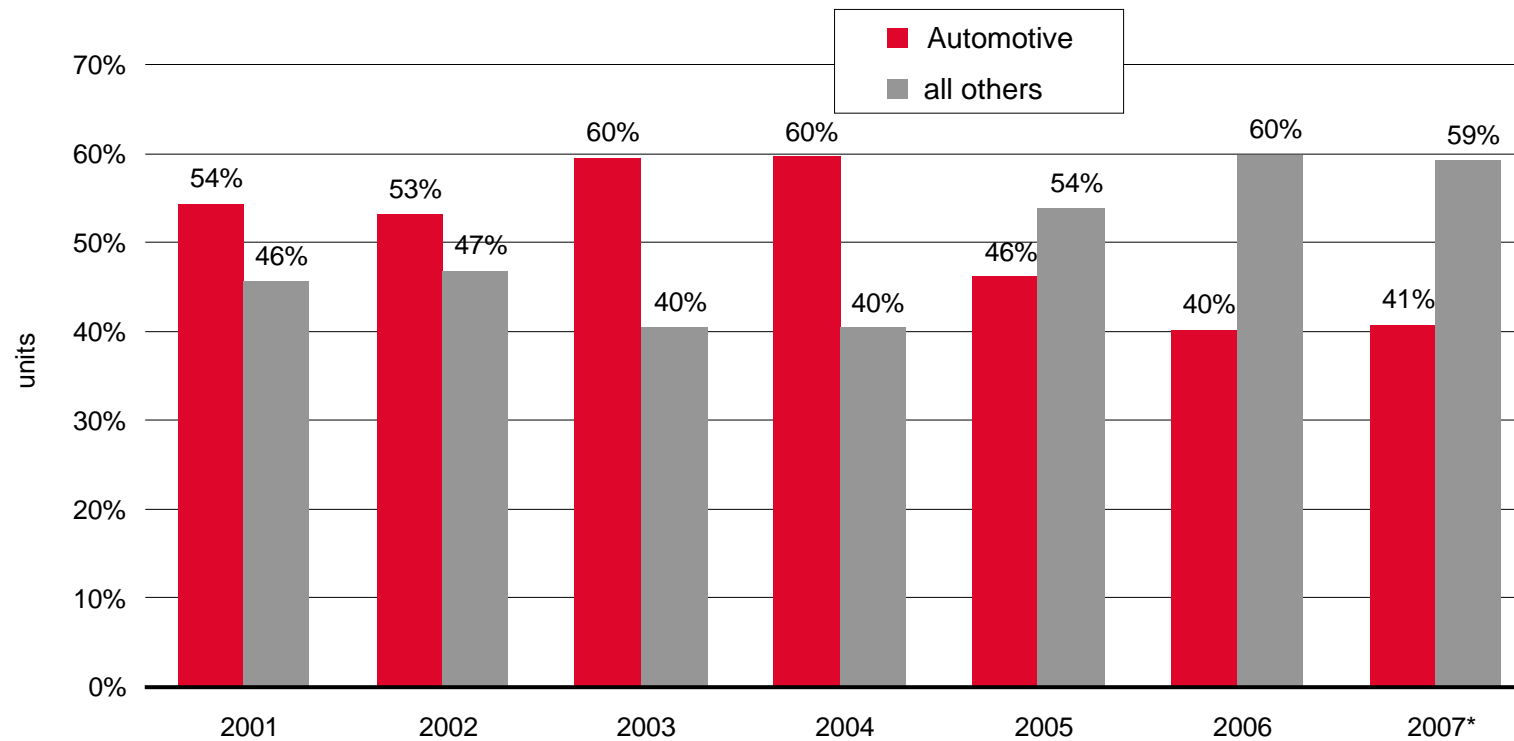
* preliminary data

Source: IFR Statistical Department

World Robotics 2008 – Europe

Demand of non-automotive is growing

Estimated yearly sales of industrial robots 2001 - 2007
Share of Automotive - Non-automotive Industry in Europe



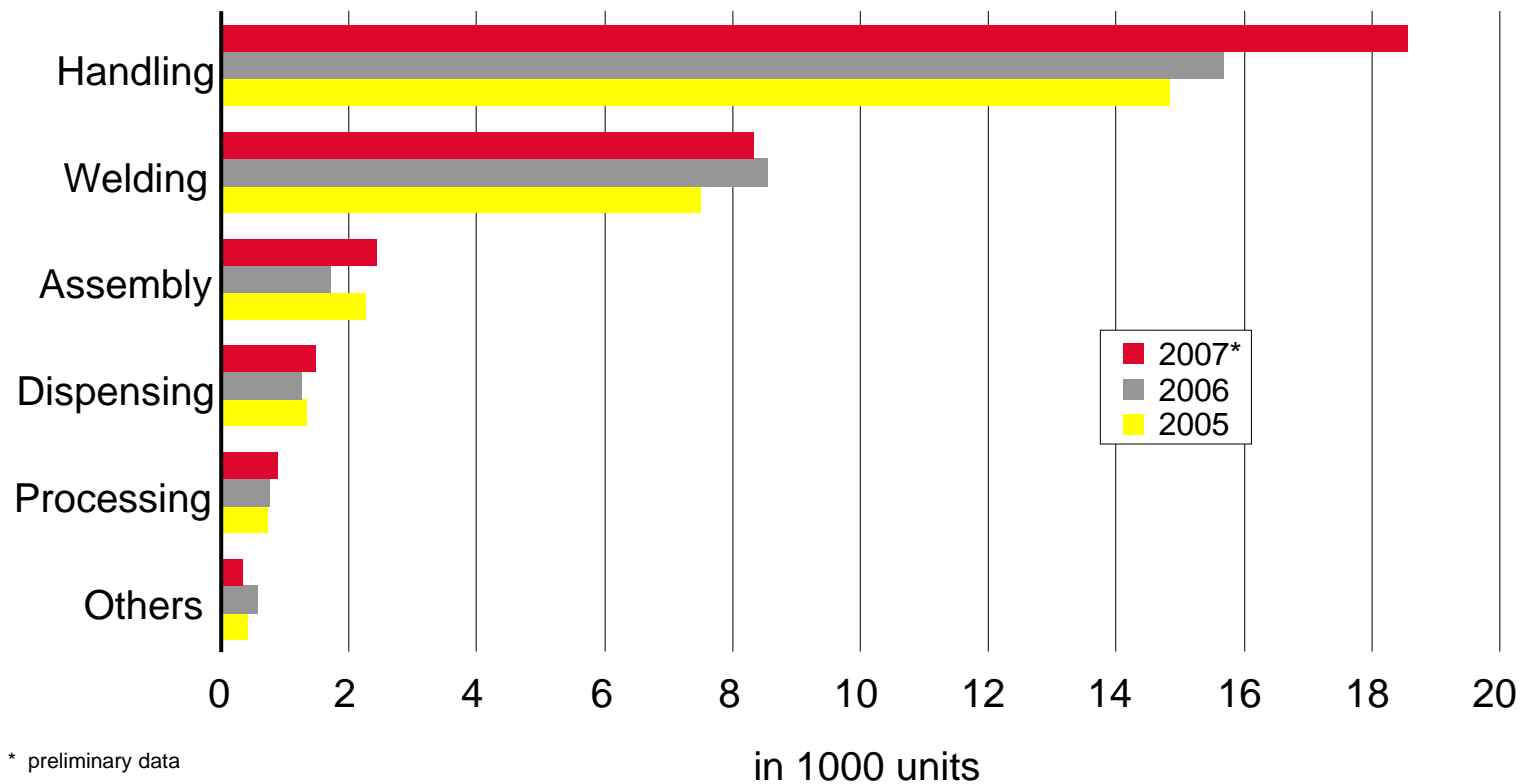
* preliminary data

Source: IFR Statistical Department

World Robotics 2008 – Europe

Material handling is surging

**Estimated yearly supply in Europe
of industrial robots 2005 - 2007* by applications**



Source: IFR Statistical Department



Robots in SME Manufacturing?



Why robots?

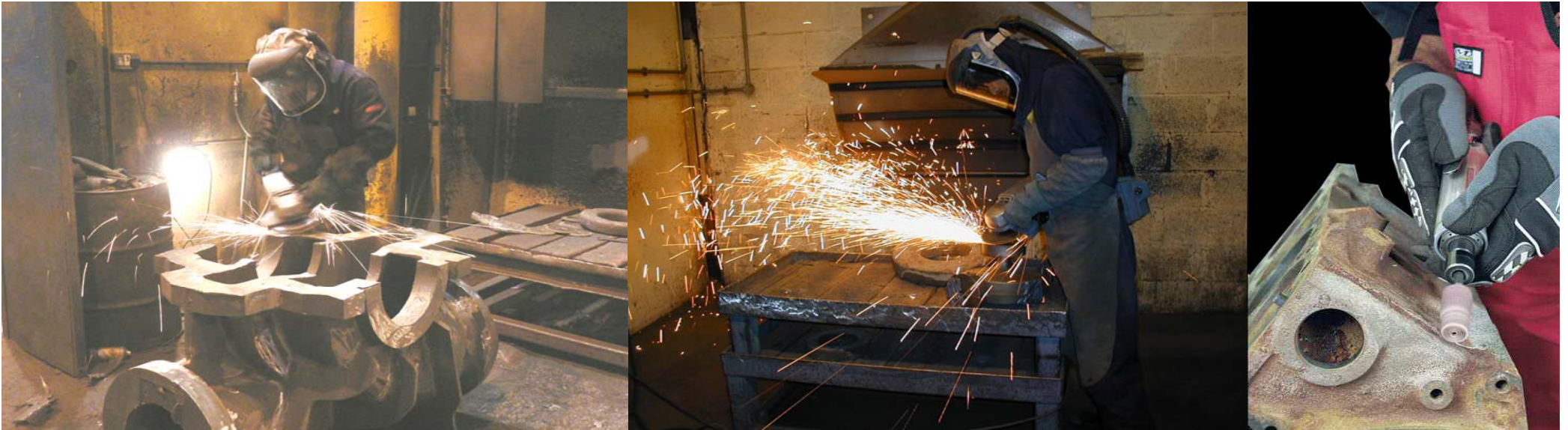
- Increase productivity
- Improve quality
- Qualified and safe jobs



Haven't industrial robots become a:

- commodity?
- synonym for flexible automation?
- symbol of high-tech?

Cutting and Deburring



Today's industrial robots lack of:

- Alternative rapid instructions methods to robot pendants
- Intuitive instruction schemes for force/torque-control
- High process forces "when needed"

Wood working



Today's industrial robots lack of:

- Intuitive instruction (instruction time versus process time)
- "Plug 'n Play" retooling
- Safe worker-robot cooperation



Why haven't robots made it in SMEs?

Machine tending and handling



Today's industrial robots lack of:

- Mobility for placing and clamping to machines
- Robust object localization
- Multi-purpose grippers



Requirements of Future Robotic Designs



- < once/year
- "offline"
- ~4*robot unit price
- ~5% of installations
- Trained staff

Changeover
Programming
Workcell cost
Sensor equipped
Maintenance

- < once/day
- "on-line", shop-floor
- ~1*robot unit price
- 100%
- Worker

Photo: KUKA-Roboter GmbH



SMErobot: A Family of New Robots



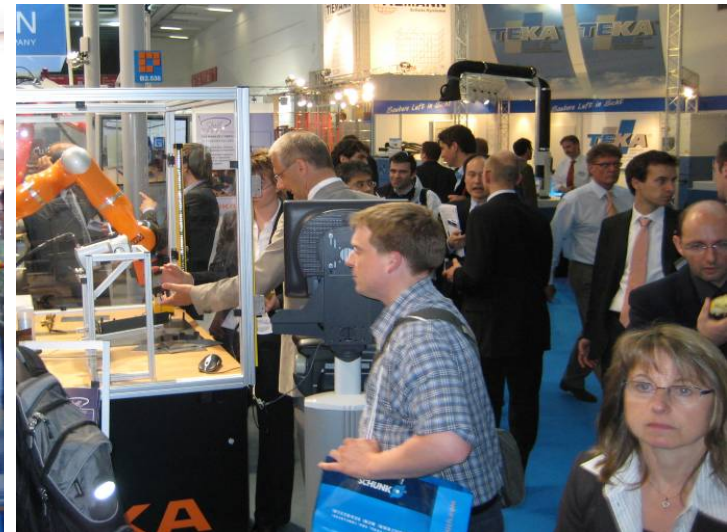
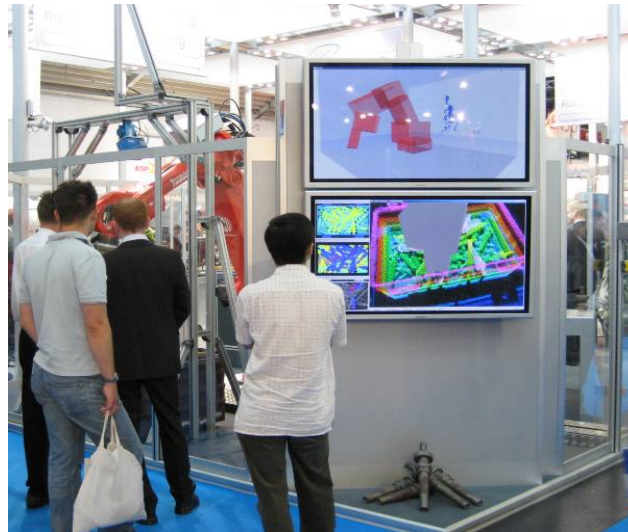
Three Major Innovations:

1. Robot capable of understanding human-like instructions
2. Safe and productive human-aware space-sharing robot
3. Three-day-deployable integrated robot system

- Integrated approach – Critical Mass
- 17 partners, major European robot manufacturers
- Project runtime March 2005 - May 2009



SMErobot at AUTOMATICA June 2008





The SMERobot Initiative

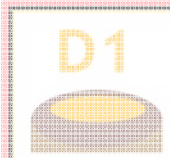
Research & Development

The robot capable of understanding human-like instructions

Safe and productive human-aware space-sharing robot

Three-day-deployable integrated robot system (install-configure-instruct)

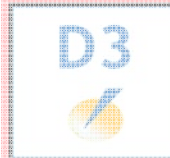
Demonstrations (in SMEs)



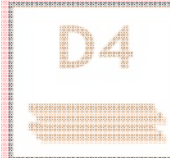
Intuitive instruction of fettling castings for the foundry



Fast installation, small batch size production change (forgery)



Robot Assistants as Multi-Purpose Tools (example welding)



Automation of manual woodworking processes

Innovation Related Activities

- Training and education
- Socio-economics (new business models, LCC)
- Standardization
- Exploitation, IPR