Czech-Luxembourgish Robotics Day
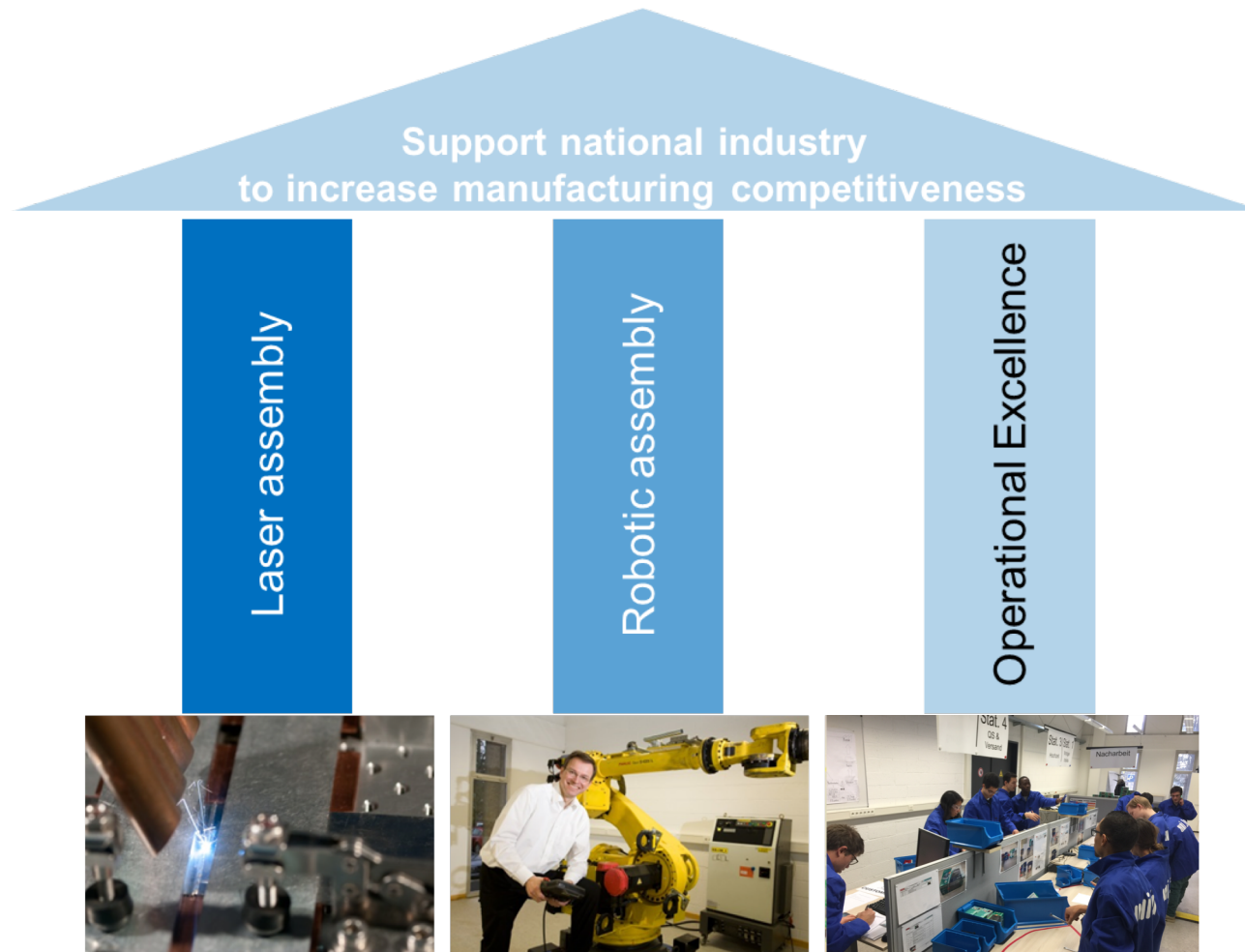
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UNIVERSITÉ DU LUXEMBOURG

14. May 2019

Luxembourg

Université du Luxembourg

Campus Kirchberg
6, rue Coudenhove-Kalergi,

L-1359 Luxembourg

Peter Plapper, peter.plapper@uni.lu

Manufacturing Engineering Research

Support national industry
to increase manufacturing competitiveness

Laser assembly

Robotic assembly

Operational Excellence

Peter Plapper, peter.plapper@uni.lu

Robotix Academy

- Integration in Greater Region

- Projects

  - Intelligent, robot-assisted assistance for dismantling industrial products
  - Human Robot Interaction
  - Robot based 3D printing from wire
  - Industry 4.0 and lean Assessment of industry

- Interaction with industry
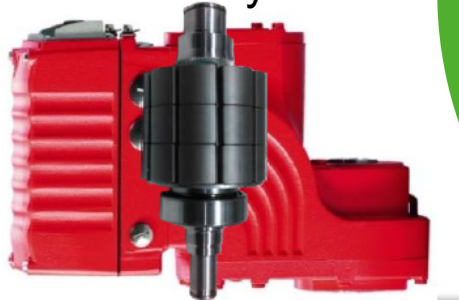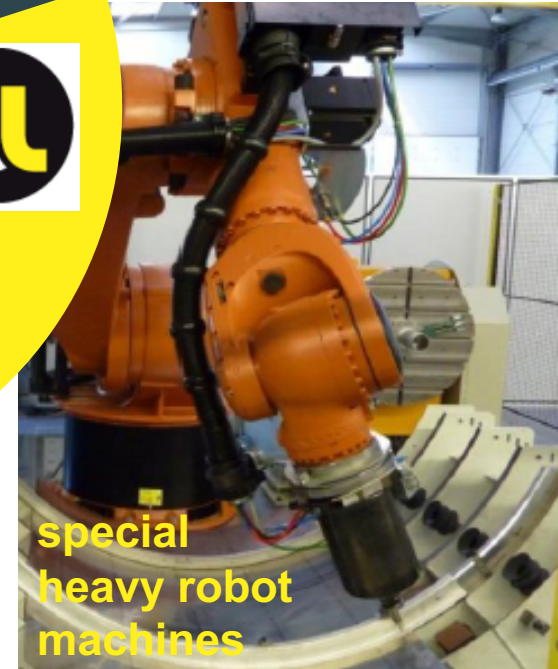
Robotic Manufacturing

Assembly processes and automatization
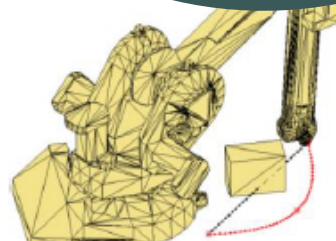
Robotic assisted disassembly

kinematics, dynamic and control of robots

special heavy robot machines

Peter Plapper, peter.plapper@uni.lu

Remanufacturing of industrial products

- **Issue:** Assist robots in disassembly of industrial products

- **Advantage:** Development of an intelligent, robot-supported assistance system

- **Contact:** Jan Jungbluth

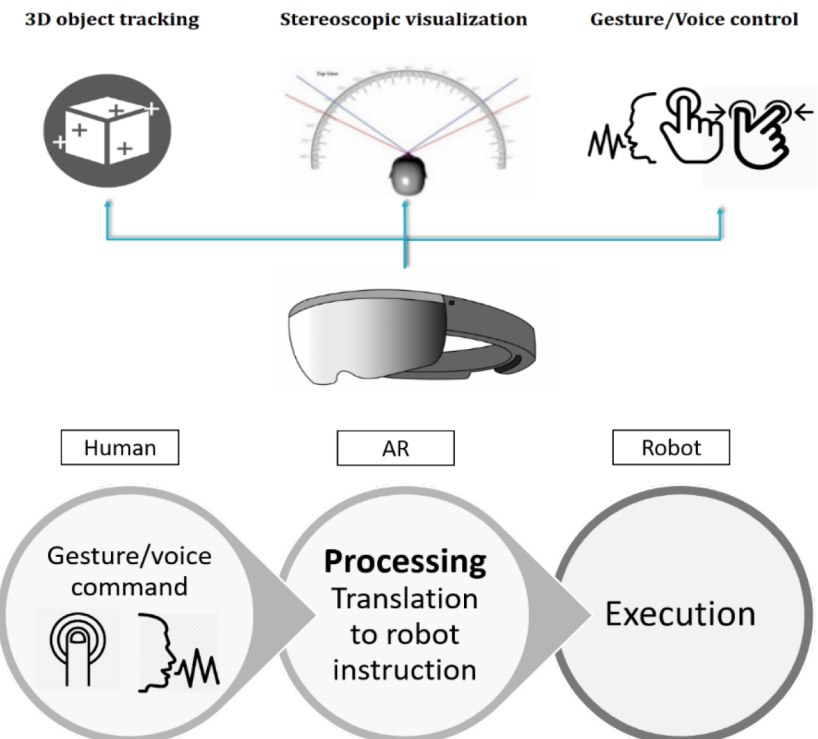- **Method/result:** Multi-agent system architecture

  Internet of Things communication infrastructure

  Model based disassembly planning for individual product dismantling with variable objectives

  Modell based action planning for coordination of man and machine actions

  Adaptive control of action execution and process monitoring
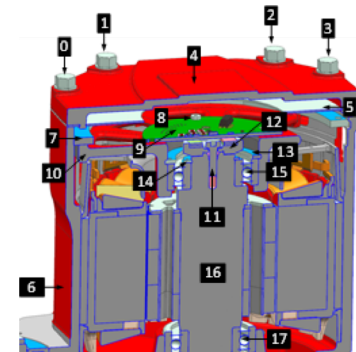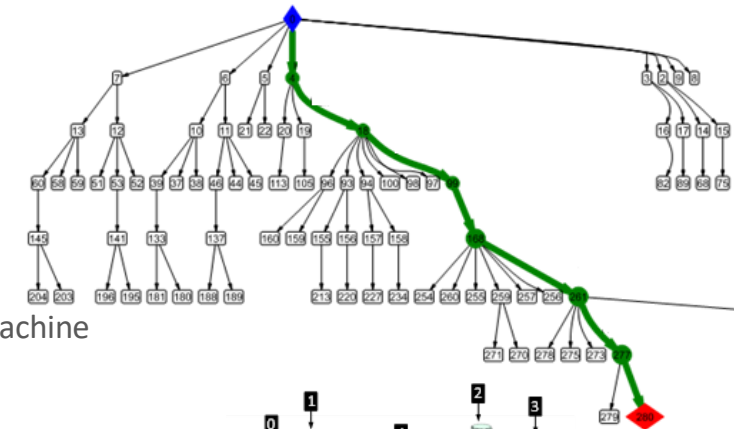
Human Robot Interaction using Augmented Reality

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- **Issue:** Interact with collaborative robots using AR

- **Advantage:** Reduce programming timing

  Efficient and fast communication

- **Contact:** Abir Gallala

- **Method/result:** Manipulate a virtual model of robot.

  Simulate manipulation of the model.

  Synchronize real and virtual robots.

3D object tracking   Stereoscopic visualization   Gesture/Voice control

Human	AR	Robot

Gesture/voice command → **Processing** Translation to robot instruction → Execution

Interreg
Grande Région | Großregion
Robotix-Academy
Fonds européen de développement régional | Europäischer Fonds für regionale Entwicklung
EUROPEAN UNION

Peter Plapper, peter.plapper@uni.lu

Robot based 3D printing from wire

- **Issue:**   Trajectory planning for additive manufacturing.

- **Advantage:**   Optimal filling of surface of A.M.

  Interface with laser based wire deposition process

- **Contact:**   Natago Mbodj

- **Method/result:**   Create digital twin to simulate the robot path

  Transfer to physical demonstrator

  Project in Cooperation with 2nd PhD project about laser positioning process.

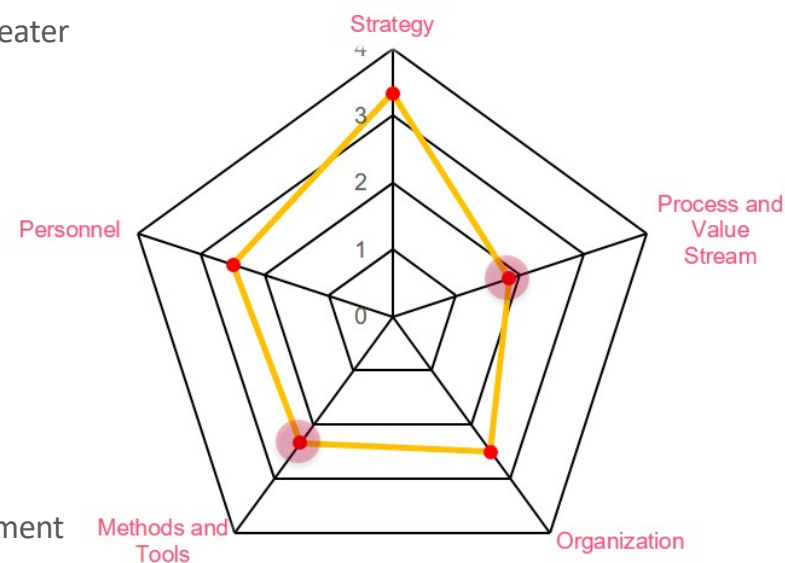Peter Plapper, peter.plapper@uni.lu

Industry 4.0 and lean Assessment of industry

- **Issue:** Asses the productivity of manufacturing SMEs in Greater Region

- **Advantage:** Increased productivity
  Effective manufacturing processes
  Build foundation towards industry 4.0

- **Contact:** Sri KOLLA

- **Method/result:** Lean and Industry 4.0 Assessment using self-assessment model

  Analysis of the data → Gap analysis

  Scouting for innovations

  Case studies with companies

- All research / PhD projects with industrial partners