

PISA

Flexible Assembly Systems through Workplace-Sharing and Time-Sharing Human-Machine Cooperation



The overall goal of PISA is to keep human workers in the loop but to support them with powerful tools.

Project Coordination

**Dr. Klaus Schröder,
Volkswagen**

Project Management

**Mr. Gerhard Schreck,
Mr. Volker Katschinski
Fraunhofer IPK**

Partner Structure

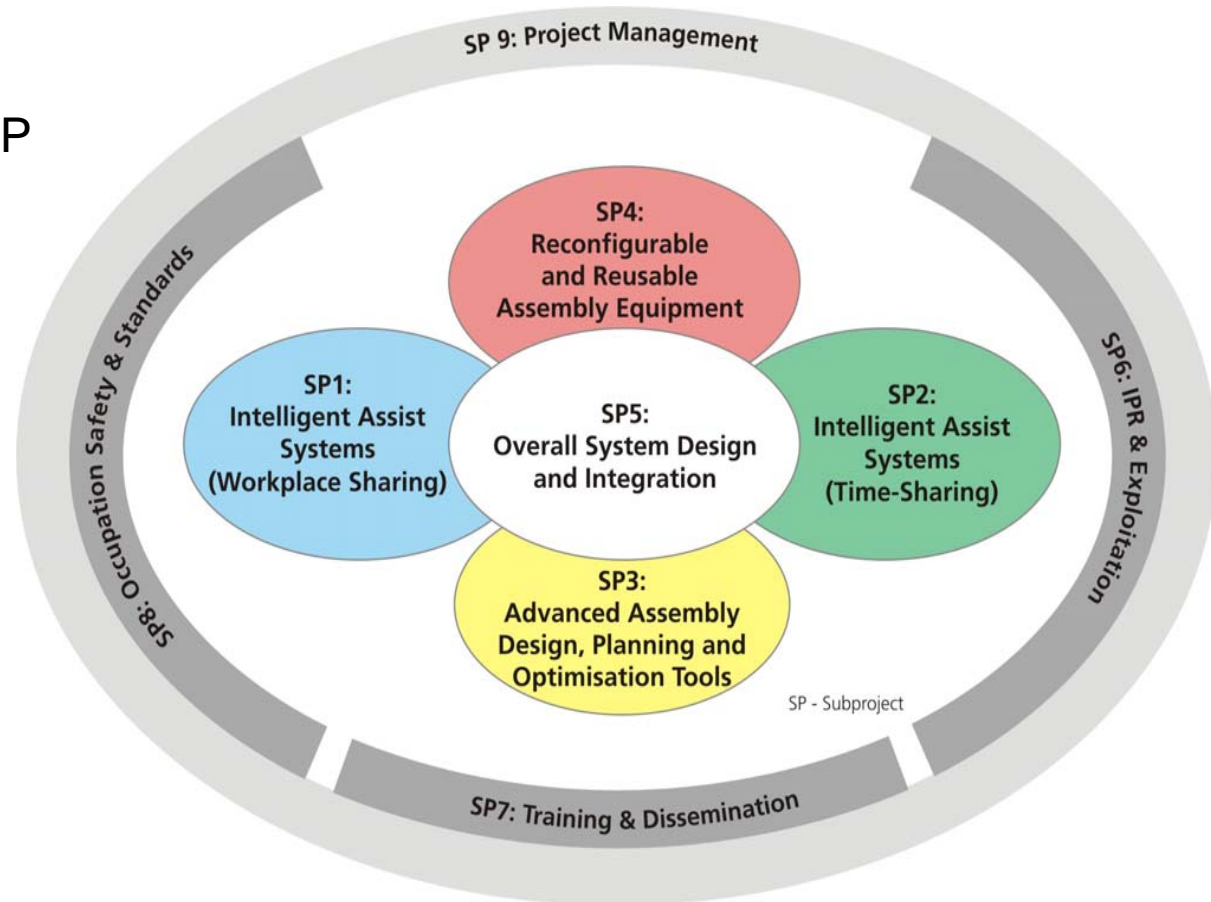
- 4 Industrial Companies
- 7 Small & Medium Enterprises
- 7 Universities / Research Institutes

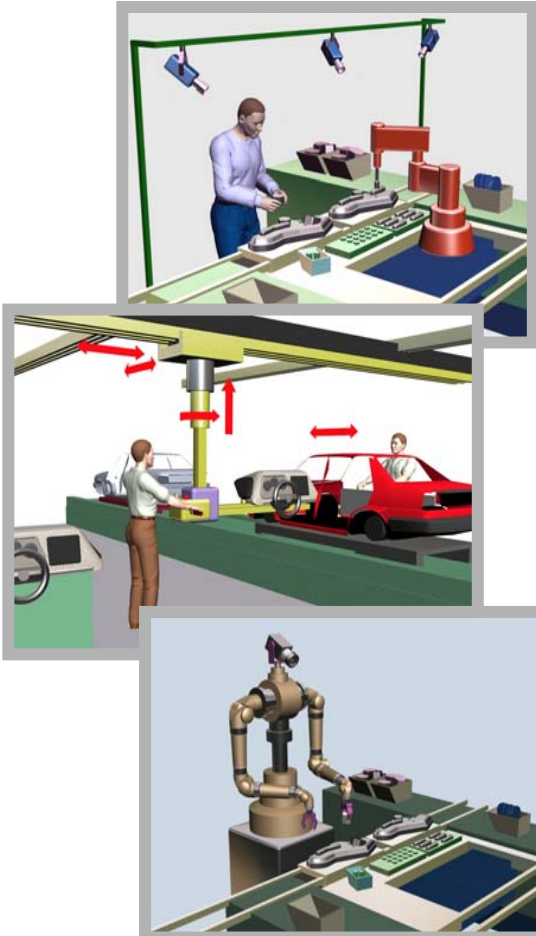
PISA Partners

- VW
- FHG IPK
- COMAU S.p.A.
- EADS CRC F
- Senur Elektrik
- all-time-zones engineering GmbH
- BGS
- EICAS Automazione S.p.A.
- pi4_robotics GmbH
- Profactor
- Schmidt-Handling GmbH
- Visual components
- Fraunhofer Gesellschaft IPA
- Fundación Fatronik
- Technische Universität Berlin (TUB)
- Tampere University of Technology (TUT)
- Universidad Politécnica de Madrid
- Technical Research Centre of Finland VTT

PISA Structure

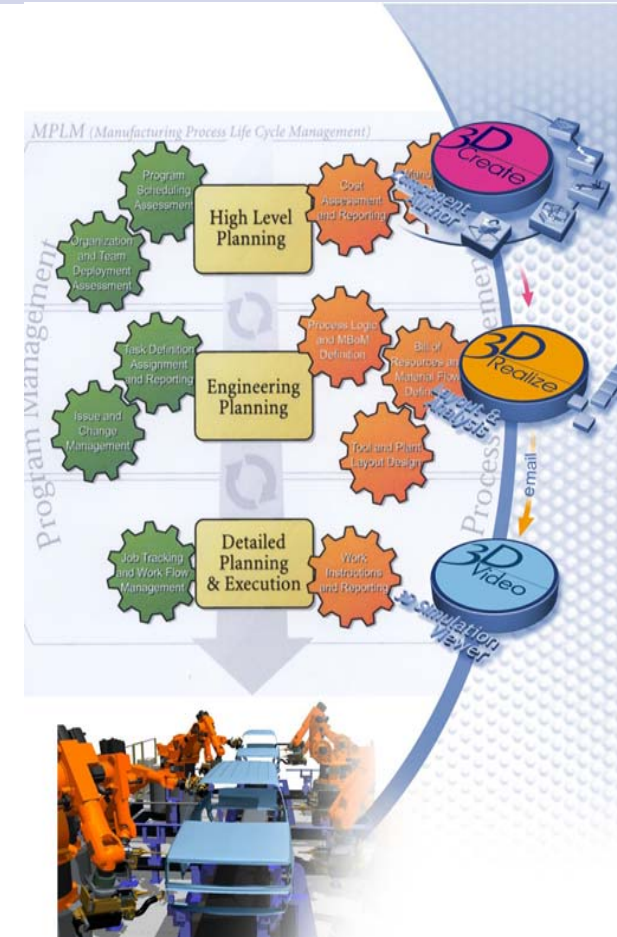
- 5 S&T oriented SP
- 3 innovation related SP
- Project Management





Breakthrough

- Novel Intelligent Assist Systems IAS
- Planning tools for their Integration
- Reconfigurability and Reusability of Assembly Equipment

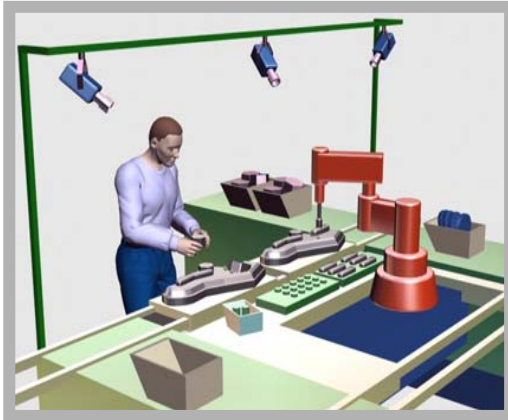


PISA is subdivided in nine subprojects

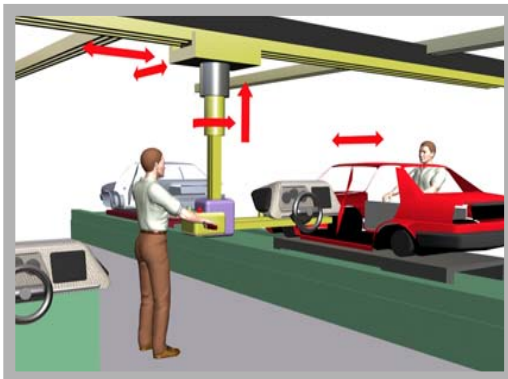
- Subprojects 1-5: Research and Technology Development
- Subprojects 6-8: Innovation Activities
- Subproject 9: Project Coordination and Management

Subproject 1:

Intelligent Assist System (Workplace-Sharing)

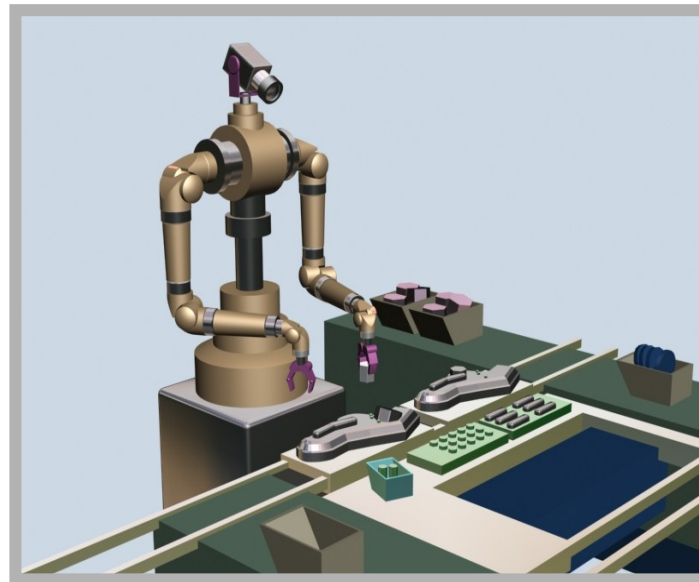


- **Robot-IAS**
Cooperation of human workers and industrial robots on a common workplace



- **COBOT**
Collaboration of human workers and programmable, passive robotic systems

- **HSR**
Humanoid Service Robot applicable on a workplace designed for humans (e.g. additional work-shift for product volume peaks)



Subproject 3:

Advanced Assembly System Design, Planning and Optimisation Tools

- Development of methods and tools based on concurrent engineering approaches, which enable the use of virtual assembly for process design and system planning.
- Integration of geometrical and non-geometrical features and knowledge from the product and assembly process.
- Inclusion of models and human-machine collaboration in the planning phase, as well as the operation of assembly lines.

Subproject 4:

Reconfigurable and Reusable Assembly Equipment

- Development of reconfiguration concepts that support rearrangement and reuse of assembly devices and systems.
- Development of standardised hardware and software interfaces and tools enabling reconfigurability and reusability of assembly equipment.
- Design of reconfigurable & reusable assembly system components considering in particular the mechanical interfaces, condition monitoring systems and condition prediction algorithms.
- Development and prototypical implementation of distributed control system hard-, software, and IT infrastructure for reconfiguration and reuse. Development of visualisation and simulation support.

Subproject 5:

Concepts, Design, Implementation, and Optimisation of Integrated Flexible Assembly Systems Prototypes (1)

- Development of assembly system concepts that meet and balance the demands in terms of flexibility, cost-efficiency and technology level.
- Specification of requirements on performance and safety of new human-assisting and enhancing assembly technology, as well as on planning methods and design tools supporting the novel technology and concepts (inputs to SP1-SP4).
- Assessment of prototype systems (outputs of SP1-SP4) according to established demands.

Subproject 5:

Concepts, Design, Implementation, and Optimisation of Integrated Flexible Assembly Systems Prototypes (2)

- Integration of subproject prototypes and design of overall demonstration systems, testing scenarios and evaluation criteria.
- Testing the project demonstrators and examination of benefits considering reliability, flexibility, reusability and economical aspects.
- Definition of product design guidelines to optimally support new technology.

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<http://www.pisa-ip.org>

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