

Mechanical Design: Design Project – Real prototype



Summary

- GEARE enhances the value of engineering education for both students and universities by implementing a two-semester multinational design-team project into an international student exchange program.
- Undergraduate students get the opportunity to get involved into working in multi-national teams on industry-inspired projects.
- The multinational design-team project could be introduced into the exchange programs with Purdue University (USA), Shanghai Jiao Tong University (China) and University Karlsruhe (Germany).
- Students report about the positive effects taking part in the multinational design-team project within GEARE had for their academic and personal life.
- Students comments show that the multinational design-team project within GEARE is a great program bringing benefits to both the universities and the students.

GEARE Feed Back

“This is the most unforgettable experience in my life. I have gained a lot of unique experiences which will benefit me in my future life.” - “Taking part GEARE was the most unforgettable and eye-opening experience for me. It provided me with an opportunity to observe and meditate my study, my life and the world around me in the light of a different culture and civilization. This unique experience will exert a lasting influence on my whole life.”

[Students from Shanghai Jiao Tong University in China, taking part in the Undergraduate Student Exchange with University Karlsruhe (TH) in Germany]

GEARE - Global Engineering Alliance for Research and Education



Global Engineering Alliance
for Research and Education

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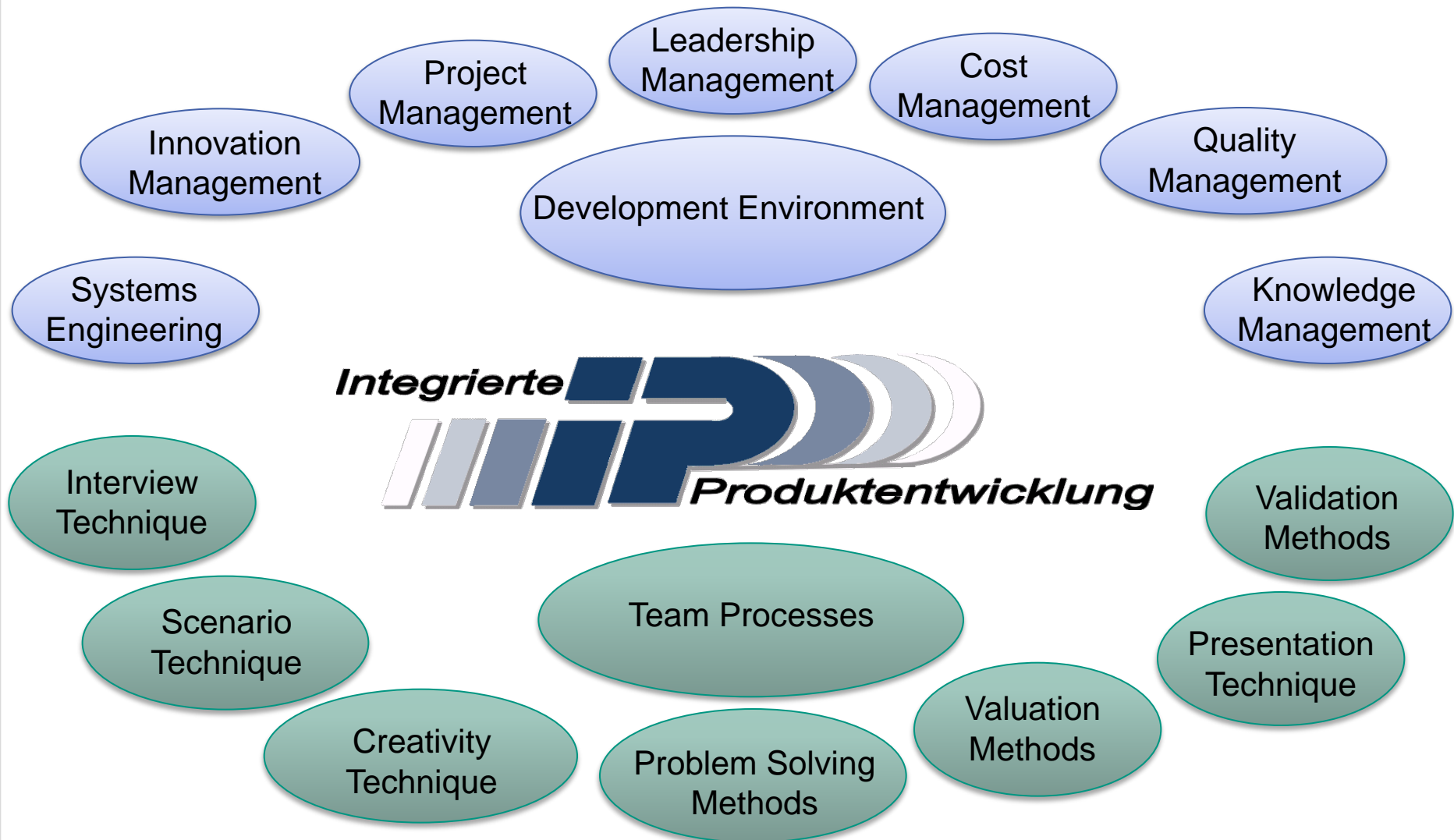
email: burkardt@ipek.uka.de

Karlsruhe Education Model for Product Development

Three Elements of the KaLeP:

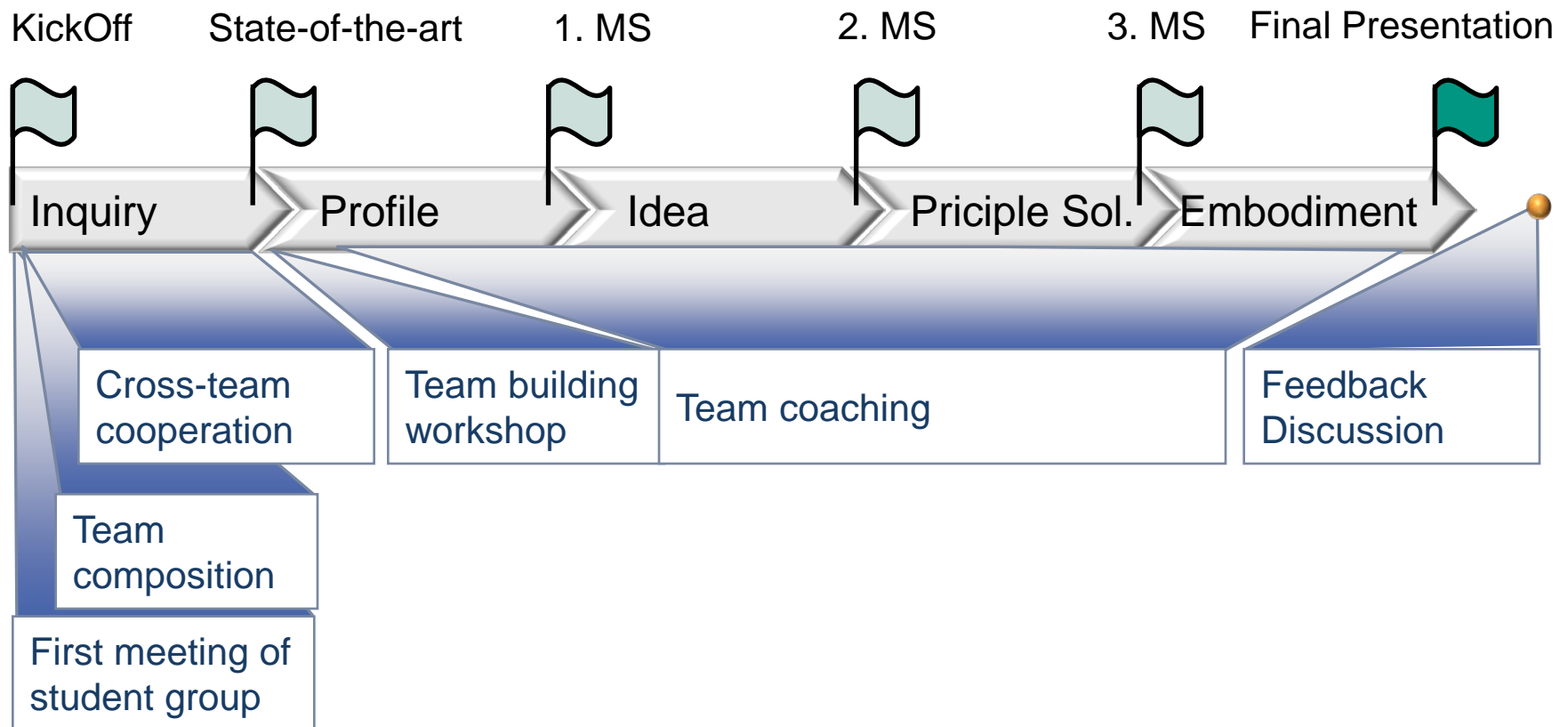
	Systems	Methods	Processes
Course Title	Machine Design	Methods of Product Development	Integrated Product Development
Settings	<ul style="list-style-type: none"> - Lecture - Tutorial - Project 	<ul style="list-style-type: none"> - Lecture - Tutorial 	<ul style="list-style-type: none"> - Lecture - Workshops - Project
Competence Acquisition	High	Medium	Very high
Course Contents	<ul style="list-style-type: none"> - team work - self organization - communication - idea transfer 	<ul style="list-style-type: none"> - Design methods - Creativity techniques 	<ul style="list-style-type: none"> - Team developm. - Team leading - Proj. management - Presentation
Number of Students	700	400	30
Curriculum	Bachelor	Bachelor	Master

IP Course Contents



Karlsruhe Teaching Model for Product Development

Example of team development during the design project



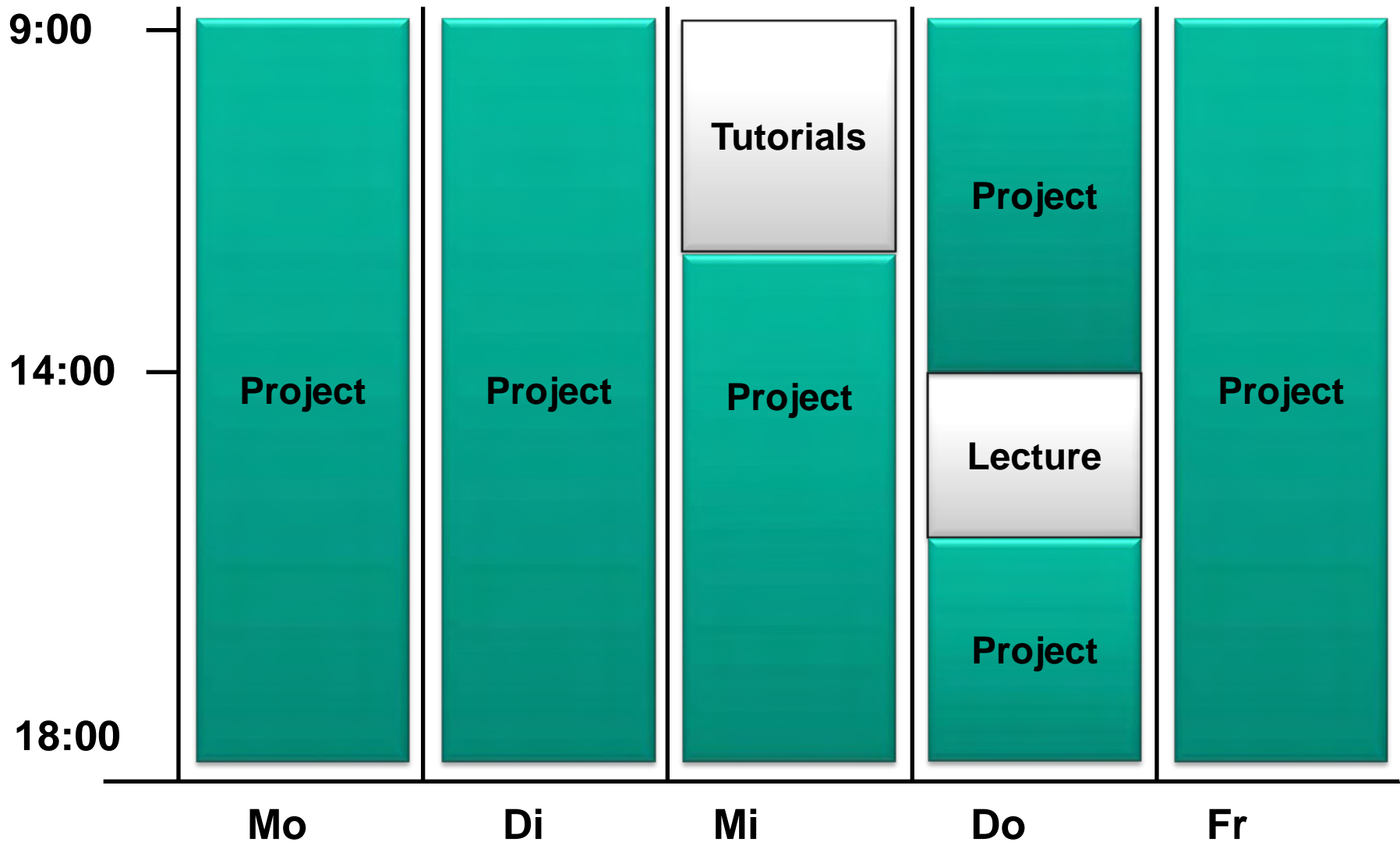
IP Lecture Impressions



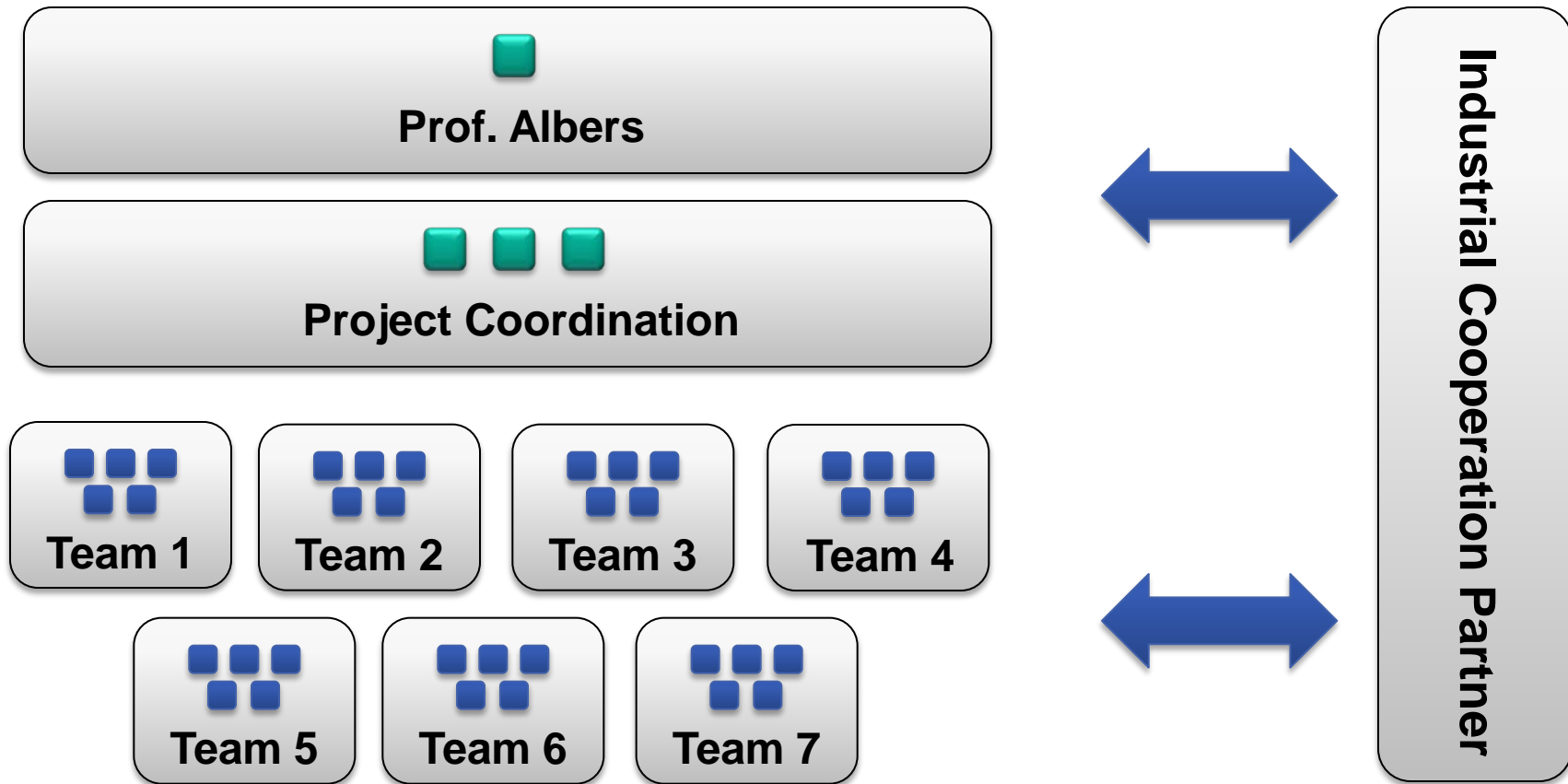
IP Tutorials Impressions



IP Project Schedule



IP Project Structure



Project Process IP 2009

Profile Detection

Idea Detection

Principle Solution

Embodiment

9.10.2009

27.11.2009

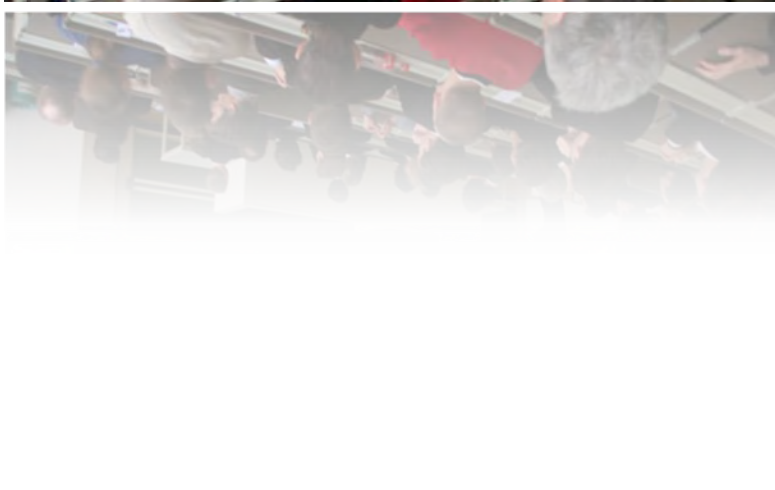
15.12.2009

19.01.2010

19.02.2010



IP Final Presentation Impressions 2009



Visiting lecturers complete KaLeP

- Leadership & management development
- Patents and patent strategies
- Project management in global engineering structures
- Strategic product planning
- Sustainable product engineering
- Technical design



Integrated Product Development Project Example

Task Project „GreenKeeper“ IP 03/04

Development of an **innovative product** for the company STIHL, which extends the product portfolio in the **target market „Lawn & Garden“** in a promising way.



STIHL®

Integrated Product Development Project Example

From Profile to conceptual design and prototypes in 4 months

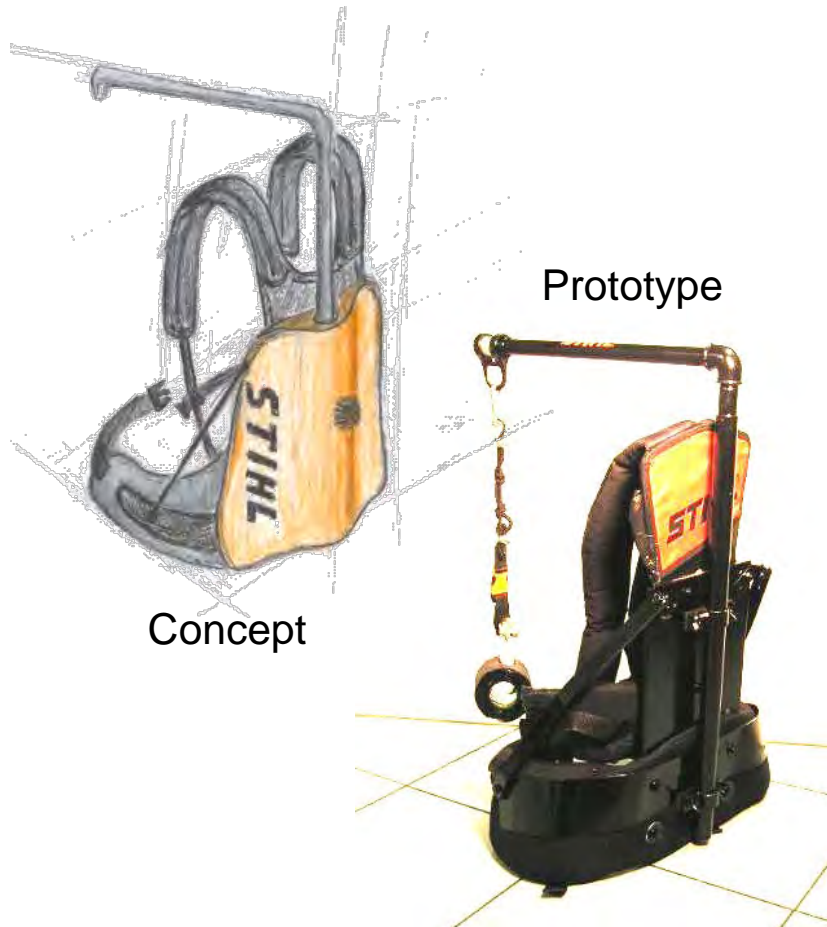
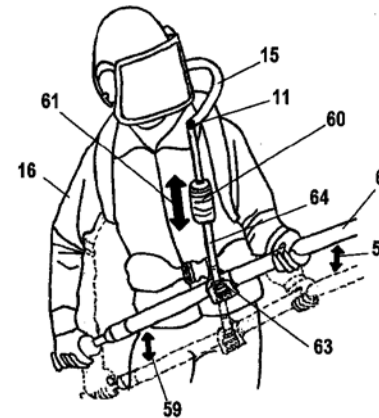


Fig. 13



Patent application
DE 10 2005 001 843 A1

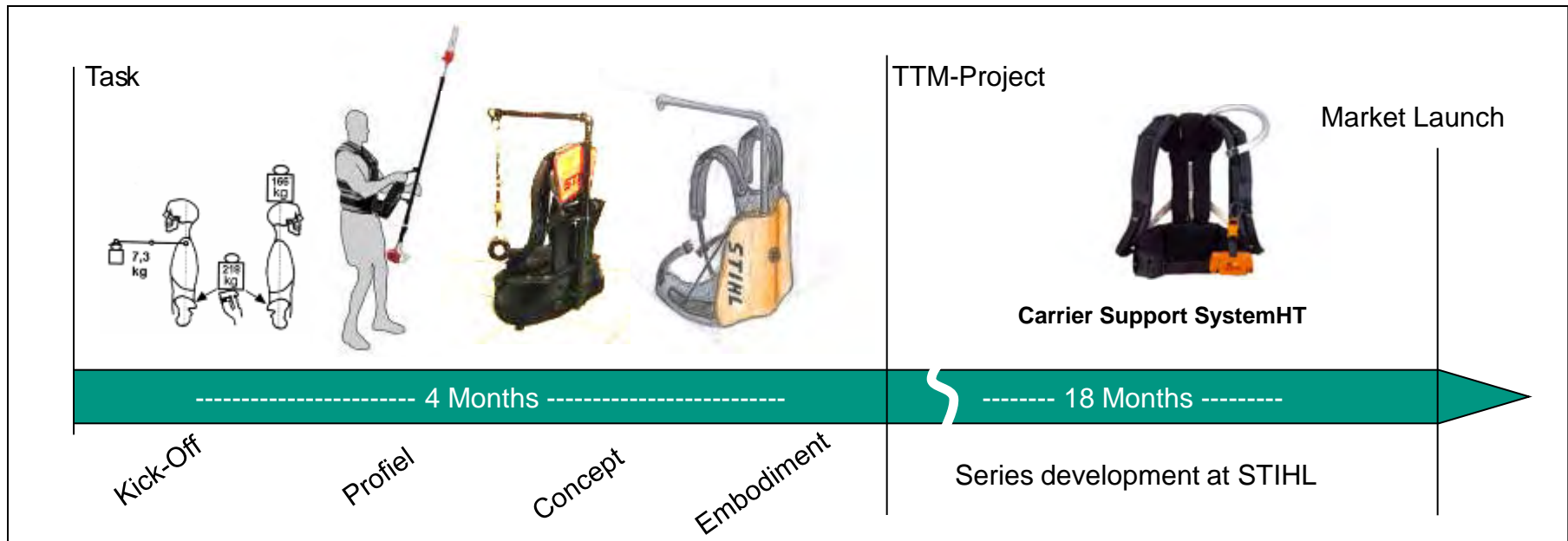


Carrier Support System
HT, 112 €
(product catalogue 2010)

STIHL®

Integrated Product Development Project Example

Konkreter Projektverlauf



10 Years Integrated Product Development

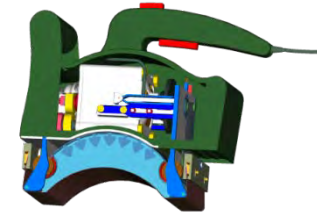
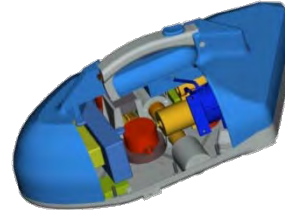
1997/98
Coffee Machine



1998/99
Campus-Bike

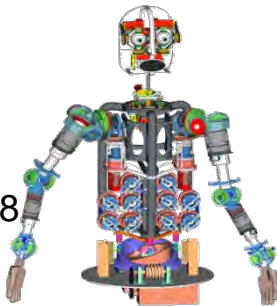


1999/2000
Window



2000/01 Metabo
Projekt X

2001/02 SFB 588
KALIMERO



2002/03 SFB 499
 μ -ProFi

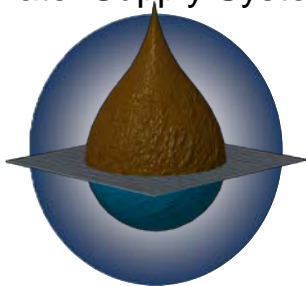


2003/04 STIHL
Greenkeeper



2004/05 LuK
Drivetrain 2015

2005/06 Freudenberg
Water Supply Systems



2007 Hilti
Drill Hammers



2007 Kärcher
UV-Water Sterilization



2008 Blanco
Kitchen Sinks

2009 STIHL
Cropping, cultivating
& harvesting 2020



Stability Pact for South East Europe

- Academical Reorganization in South East Europe
- Implementing the Karlsruhe Education Model for Product Development (KaLeP) in Universities in South East Europe
- Sponsorship by DAAD

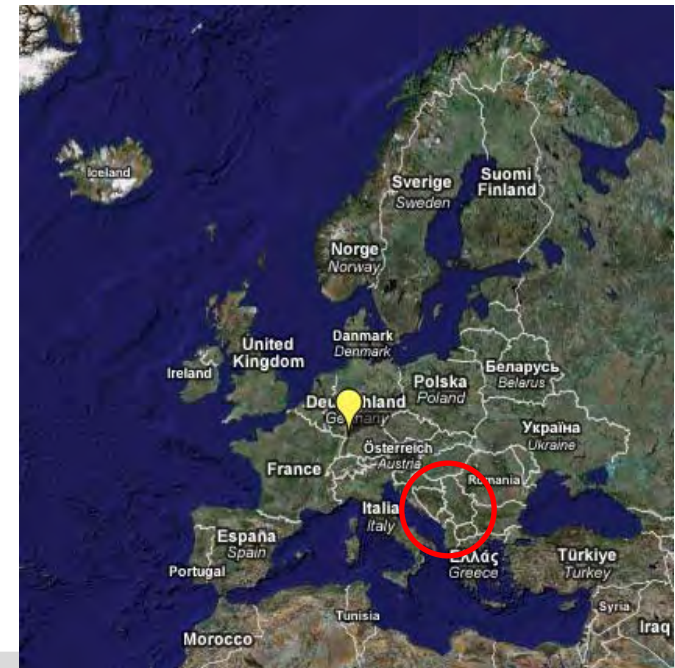


STABILITY PACT
FOR SOUTH EASTERN EUROPE



DAAD

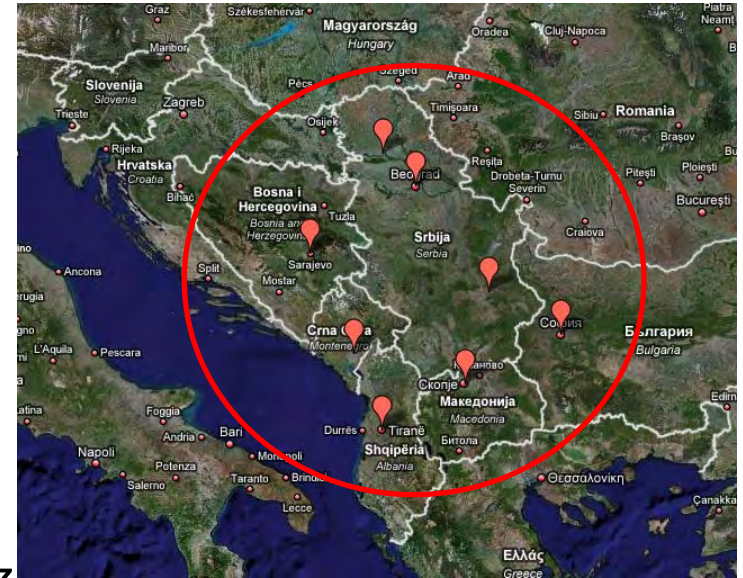
Deutscher Akademischer Austausch Dienst
German Academic Exchange Service



Stability Pact for South East Europe

■ Participating Universities:

- Technical University of Sofia, Bulgaria
- University of Belgrad, Serbia
- University of Nis, Serbia
- University of Novi Sad, Serbien
- University of Skopje, Macedonia
- Technical University of Tirana, Albania
- University of Sarajewo, Bosnia and Herzegovina
- University of Podgorica, Montenegro



Stability Pact for South East Europe

- Class „Integrated Product Development“ for Graduate Students taught in Karlsruhe and parallel in Nis, Serbia
 - Industrial project-work for student-teams based on a real product development process
 - Student-teams in Karlsruhe and in Nis working on the same project
 - video-conferencing
 - long distance learning



Stability Pact for South East Europe

- Center of Product Development for South East Europe in Nis, Serbia starting in 2008
 - Implementing The Karlsruhe Education Model for Product Development (KaLeP)
 - Exchange for students and faculty from South-East Europe
 - Workshops and classes in Product-Development
 - Enable project-work for international student-teams



Center of Product Development for South East Europe in Nis, Serbia

- Classes are held in the Center of Product Development using The Karlsruhe Education Model for Product Development (KaLeP)
- Participating universities in the Stability Pact for South East Europe:
 - Send professors to the Center of Product Development to hold their own classes temporarily in Nis
 - Send students to the Center of Product Development to attend the classes for a certain period of time



FDIBA

Technical University of Sofia, Bulgaria

- German speaking students from South-East Europe
- German-taught degree programs
 - Bachelor of Science (Bsc.) in Computer Science
 - Bachelor of Science (Bsc.) in Mechanical Engineering
 - Master of Business Administration MBA
- Visiting Professors from different German Universities giving classes in Sofia throughout the year
- Implementation of The Karlsruhe Education Model for Product Development (KaLeP)



Visions for Internationalization in Engineering Education

- Encourage students, researchers and faculty to participate in international programs and exchanges
- Establish integrated research projects between different universities bringing together people from all over the world
- Create long-distance research and teaching projects – one research at different places
- Encourage fundraising projects und sponsorship programs for internationalization in engineering education