

Panel discussion *Global Composites*

SAMPE, 6-9 May 2013

Long Beach, CA, USA)

Panel discussion Global Composites

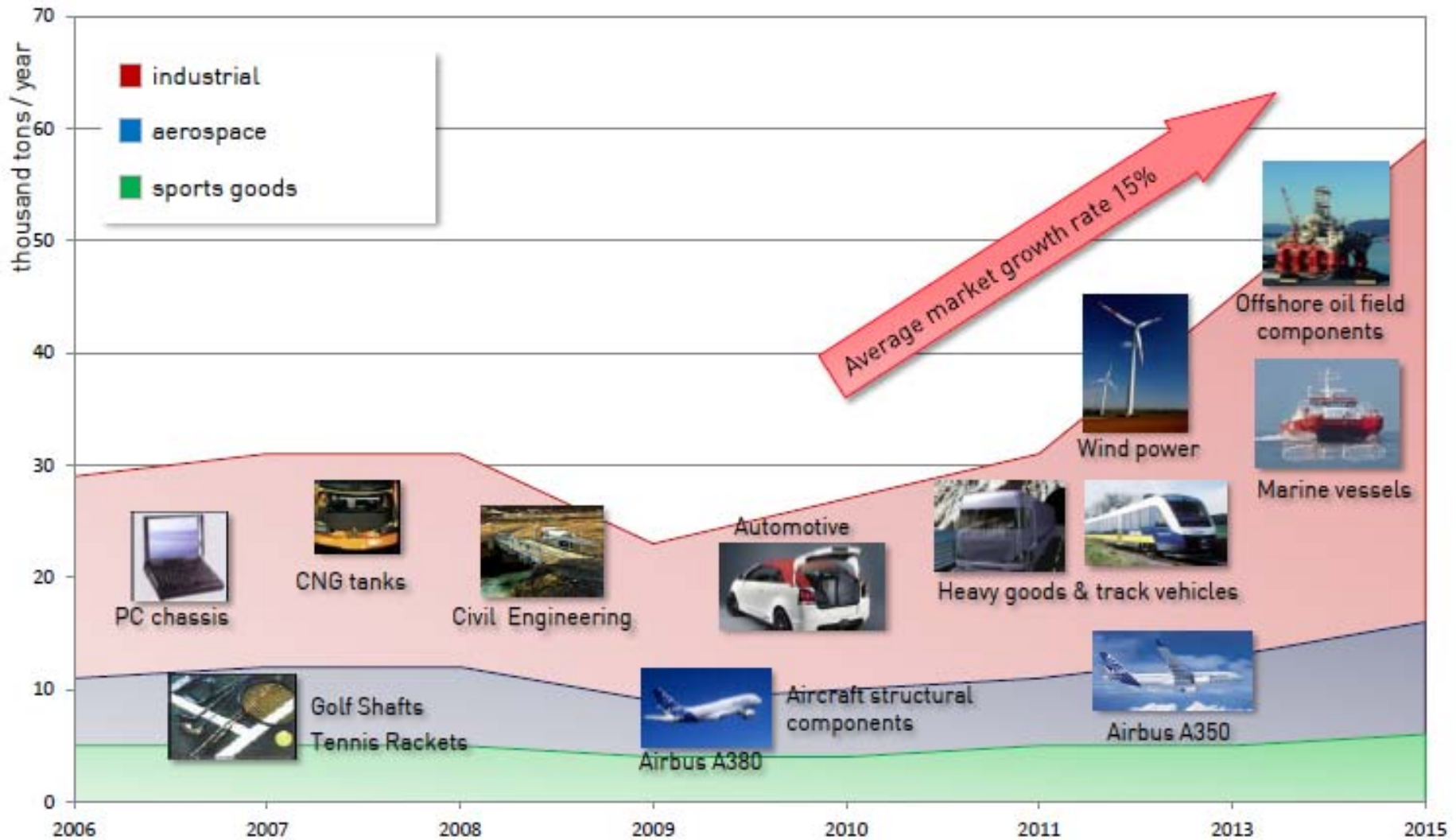
Richard Degenhardt

German Aerospace Center (DLR)

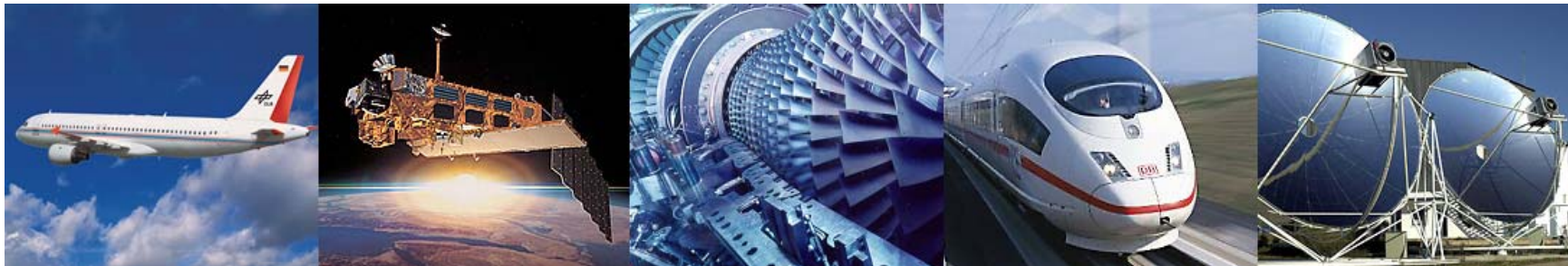


Knowledge for Tomorrow

Carbon Fibre Market trends 2006-2015



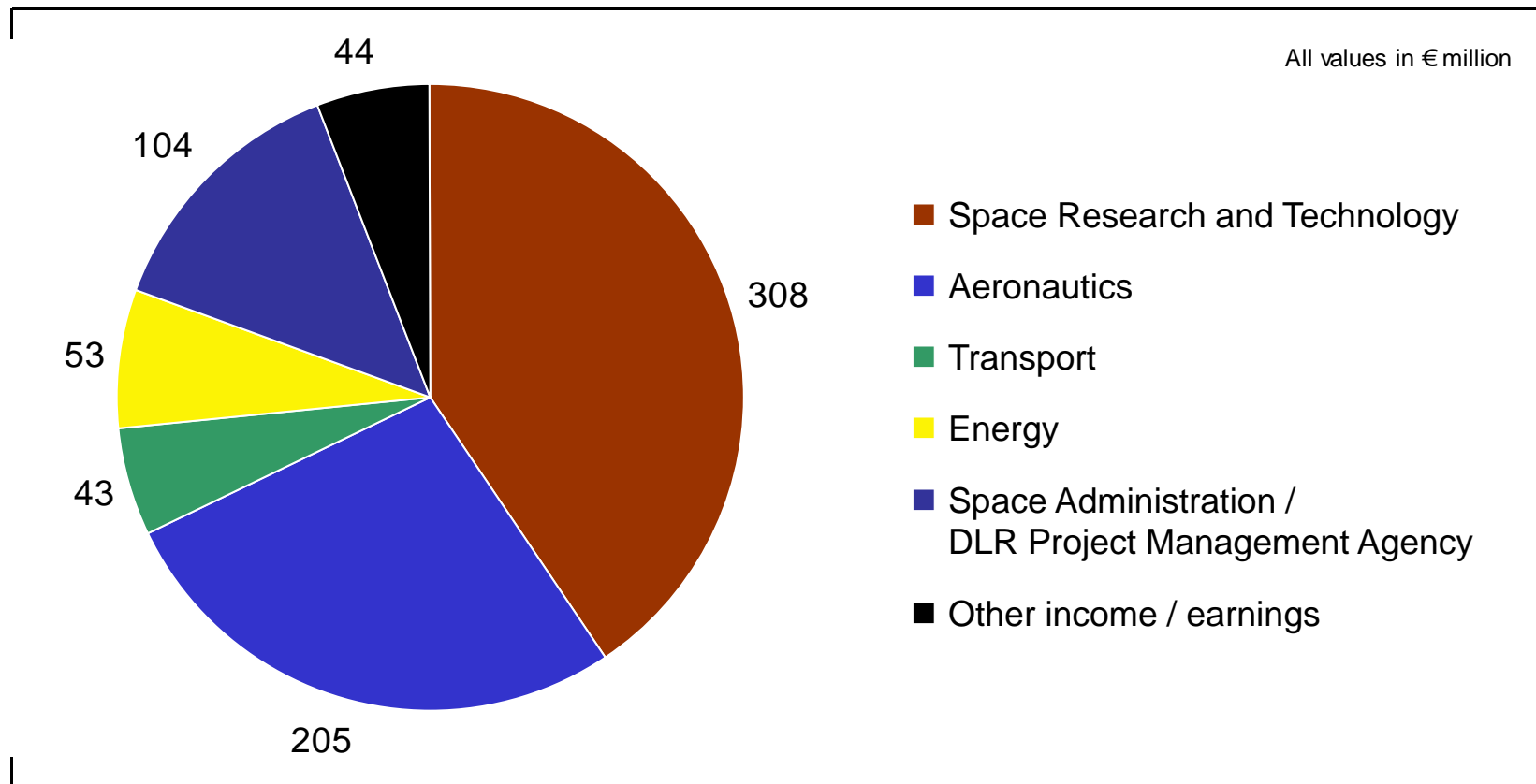
DLR German Aerospace Center



- Research Institution
- Space Agency
- Project Management Agency

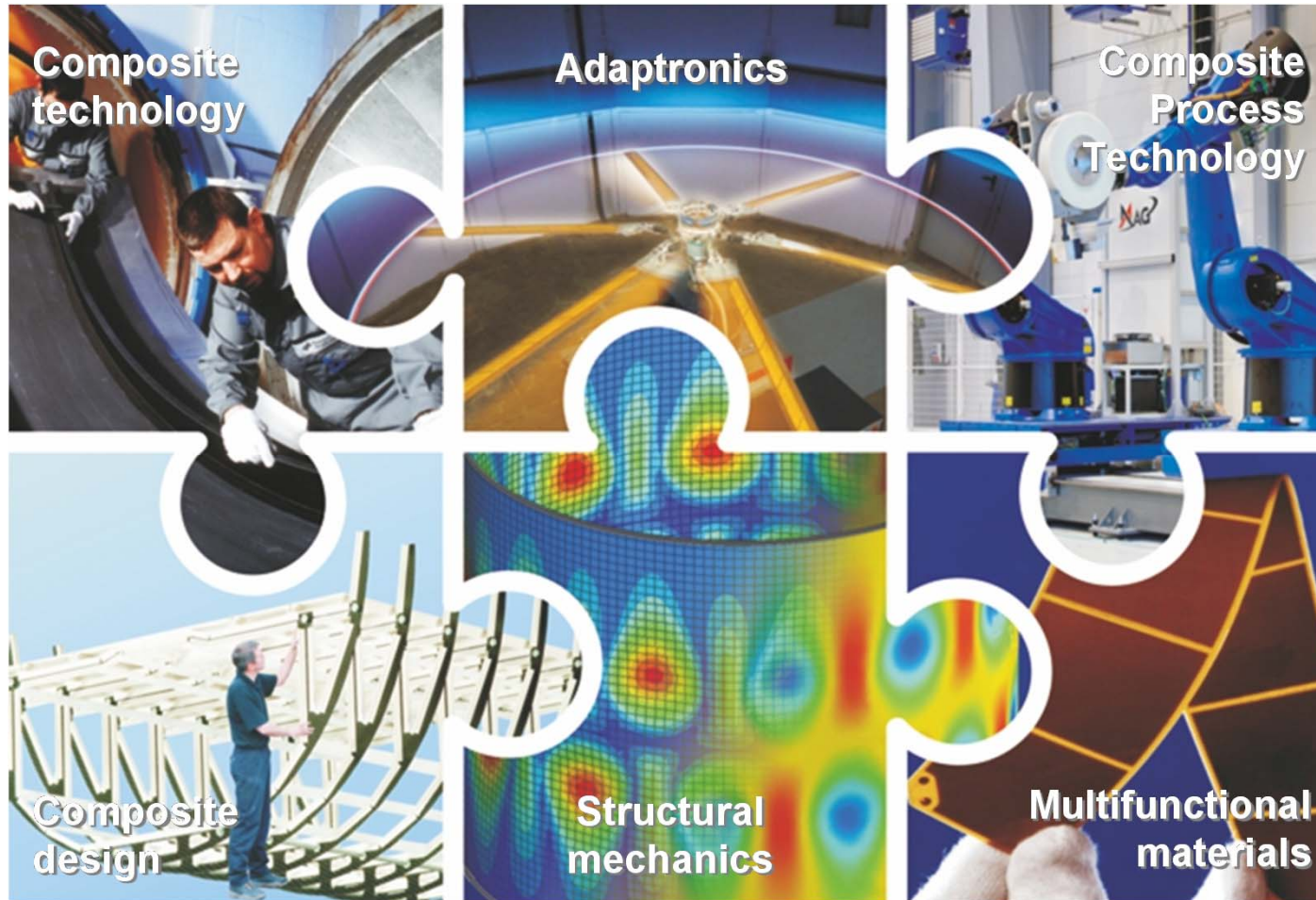


Total income 2010 – Research, operations and management tasks (excluding trustee funding from the Space Administration / DLR Project Management Agency): **€745 Mio.**



Institute of Composite Structures and Adaptive Systems

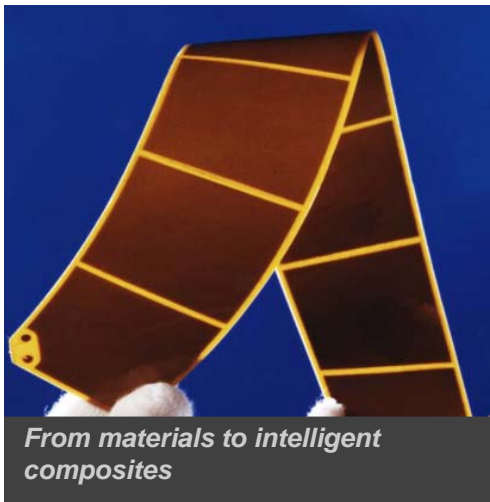
Director: Prof. M. Wiedemann



Multifunctional Materials

Dr. P. Wierach

We increase the ability of the materials!

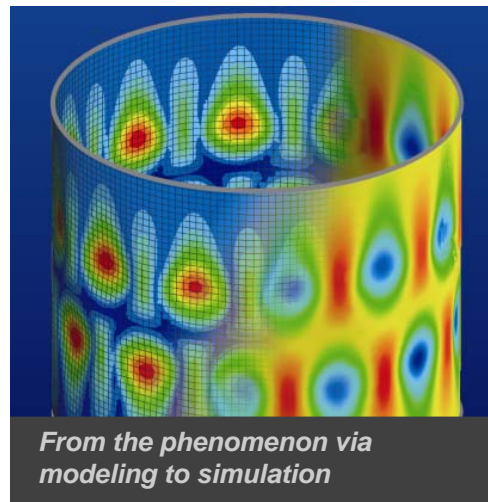


- Fiber- and nanocomposites
- Smart materials
- Structural health monitoring
- Material characterization

Structural Mechanics

Dr. A. Kling

With high fidelity to virtual reality for the entire life cycle!

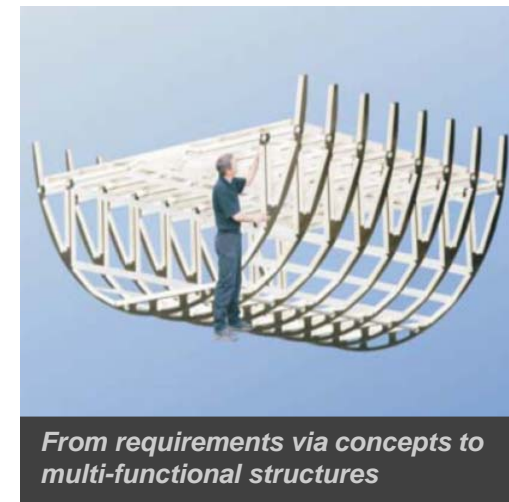


- Global design methods
- Stability and damage tolerance
- Structural dynamics
- Thermal analysis
- Multi-scale analysis
- Process simulation

Composite Design

Dr. C. Hühne

Our design for your structures!



- Design and Sizing
- Structure concepts and assessment
- Multi-functional structures
- Shape-variable structures
- Hybrid structures



Composite Technology

Dr. M. Kleineberg

Tailored manufacturing concepts



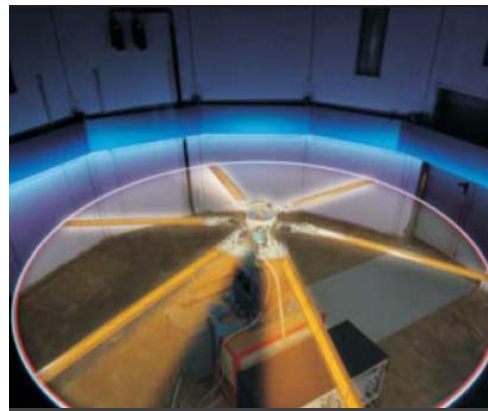
From the idea via processes to prototypes

- New technologies for manufacturing
- Hybrid manufacturing
- Assembly
- Repair
- Process automation

Adaptronics

Dr. H. P. Monner

The adaptronics pioneers in Europe



From functional composites to adaptive systems

- Simulation and demonstration of adaptive systems
- Active vibration control
- Active noise control
- Active shape control
- Autarkic systems

Composite Process Technology

Prof. Dr. M. Wiedemann

Research with industrial dimension



For sustainable processes

- Automated FP und TL
- Online QA within autoclaves
- Automated manufacturing for mass-production
- Simulation methods for maximum process reliability and process assessment



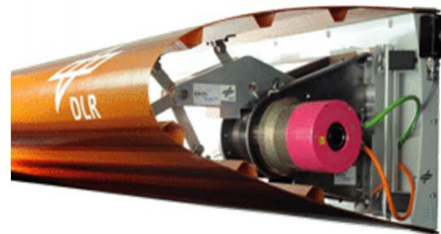
Applied Research | Our Foci of Product Oriented Research

Focus
Fuselage Technologies | Dr. T. Wille



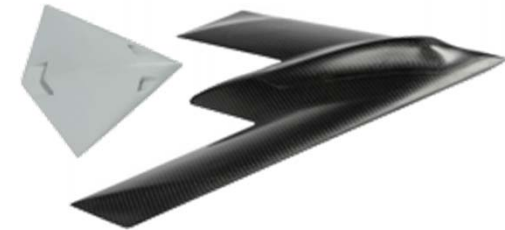
- Fuselage design
- Large cut-outs
- Manufacturing technologies

Focus
High Lift | M. Kintscher



- Flexible leading edge
- Morphing of high lift systems
- Structural integration of active flow control

Focus
Special Structures | M. Hanke



- Safety relevant aeronautic structures and UAVs
- Multifunctional composite structures
- Demonstration of design and technology



Applied Research | Our Foci of Product Oriented Research

Focus
Space | M. Straubel



- Lander structures
- Deployable space structures
- Upper stage

Focus
Transport | J. Nickel



- Next generation train
- Novel vehicle structures



DLR Centre for Lightweight Production Technology (ZLP)

ZLP Site Stade

Prof. Wiedemann, Dr. Kruse



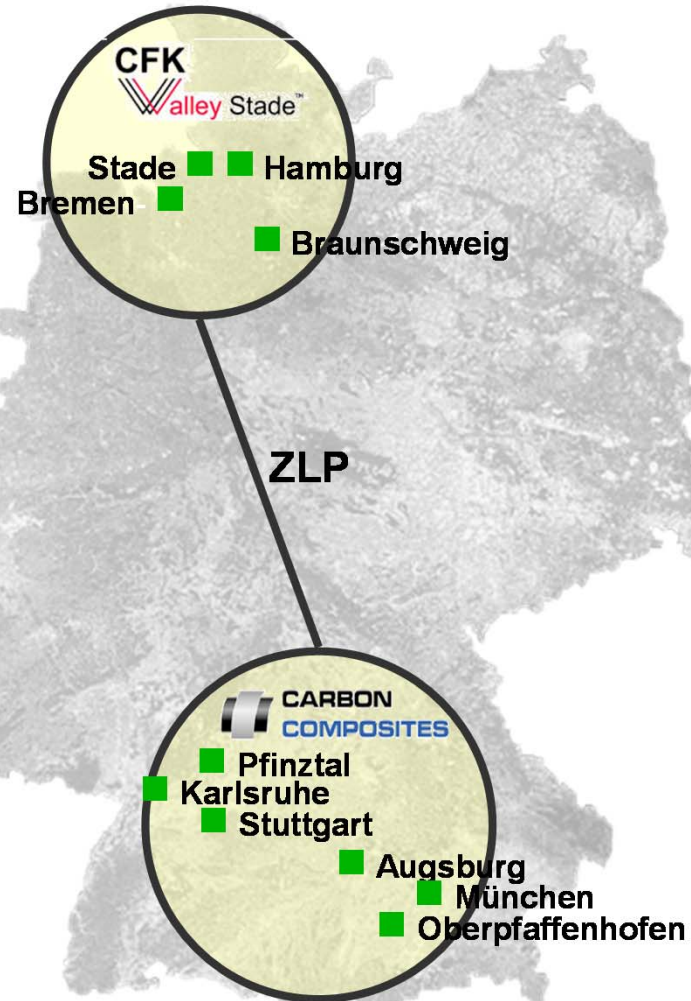
ZLP Site Augsburg

Prof. Voggenreiter, Dr. Dudenhausen



Head of ZLP:

Dr. Kruse

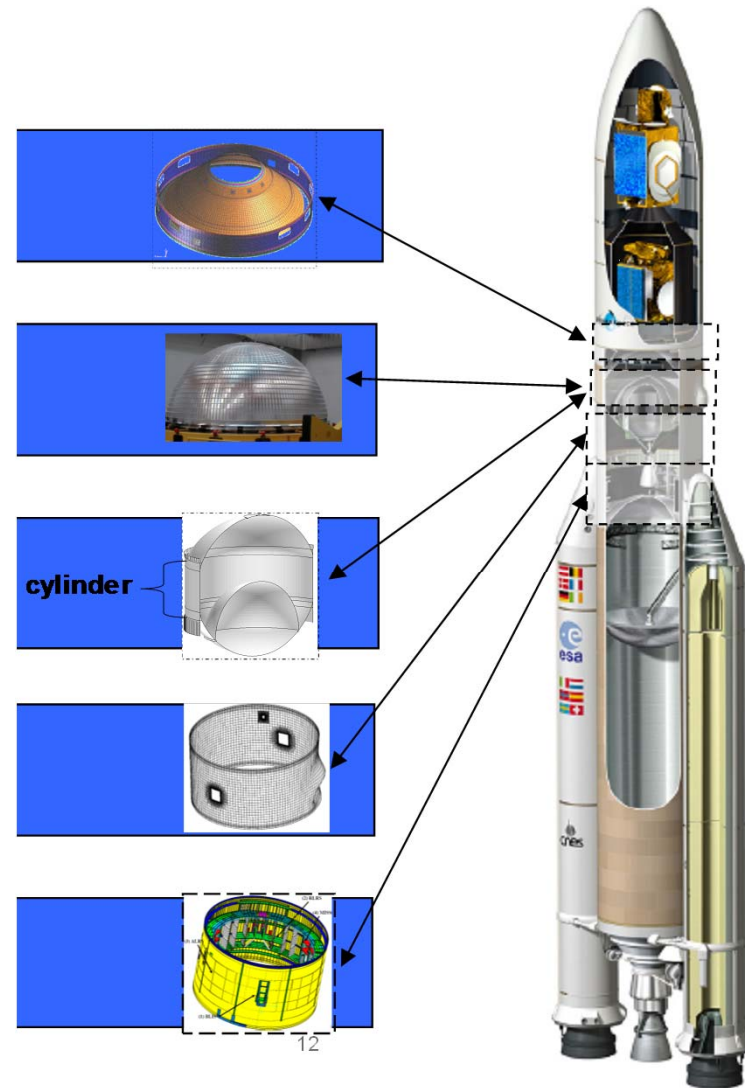


Deutsches Zentrum
für Luft- und Raumfahrt e.V.
in der Helmholtz-Gemeinschaft

-Institute of Composites Structures and Adaptive Systems

Example: Space structures

- “Stability” is the relevant design criterion for most parts of launcher structures
- The current design guidelines are from 1968 and developed for metallics
- There are no guidelines for composites which allow exploiting all reserve capacities



Ariane 5





CFK VALLEY STADE



regional network - global impact

Prof. Dr.-Ing. Axel Herrmann,
Patrick Markert,
Helge von Selasinsky

Infrastructure of the CFK-Valley Stade



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Competencies along the entire value chain (96 members)

CFRP-
education



research



technology-
development /
-engineering



manufacturing



recycling

3D CONTECH, BROUWER AUTOMATION, FIBRE, Heraeus, INVENT, LACH-DIAGNOSTIK, AEROTEC, thomas Technik + Innovation, 3T, CGTECH VERICUT, Flow, HXCEL, Kämmerer, LZH, Rhein Composite, Toho Tenax, ACE, ACROSOMA, CGT, form.staal, HOCHSCHULE, KARL MAYER, mecoplan, RKM, The Team, AFFAN, COTESA COMPOSITES, Fraunhofer IFAM, HOCHSCHULE, KARL MAYER, mtec-akademie, MET, Rolls-Royce, TU Clausthal, AIRBUS, DASSAULT SYSTEMES, FRIMO, GE, GE, KUEHN, AUERRES, S.A.B.C.A., TU Delft, AIRTECH, ALRES, DLR, GE, GE, HOUSE AND LIFE, KUEHN, AUERRES, SOL GROUP, TUHM, SGS, PM, VIRO engineering, SOFCAR, VOITH, ON asystem, DSM, GMA, HUFSCHMIED ZERSTÄUNUNGSSYSTEME, KROMI, NEUFORM, SE, Volksbank Stade-Cuxhaven eG, BCT, EADS, GS, ifs, KUKA, NORDEX, BOITZNER, BIBA, HADEG, IHS, KUKA, NORDEX, celerich, STADE, WEMME, Bishop GmbH, EB-WORK, HAHLBROCK, IHS, LURBECK AG, P3 digital services, STYRON, xperion, BOLLE & CORDS Elektrotechnik GmbH, EVONIK, HDE CONSULT, Ingenieurbüro TARTLER GmbH, PFH, PFH UNIVERSITY of Applied Sciences, TENCATE, xperion

Lightweight potential of reinforced plastics in the mobility sector

Vehicle	operating time	ecological benefit	example
Airplane	~ 60.000 h	1 kg less weight saves 3 t of kerosene 1,35 €/l -> 4050,- € per kg	A380 max. take off weight: 560.000 kg!
Car	~ 6.000 h	100 kg less weight leads to 0,35 -0,5 l / 100km less fuel consumption -> 8,8-12,5 g/km less CO ² emission	Golf I: 780 kg Golf VI: 1142 kg + 25%
Train	~ 75.000 h	Reduction of journey-time HH to M: up to 20 Min.	Significant reduction of energy consumption e.g. on subway trains
Truck	~ 1.000.000 km	Lightweight trailer saves up to 25 % fuel	270.000 l instead of 350.000 l diesel consumption

