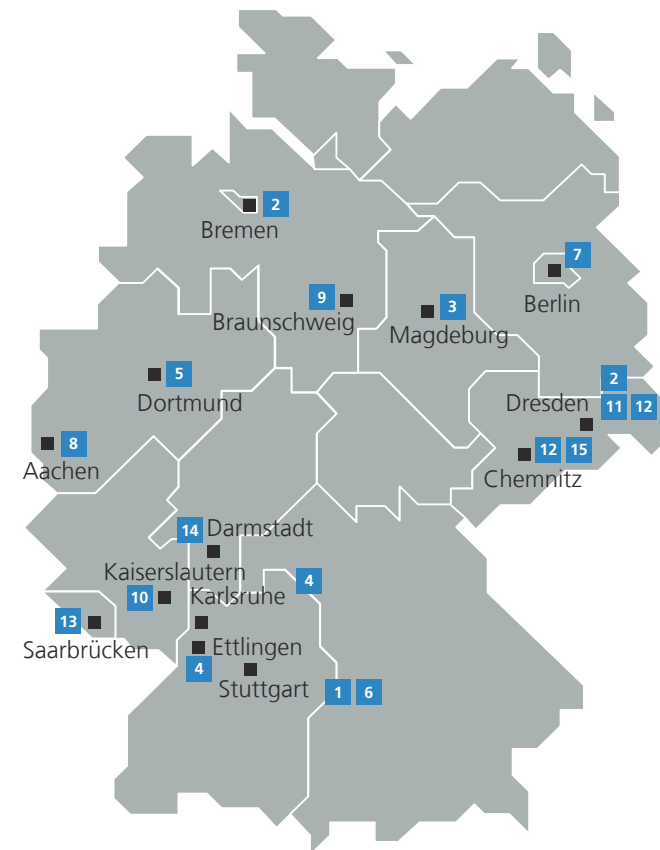


## MEMBERS



Fraunhofer Institute for

- 1 Industrial Engineering **IAO**
- 2 Manufacturing Technology and Advanced Materials **IFAM**
- 3 Factory Operation and Automation **IFF**
- 4 Optronics, System Technologies and Image Exploitation **IOSB**
- 5 Material Flow and Logistics **IML**
- 6 Manufacturing Engineering and Automation **IPA**
- 7 Production Systems and Design Technology **IPK**
- 8 Production Technology **IPT**
- 9 Surface Engineering and Thin Films **IST**
- 10 Industrial Mathematics **ITWM**
- 11 Material and Beam Technology **IWS**
- 12 Machine Tools and Forming Technology **IWU**
- 13 Non-Destructive Testing **IZFP**
- 14 Structural Durability and System Reliability **LBF**
- 15 Electronic Nano Systems **ENAS**

### Imprint

#### Fraunhofer Automobile Production Alliance

##### Chairman of the Alliance

Prof. Dr. Matthias Putz

Fraunhofer Institute for Machine Tools  
and Forming Technology **IWU**  
Reichenhainer Straße 88  
09126 Chemnitz, Germany

##### Alliance Office

c/o Fraunhofer Institute for Machine Tools  
and Forming Technology **IWU**  
Reichenhainer Straße 88  
09126 Chemnitz, Germany

##### Director

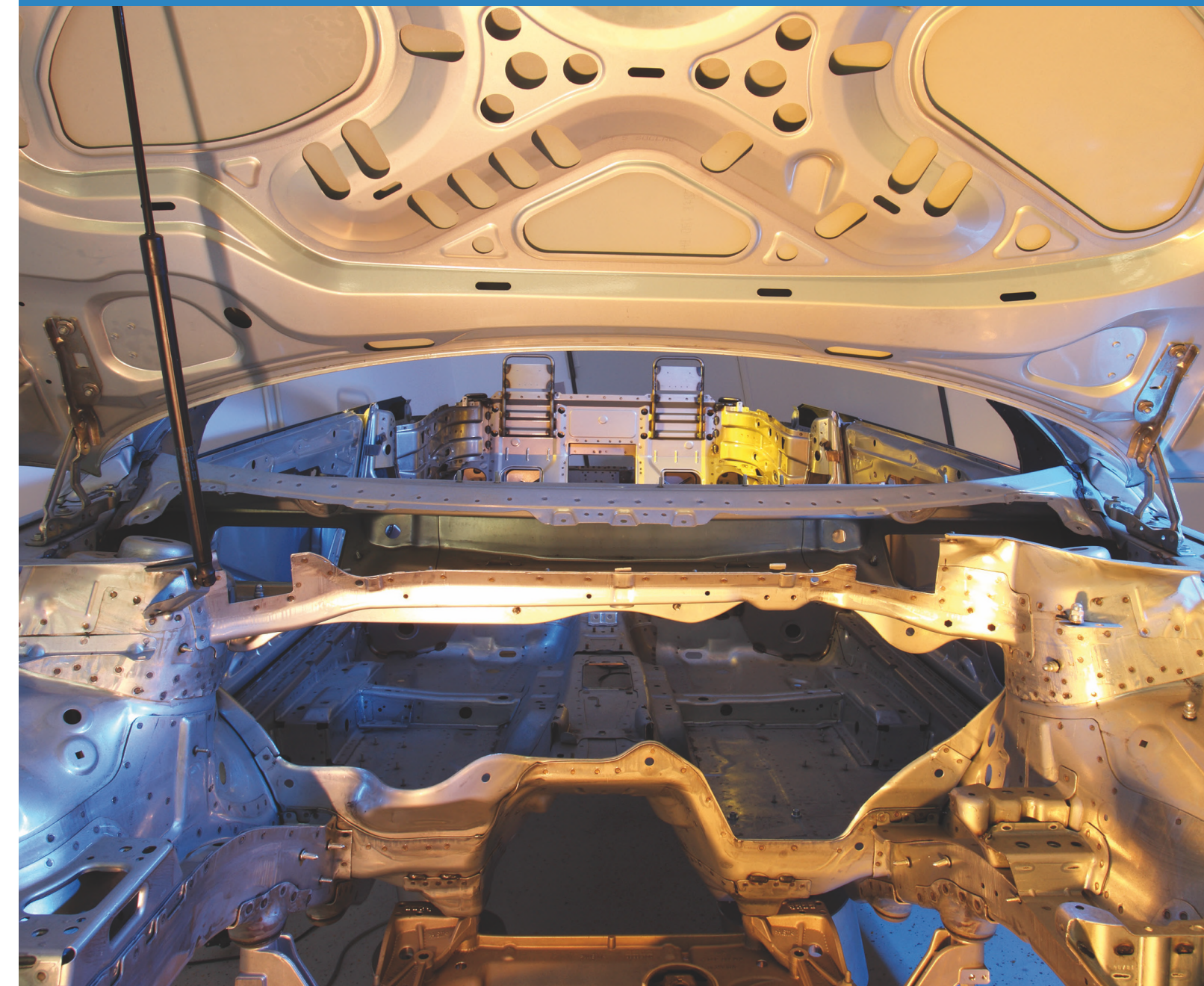
Karsten Hülsemann  
Phone +49 371 5397-1365  
karsten.huelsemann@iwu.fraunhofer.de  
www.automobil.fraunhofer.de

##### Photo acknowledgements

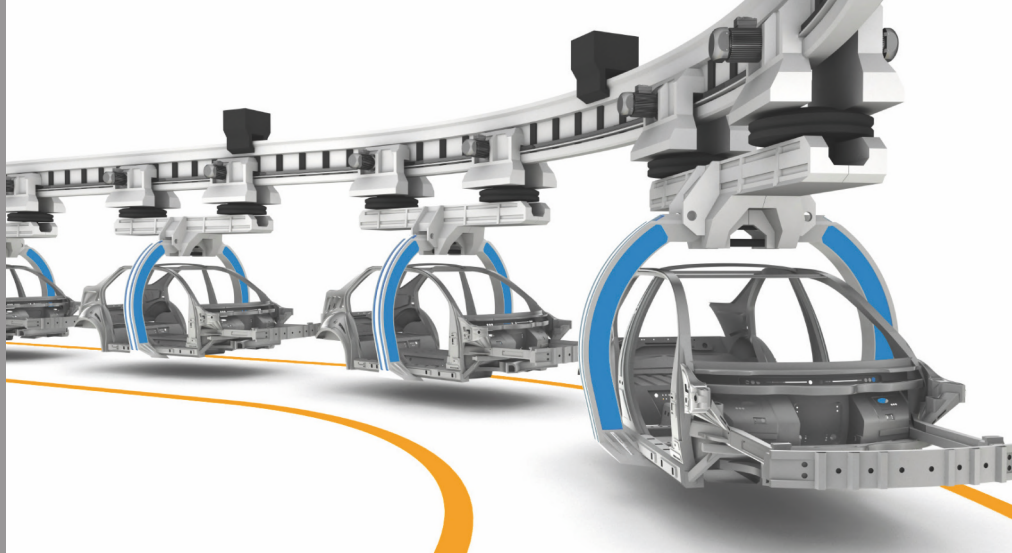
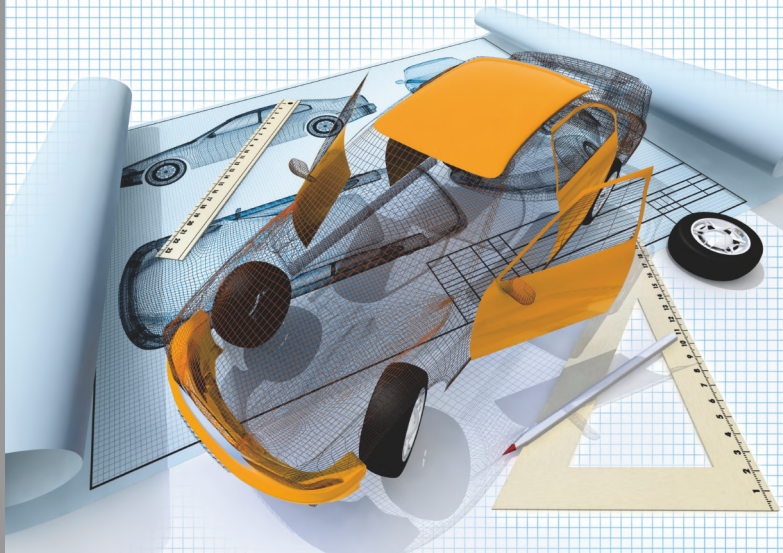
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## TECHNOLOGIES FOR AUTOMOBILE PRODUCTION







MOTIVATION

Carmakers, their suppliers, and those equipping the automotive industry, represent a decisive economic factor in Germany. Significant changes to the entire concept of mobility are ultimately being driven by global trends, such as dwindling natural resources, an increasing need for mobility, urbanization and megacities. In addition, German carmakers and their suppliers are facing increasingly tough competition as the trend towards low-cost vehicles takes hold.

Alternative vehicle concepts cannot be realized in high volume currently but the demand for new distribution and utilization concepts grows constantly. Production technologies for key skills saving expenses are missing. Currently several drive concepts are being designed and produced, in which the portion of alternative drives rises steadily. This requires a radical structural change of the automobile production regarding to organization, technology and production systems.

The creation of production-related conditions to detach small series and the changeover to a profitable and energy-efficient mass production could be the solution of this problem.

- Key tasks performed by the alliance are
- Sustainable improvement in efficiency as well as saving resources
  - Development of technologies and methodes for automotive engineering which are ready for serial production
  - Creation of production networks and optimal utilization concepts

Competence by networking

Car manufacturing is more than merely production to us as we conceive automotive manufacturing as a network. One outstanding quality of the Fraunhofer Automobile Production Alliance is our multidisciplinaryity and the conjunction of our competences, consistently existing throughout the entire automotive production life cycle process and supply chain.

By pooling the skills of a total of fifteen institutes, the alliance has created a broadranging and proficient partner for the German automotive sector in research and development. The topics confining the focus of research lead to innovations along the entire process chain of automotive manufacture – i.e. from the planning stage right through to the point when the vehicle comes off the paint shop – are implemented rapidly and in an integrated and sustainable manner.

Interdisciplinary co-operation covers the complex automotive production life cycle process and the entire automobile supply chain management.

Being an alliance, we do not compete with the Fraunhofer institutes. By integrating the individual competencies of each institute we create new services on the market.

BUSINESS UNITS

The alliance concentrates on rising to ecological challenges such as fuel and CO<sub>2</sub> reductions, electric mobility, and on decreasing the quantity of material used taking into account economic considerations.

According to their competencies, the members of the alliance are working together in the following business units:

Business Units “Carbody” and “Powertrain and Running Gear”

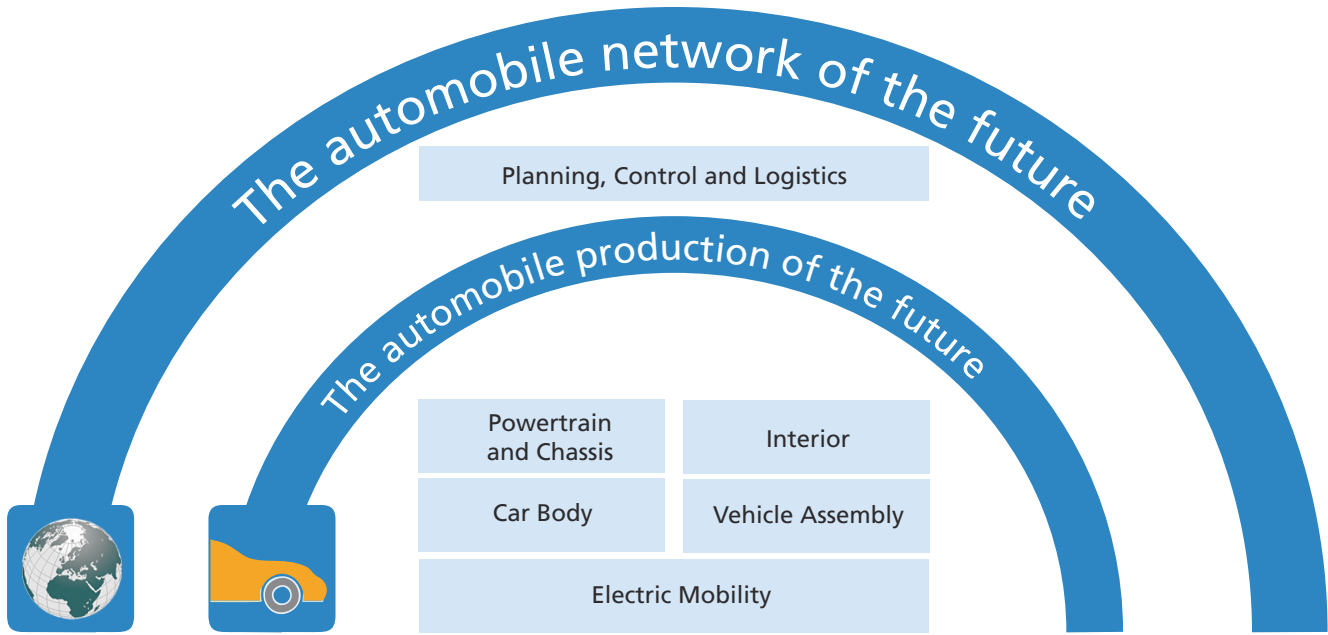
- Emphases of the business unit car body (from coil to finish) and powertrain and running gear (from battery to wheels) are:
- Process planning, incl. FE-simulation tools and methods
  - Design, construction and manufacture of tools (CAD/CAM)
  - Development and testing of new tool materials and coatings
  - Development and optimization of processes (sheet metal, bulk metal, hydroforming, special processes)
  - Machining of new materials
  - Process control systems (sensor technology, actuating elements)
  - Feasibility studies, prototypes, low volume production

Business Unit “Interior”

- The business unit interior also represents subjects to system optimization, such as:
- Seats (lightweight construction, surface materials, individualization, safety)
  - Cockpit (haptics, appearance, acoustics, comfort, modularization, recycling)
  - Car interior lining (polycarbonate as alternative to glass, shiftable polymers, material- and cleaning systems, heat insulation)

Business Unit “Vehicle Assembly”

- The objective is to realize the overall concept “Assembly in 2020” under the aspect of product and demography change as well as the integration of automobile-specific partial solutions into this concept. Specific topics are:
- Holistic assembly and logistics planning
  - Assembly simulation in the vehicle development
  - Adaptive fixture concepts
  - Cooperation systems (human/robots)
  - Robot systems with extended kinematics
  - Intelligent process tools
  - Evaluation of energy efficiency of assembly concepts
  - Use of IT-, RFID- and sensor technology in assembly and logistics processes



Business units of the Fraunhofer Automobile Production Alliance

Business Unit “Planning, Control and Logistics”

This business unit operates as a link between all business units of the alliance. Main topics are the strategic and technological development, design and management of processes and production systems, efficient and sustainable in-house and external logistics as well as information technology and information systems for the automobile industry.

Business Unit “Electric Mobility”

The business unit electric mobility works across all business units on everything related to electric-vehicle concepts, alternative energy production, electric energy in operation, energy storage as well as energy transfer. To achieve optimal results, the business unit draws on the results of the other business fields.