

# German Aerospace Centre (DLR)

## *Institute for Construction Methods and Structural Technology*

### About this organisation

#### Machine translation

This organisation has been machine-translated based on data provided in German.

The Institute of Structures and Design develops high-performance structures for aerospace, vehicle construction and energy technology. The focus is on components made from fibre-reinforced ceramic and polymer composites as well as hybrid structures. New design concepts and automated production processes make lightweight structures particularly efficient and cost-effective.

The institute works at the DLR sites in Stuttgart and Augsburg with five departments along the entire process chain - from materials to production technology: - Structural integrity (crash, high velocity impact, virtual design, testing, certification) - Component design and production technologies (construction methods, design, production of continuous fibre-reinforced high-performance polymers, high-performance structures for engines) - Automation and quality assurance in production technology (robot-supported process chain optimisation, production-integrated quality assurance) - Ceramic composite structures (process technology, material development for the production of high-performance ceramic components, simulation, engineering, non-destructive testing methods) - Space system integration (thermal protection systems for re-entry, ceramic construction methods for space propulsion systems) Questions from research and industry can thus be answered quickly and flexibly.

Pfaffenwaldring 38-40  
70569 Stuttgart  
Baden-Württemberg  
Germany  
[www.dlr.de/bt](http://www.dlr.de/bt)



#### Organisation type

Non-university research institution

#### Sectors



#### Employees

50 up to 249

#### Turnover

n/a

#### Funding

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|                           |                                                                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Main areas covered</b> | Crash, HVI & virtual approval, High-performance lightweight structures, Automation & QA in production, CMC technology & structural components, High-temperature lightweight structures |
| <b>Infrastructure</b>     | Firing system, drop test stand, Robot cells, taping machine, Hot presses, oven systems, Computer tomography (CT), Thermo-mechanical test system                                        |
| <b>Certifications</b>     | ISO 9001                                                                                                                                                                               |
| <b>Keywords</b>           | Material development & optimisation, Simulation, Engineering & Design, Manufacturing, production technology, Analysis & material testing, Tests, validation                            |
| <b>Memberships</b>        |                                                                                                                                                                                        |

### Overview of lightweighting expertise

#### Machine translation

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|                                                                                                                                                 | Research | Development | Manufacturing<br>& Supply |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|---------------------------|
| <b>Offer</b>                                                                                                                                    |          |             |                           |
| <b>Products</b><br>Parts and components, Machines and plants,<br>Materials, Tools and moulds                                                    | ✓        | ✓           | ✓                         |
| <b>Services &amp; consulting</b><br>Consulting, Testing and trials, Engineering,<br>Prototyping, Validation, Simulation, Technology<br>transfer | ✓        | ✓           |                           |

### Overview of lightweighting expertise

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|                                                                                                                                                                                                       | Research | Development | Manufacturing<br>& Supply |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|---------------------------|
| <b>Field of technology</b>                                                                                                                                                                            |          |             |                           |
| <b>Design &amp; layout</b><br>Lightweight manufacturing, Hybrid structures                                                                                                                            | ✓        | ✓           |                           |
| <b>Functional integration</b><br>Sensor technology                                                                                                                                                    | ✓        | ✓           | ✓                         |
| <b>Measuring and testing technology</b><br>Component and part analysis, Visual analysis<br>(e.g. microscopy, metallography), Materials<br>analysis, Destructive analysis, Non-destructive<br>analysis | ✓        | ✓           |                           |
| <b>Modelling and simulation</b><br>Crash behaviour, Loads & stress, Life-cycle<br>analysis, Optimisation, Processes, Structural<br>mechanics, Materials                                               | ✓        | ✓           |                           |
| <b>Plant construction &amp; automation</b><br>Automation technology, Handling technology,<br>Robotics                                                                                                 | ✓        | ✓           | ✓                         |
| <i>Recycling technologies</i>                                                                                                                                                                         |          |             |                           |

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|                                                                                                                                        | Research | Development | Manufacturing<br>& Supply |
|----------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|---------------------------|
| <b>Manufacturing process</b>                                                                                                           |          |             |                           |
| <b>Additive manufacturing</b><br>3D printing                                                                                           | ✓        | ✓           | ✓                         |
| <b>Coating (surface engineering)</b><br>Galvanising, Plasma process                                                                    | ✓        | ✓           | ✓                         |
| <b>Fibre composite technology</b><br>Filament winding, Manual lamination, Resin infusion process, Pre-preg processing, Vacuum infusion | ✓        | ✓           | ✓                         |
| <b>Forming</b><br>Thermal converting                                                                                                   | ✓        | ✓           | ✓                         |
| <b>Joining</b><br>Hybrid joining, Adhesive bonding, Welding                                                                            | ✓        | ✓           | ✓                         |
| <i>Material property alteration</i>                                                                                                    |          |             |                           |
| <i>Primary forming</i>                                                                                                                 |          |             |                           |
| <b>Processing and separating</b><br>Turning, Milling, Grinding, Cutting, Others (Water jet cutting, laser)                             | ✓        | ✓           | ✓                         |
| <b>Textile technology</b><br>Preforming, Knitting                                                                                      | ✓        | ✓           | ✓                         |

## Overview of lightweighting expertise

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|                                                                                                                                                                            | Research | Development | Manufacturing<br>& Supply |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|---------------------------|
| <b>Material</b>                                                                                                                                                            |          |             |                           |
| <i>Biogenic materials</i>                                                                                                                                                  |          |             |                           |
| <i>Cellular materials (foam materials)</i>                                                                                                                                 |          |             |                           |
| <b>Composites</b><br>Glass-fiber reinforced plastics (GFRP), Ceramic matrix composite (CMC), Carbon-fiber reinforced plastics (CFRP), Others (Fibre metal laminates (FML)) | ✓        | ✓           | ✓                         |
| <b>Fibres</b><br>Aramid fibres, Glass fibres, Ceramic fibres, Carbon fibres                                                                                                | ✓        | ✓           | ✓                         |
| <i>Functional materials</i>                                                                                                                                                |          |             |                           |
| <b>Metals</b><br>Aluminium                                                                                                                                                 | ✓        | ✓           | ✓                         |
| <b>Plastics</b><br>Thermoset plastics, Elastomers, Thermoplastics                                                                                                          | ✓        | ✓           | ✓                         |
| <b>Structural ceramics</b><br>Non-oxidic ceramics, Ultra-high-temperature ceramics, Others (Fibre-reinforced ceramics)                                                     | ✓        | ✓           | ✓                         |
| <i>(Technical) textiles</i>                                                                                                                                                |          |             |                           |

## Contacts

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## German Aerospace Centre (DLR)

*Institute for Construction Methods and Structural Technology*

### Contacts

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