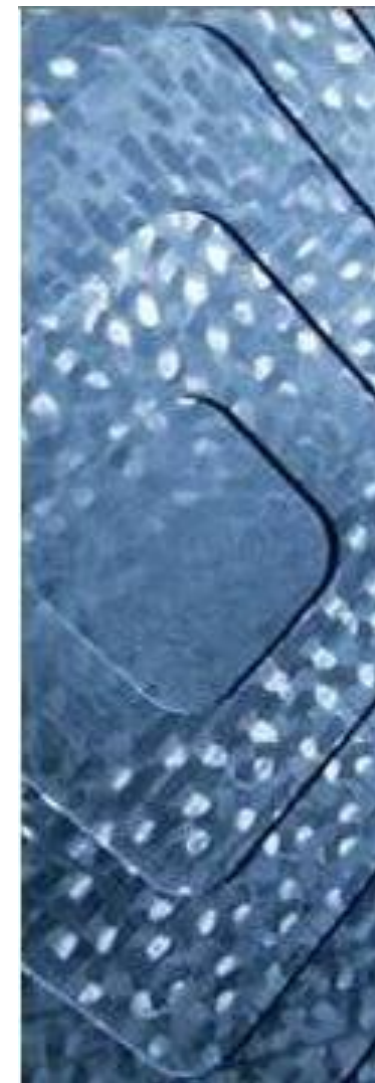




## Transfer europäischer Stärken nach NRW

Claus Bremer  
BCT GmbH

Brückenbildung NRW  
Düsseldorf, 29. Juni 2017

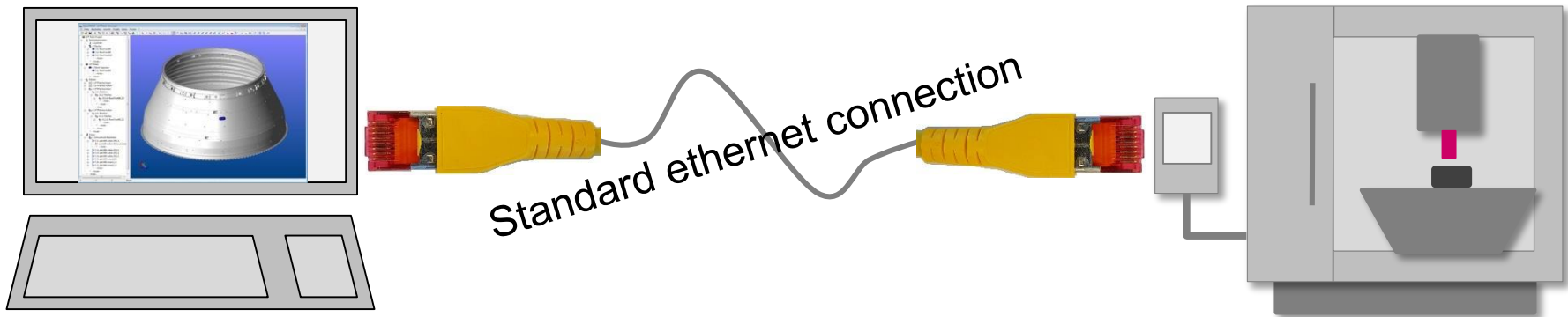


- Established in 1986
- Location
  - Dortmund, Germany - (Centre for Production Technology - CfP)
  - Subsidiary in Singapore for Asia - InnoSol-BCT
  - Partner in USA for America - Iniram
- BCT's core know-how:  
**Software solutions for automated manufacture and repair of individually shaped parts**  
→ **Adaptive machining**



# Integration of OpenARMS Software

## Simple connection of OpenARMS to machine tools & robots



### Standard PC

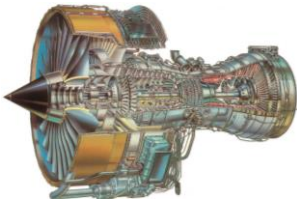
- Windows operating system
- OpenARMS software
- Ethernet port

### Machine tool / Industrial Robot

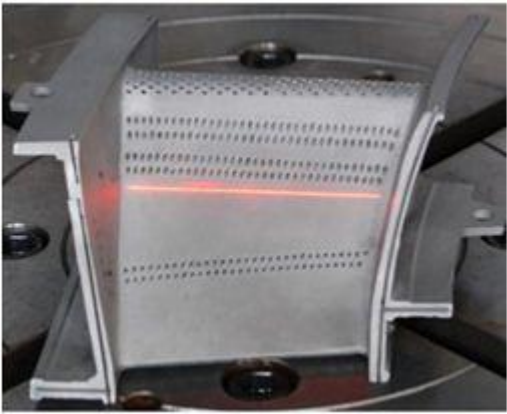
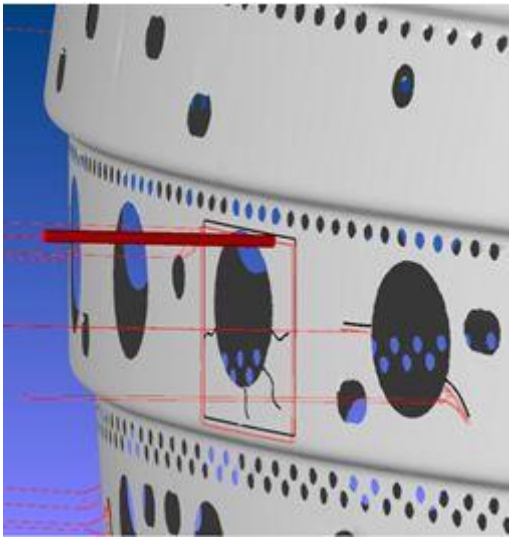
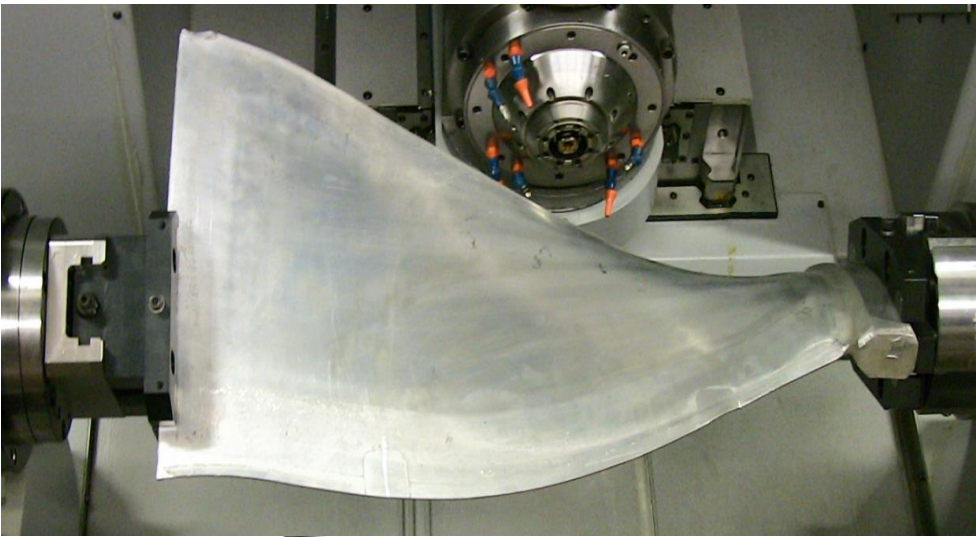
- Standard NC controls
- Ethernet port

# Turbine Applications

## Manufacturing and Repair



**BCT.**



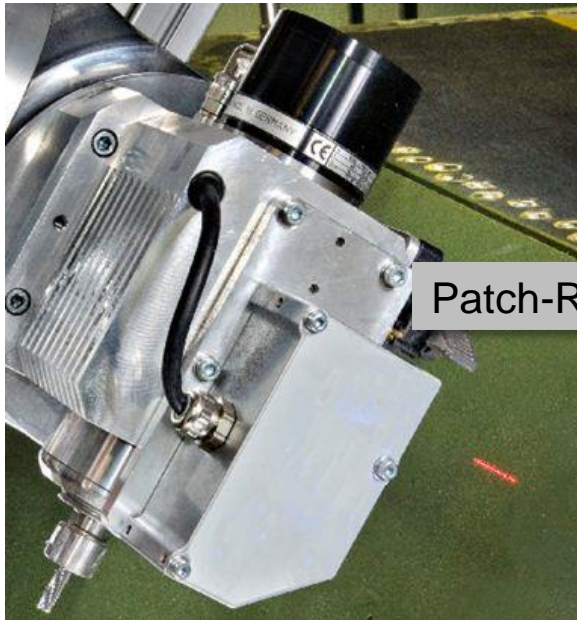
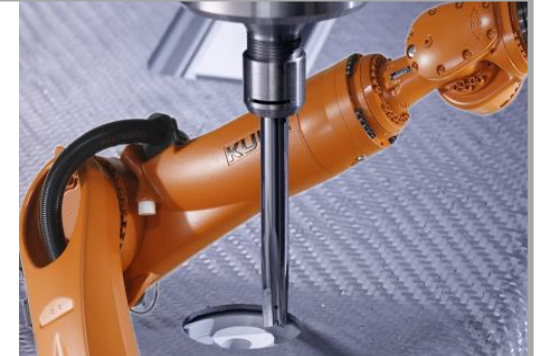
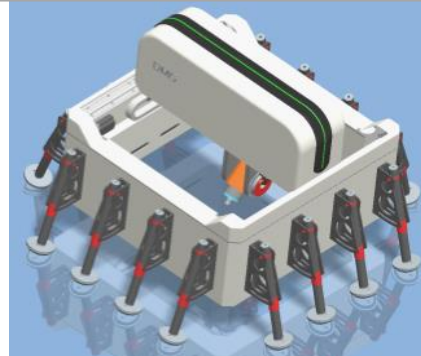
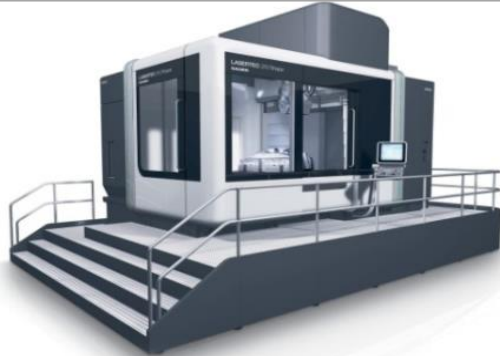
# Aircraft Applications

## Composite Post-machining and Repair

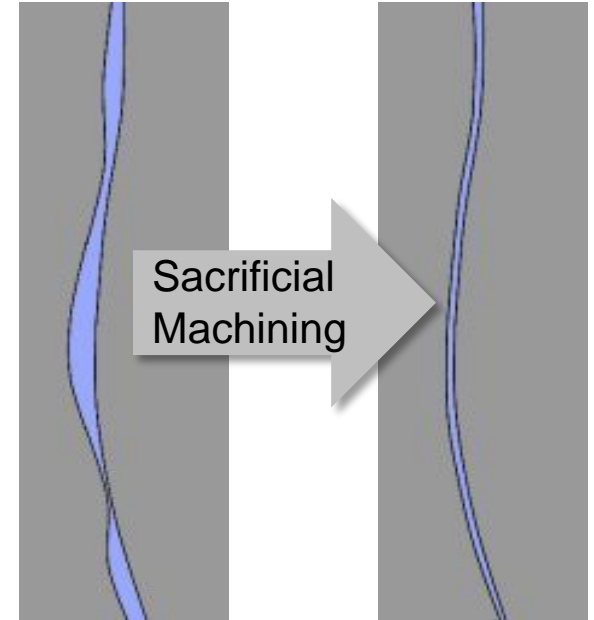
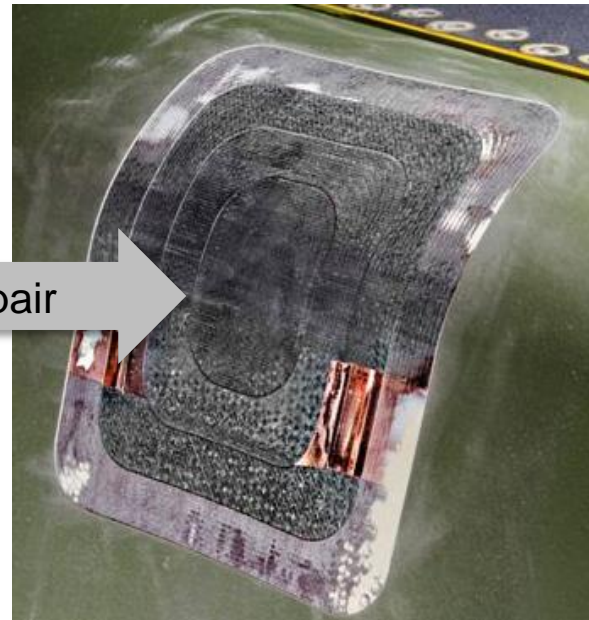


# BCT.

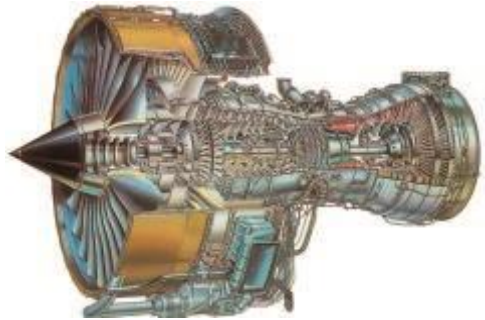
- Large machines
- Mobile Machines
- Industrial Robots



Patch-Repair



Sacrificial Machining



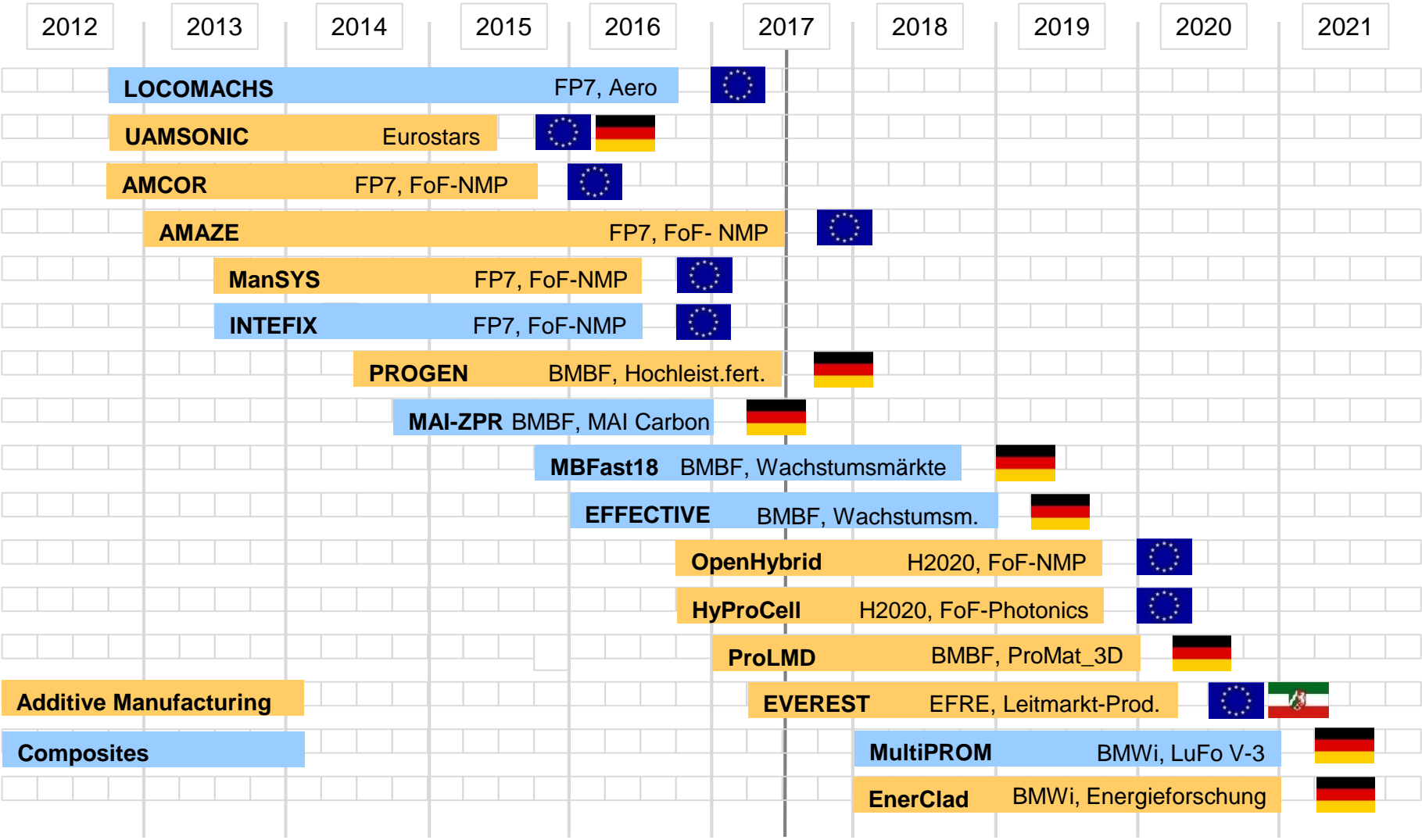
### Turbine

- ABB, Switzerland
- AirFrance-KLM/Safran, F
- Aviadvigatel, Russia
- AVIC, China
- BTL, Israel
- Chromalloy, USA
- GE/Alstom, Switzerland
- Holy, China
- Honeywell, USA
- IHI, Japan
- Leistriz, Germany
- Lufthansa Technik, Germany
- MTU Aero Engines, Germany
- MTU Maintenance, Germany
- Rolls Royce, UK
- SAESL, Singapore
- Siemens, Germany
- Safran MRO, France
- TACR, Germany
- Safran Aero Boosters, BE
- TOS (P&W), Singapore
- Safran Helicopter Engines, F
- XAE, China
- ...

### Aircraft

- Airbus, Germany
- Boeing, Australia/USA
- Bombardier, UK
- German Army
- MotorSich, Ukraine
- ...

# Research and Development Collaborative Projects



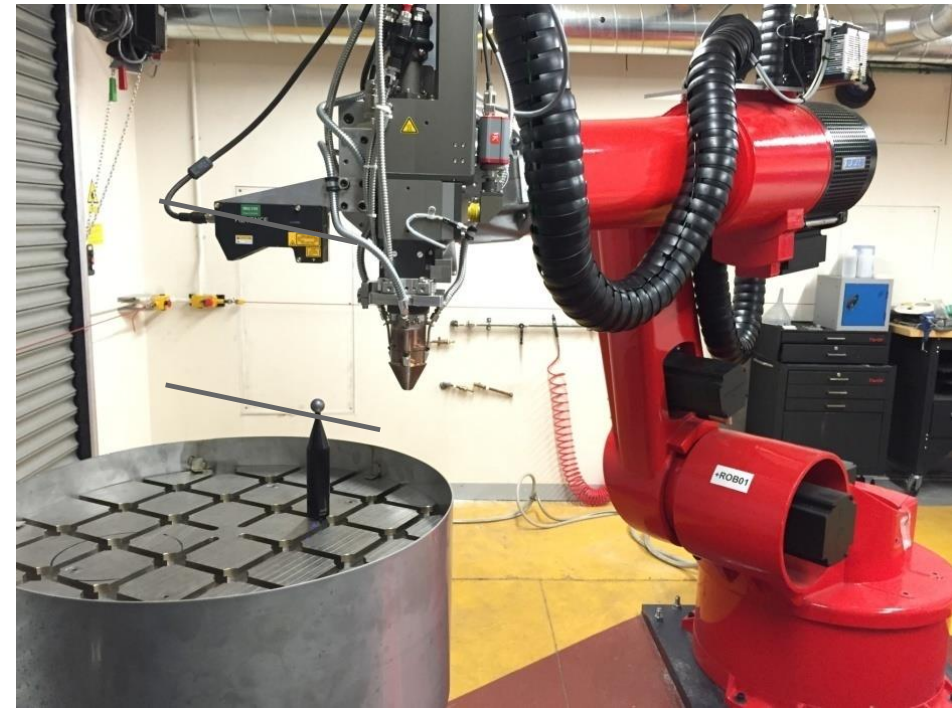
# AMCOR: Additive Manufacturing for Wear and Corrosion Applications



**BCT.**



For oil & gas industry ...

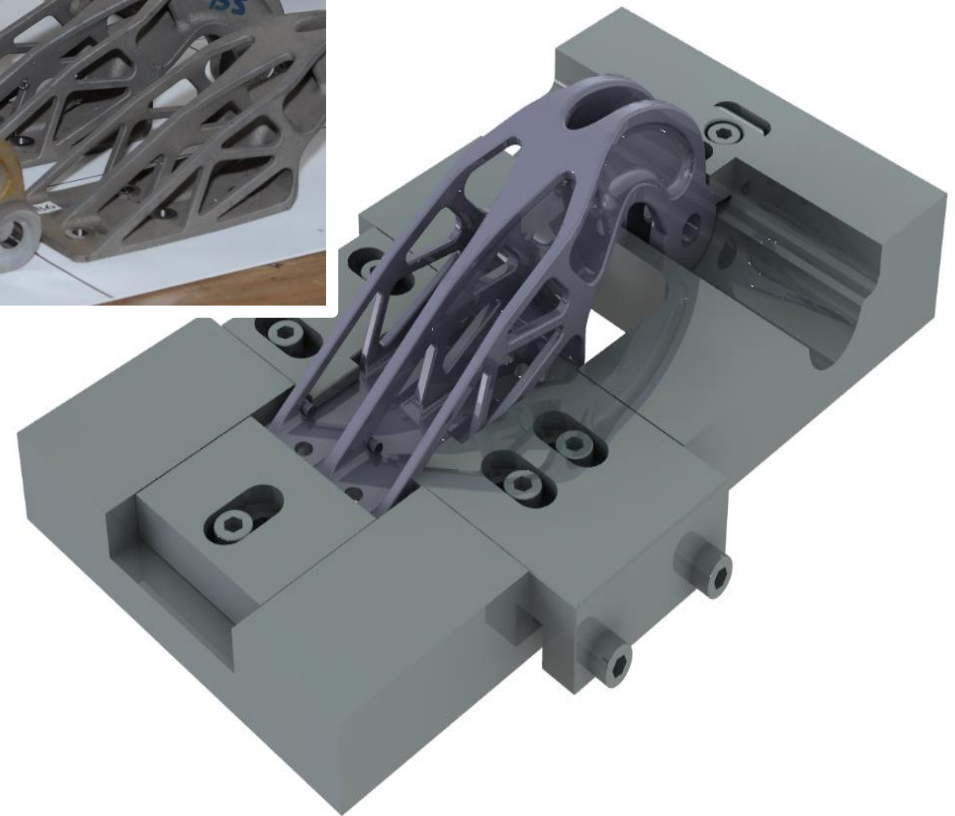
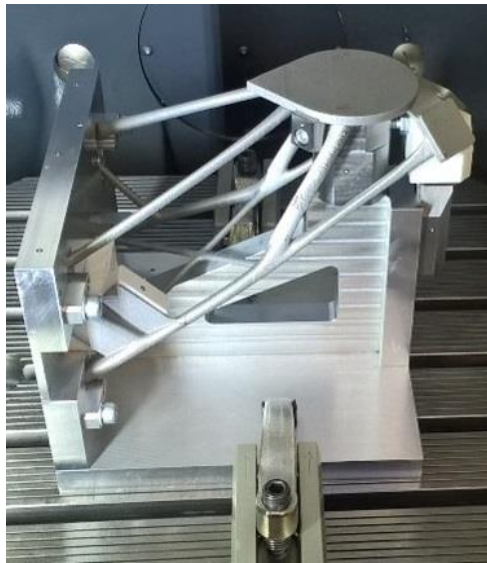




# AMAZE: Additive Manufacturing of High-Tech Metal Products



**BCT.**



Industry partners:  
turbine, aircraft, satellite  
& medical industry

# PROGEN: High-Productive Generation Using Hybrid Processes on Industrial Robots



**BCT.**




Industry partners: Airbus, Opel

# OpenHybrid: Hybrid Production Using Additive/Subtractive Machinery



**BCT.**

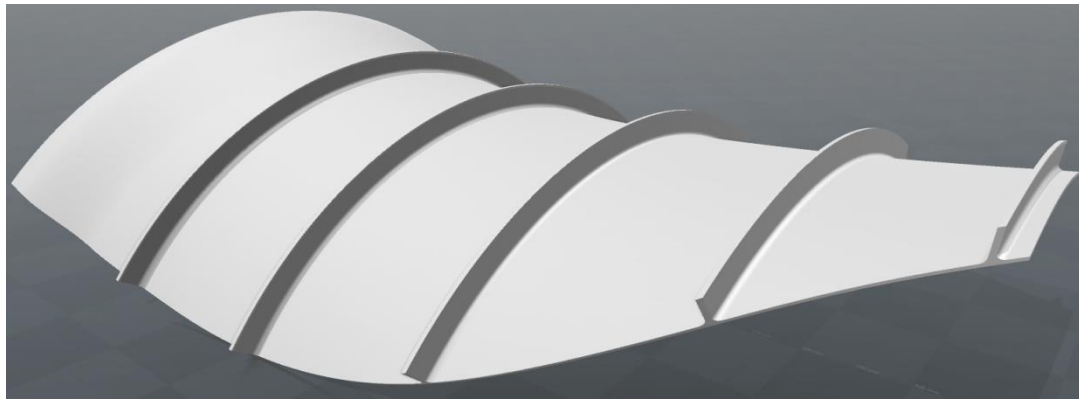
A close-up photograph of a machine tool's tool holder. Several different tools are mounted, including two large, dark-colored laser heads with copper-colored tips, and several standard metal drill bits of various sizes. The background is blurred, showing the industrial environment.

Industry partners:  
turbine & machine tool industry

# ProLMD: Production of Large Hybrid Structures on Industrial Robots



**BCT.**



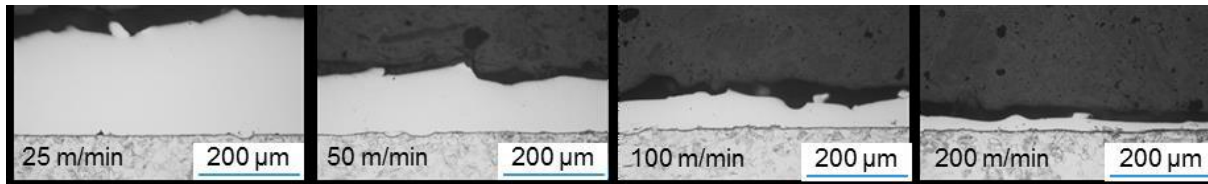
Industry partners:  
Airbus, Mercedes, MTU



# EVEREST: Extreme High-Speed Laser Metal Deposition



**BCT.**



For high-tech coating of rotary parts  
(printing machines ...)



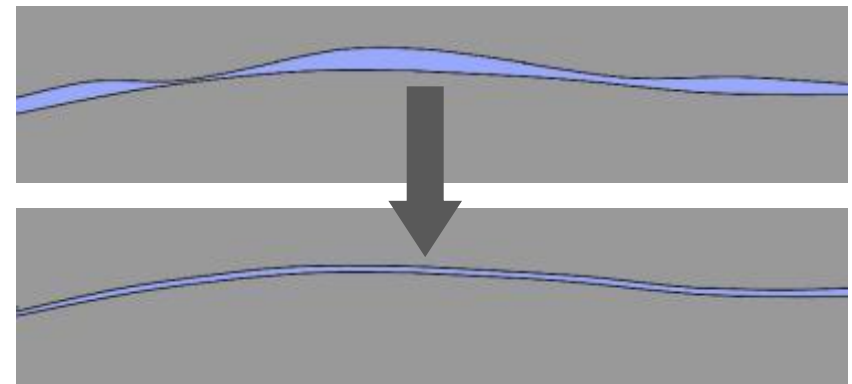
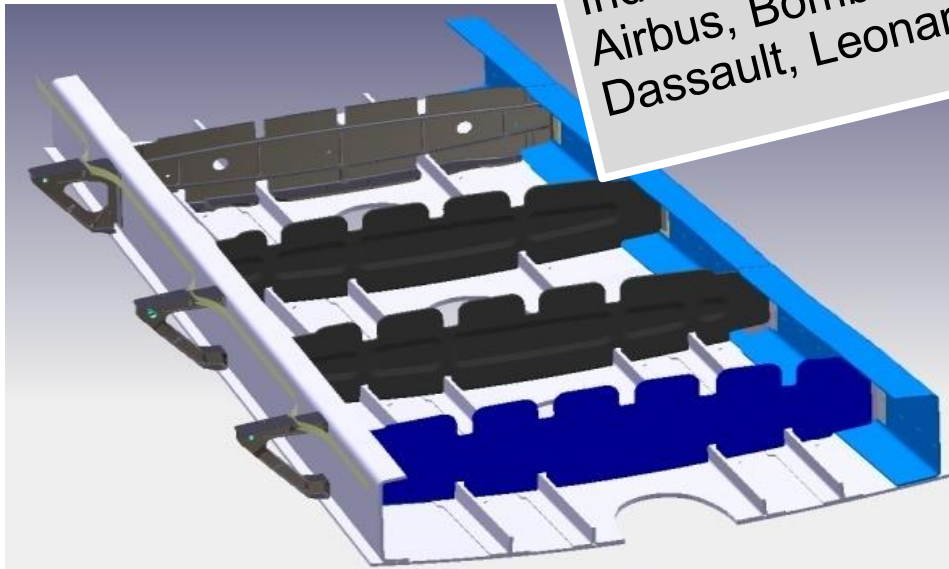
# LOCOMACHS: BCT - Adaptive Post-machining of Large Composite Structures



# BCT.



Industry partners:  
Airbus, Bombardier,  
Dassault, Leonardo, ...



# MAI-ZPR: High-precision Machining of Composite Structures Using Robots



**BCT.**



Industry partners:  
Airbus, BMW, Audi, Kuka

# MBFast18: Parallel Processing Using Multi-Robots and Mobile Machines



**BCT.**



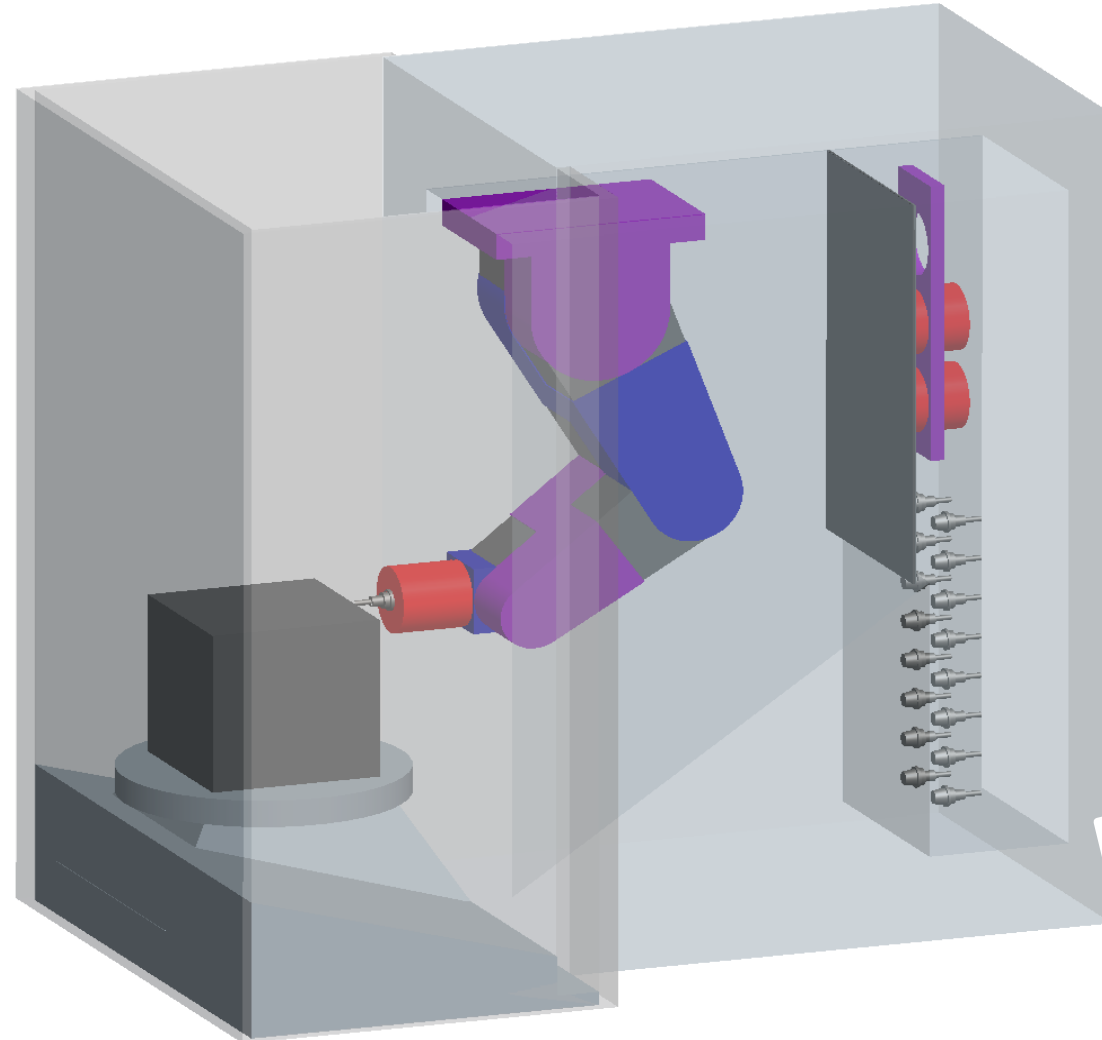
Industry partner: Airbus



# EFFECTIVE: Hybrid Milling Machine for Composite Structures



**BCT.**

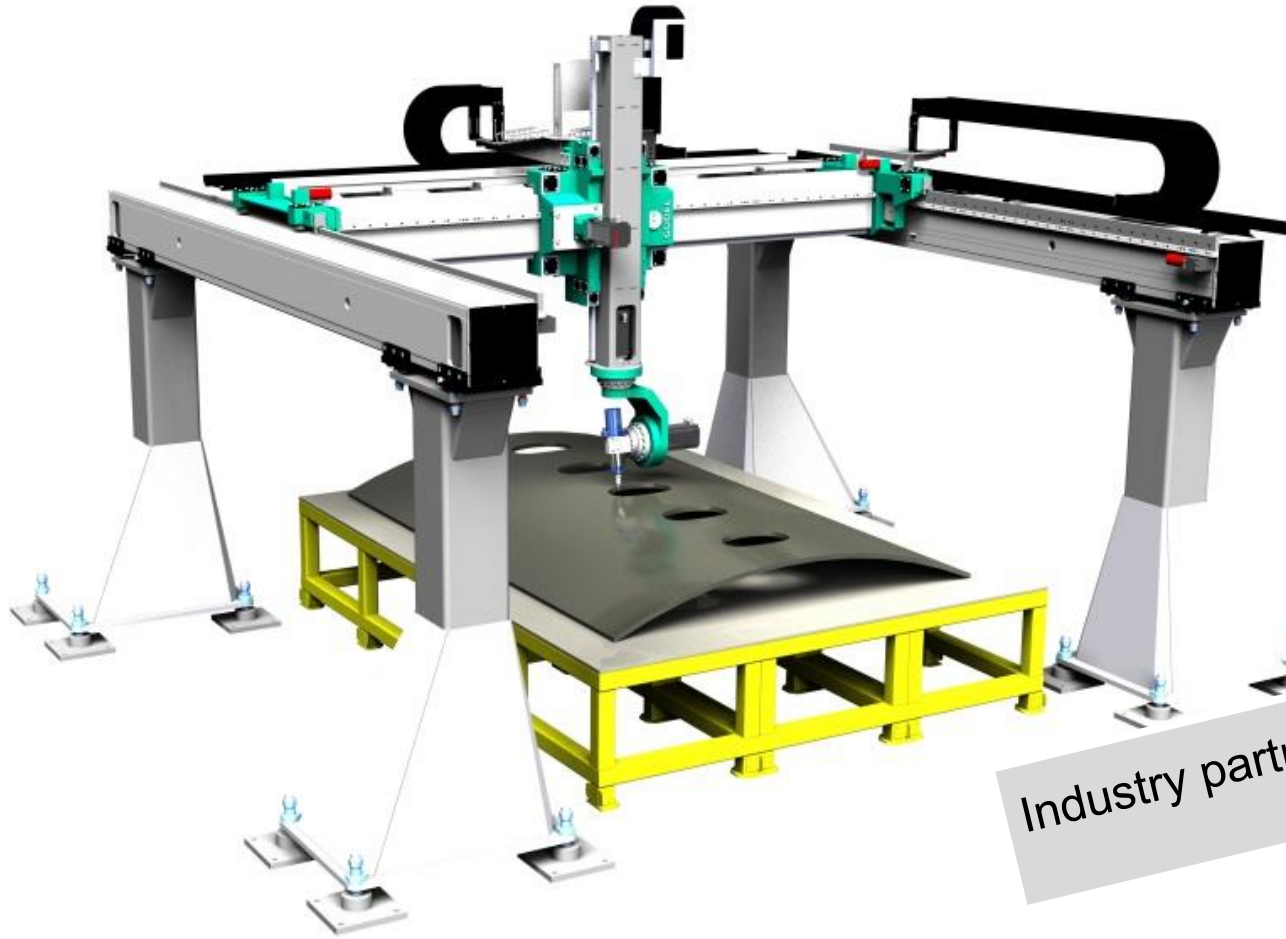


Industry partner:  
DMG MORI, Schaeffler

# MultiPROM: Multi Sensor Process and Machine Control



**BCT.**



Industry partner: Airbus

- In collaborative R&D projects, BCT is learning about the missing technology gaps which can be filled by BCT

- European R&D projects are laying the foundation for industrialisation
- National projects are focussing on the needs of German industry

- Additive manufacturing processes are mature and are on the way to industrialisation
- Missing: Seamless process chain including post-machining
- BCT: Measuring / scanning and post-machining software modules for industry

- Production of composite structures is reality (A350)
- Missing: Reduction of production costs and adequate machine concepts
- BCT: Integration of scanning and machining software modules for industry

## BCT.

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www.bct-online.de

**Thank you for your kind attention !**

**Questions ?**