

## References

The Center for Telematics (ZfT) focuses on innovative automation techniques for industrial production. Due to our specific background in telematics we are able to transfer the current state-of-the-art in international research to efficient and advanced control solutions to our customer's tasks.

**brose**  
Technik für Automobile

**iABG**



WITTENSTEIN

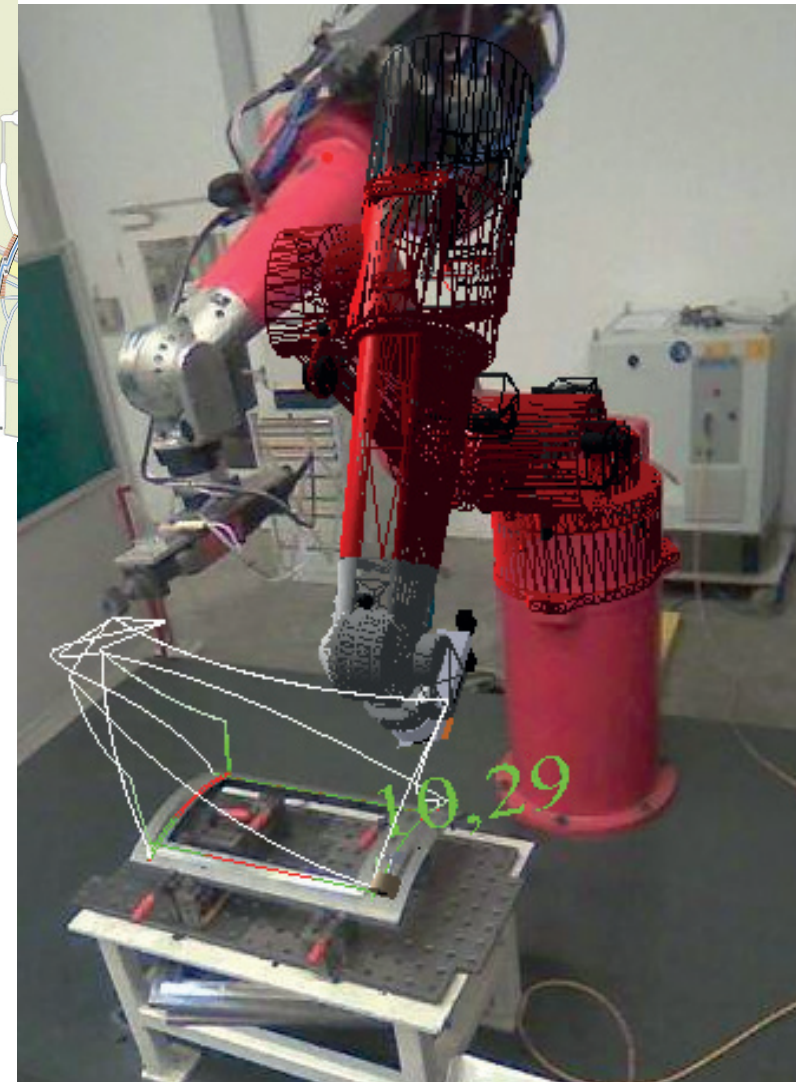
**MÖHRINGER**

**WFT P&G**

**KUKA** INDUSTRIES



## Smart Manufacturing and Adaptive Production



## Contact

The Center for Telematics (ZfT) transfers recent research results at the interdisciplinary combination of **Telecommunication, Automation and Informatics (= Telematics)** directly into solutions.

As our customer you have access to key technologies in the future oriented fields: Industry 4.0, Internet of Things, Digitalisation, Mobility, Tele-Medicine and Spacecraft Systems.

### Center for Telematics

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## Human-Robot Interaction

### Worker and Robot as Partners

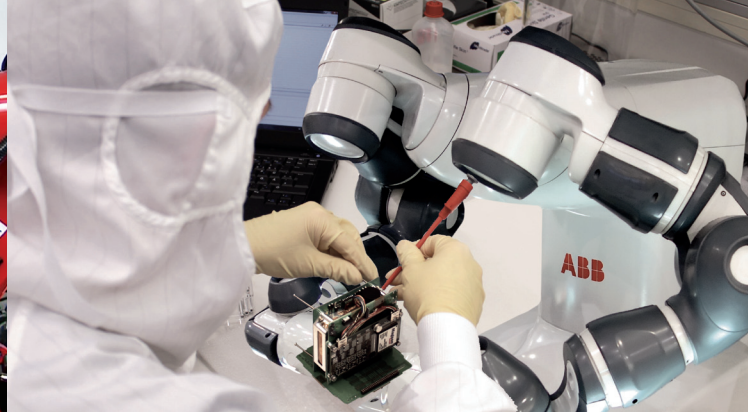
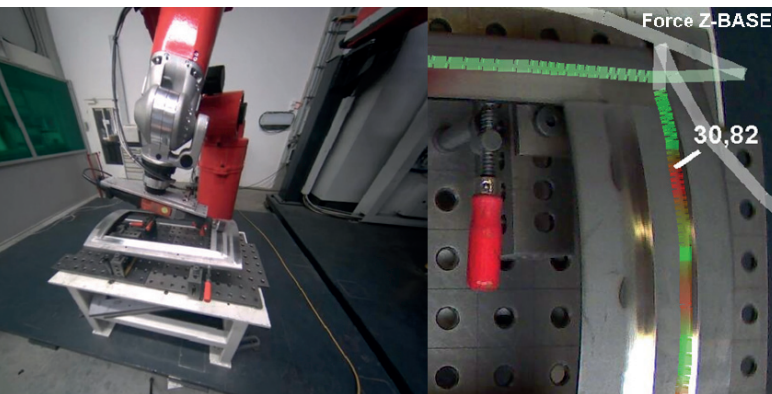
Industrial robots and workers need to share the same production environment to cooperate efficiently on the given tasks. Thus, both the carrying capacities and accuracies from the robot's side and the process experience of the worker are combined for highest productivity.

### Safety first

Highest safety requirements need to be realized to enable close cooperation between workers and robots. Examples of applied solutions are laser scanners, 3D-cameras and tactile skin covering the robots surfaces.

### Don't hesitate too long

The operator has to understand the robot's reactions intuitively. Here **Augmented Reality (AR)** methods allow the representation of complex data on a monitor or even direct projections into the work space.



## Tele-Maintenance

### Remote access diminishes costs

Tele-maintenance helps to minimize production downtimes and to avoid travel costs caused by service personal. The foundation includes remote sensor data acquisition and interactive control access. Based on this, tele-presence makes the service experts feel like standing at the industrial plant.

### Essential network security

Without appropriate security, tele-maintenance approaches would be too risky. For this purpose an individual combination of services tailors a specific communication software. The adaptive bandwidth management and security system (AMS) enables optimal performance.

### Use of mobile devices

In order to assist the worker in place, multiple functions like the robot control system, failure diagnosis support, communication and AR are integrated into one intelligent, mobile device.



## Industry 4.0 Demonstrator

### Hands-on for Industry 4.0

The ZfT Industry 4.0 Demonstrator applies adaptive, robust but simply to use system functions for industrial production. Of importance is high flexibility, fast integration capability due to modular components and the fulfillment of highest quality requirements.

### Flexible flow of materials

The vision of Industry 4.0 has the consequence that the whole production chain adapts to each individual product. Mobile transport robots increase flexibility of the material flow in industrial production. This way, more efficient logistic chains in the factory can be realized.

### Automated Testing

Automated testing procedures are integrated at all levels to monitor and check functionality and performance of the end product with high reliability and speed.

