

**ITK.** The Art of Digital Engineering.



# UNLOCK THE POWER OF ADVANCED ROBOTICS





## PUSHING THE BOUNDARIES OF POSSIBILITY WITH TECHNOLOGY

Turning complex robotic systems into simple solutions

Our roots in robotics run deep with nearly 30 years to our credit. Throughout these years, our passion for this tech never waned. Its power to improve people's quality of life and safety, lighten workloads and make services accessible to all remains an inspiration to us.

We always strive to develop solutions that – despite their great complexity and stringent standards for safety – are easy to understand and intuitive to use.

Our interdisciplinary team supports our customers as a reliable partner. Drawing on a deep well of experience, we make the most of robotics to enable a wide range of novel use cases and push the limits of what is possible. Get in touch with us about the possibilities in your field of application and secure decisive competitive advantages through the use of innovative robotics.



**Breaking ground for new robotics solution**

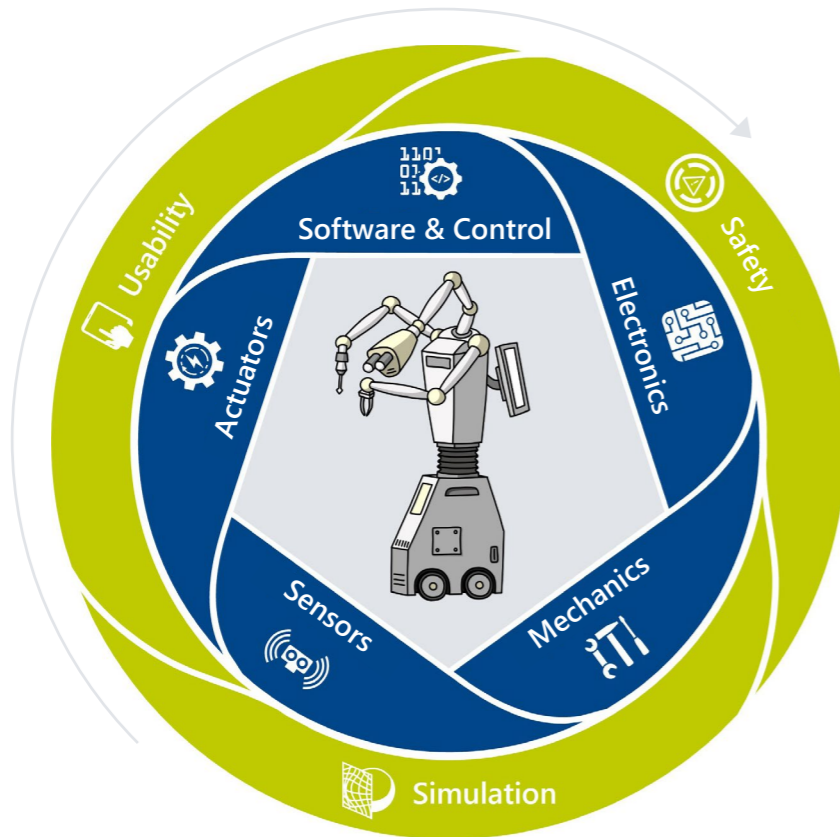


**Cope with high complexity**



**Technological gain from interdisciplinary teamwork**

## 360-degree system development



## ROBOTS BUILT WITH THE BIG PICTURE IN MIND

Seeing the system through a holistic, interdisciplinary lens

Experience has taught us the importance of considering robotic systems as a unified whole. This is the most efficient path to the best and safest solution. To do this, we have to understand the application, context and the robot's role while factoring the needs and objectives of all stakeholders into the equation. With our holistic grasp of robotics and interdisciplinary skills, we are able to design the perfect system for the given purpose. To this end, we

- Design systems and software architectures
- Define stakeholder and system requirements
- Practice human-centered design
- Develop safety and security concepts
- Conduct a feasibility analysis and virtual prototyping
- Employ model-based methods and tools
- Meet market-specific requirements and standards





# TAMING COMPLEXITY IN ROBOTICS

With state-of-the-art methods to a market-ready product

## Control systems



Safe, robust real-time control for use-case-specific systems

- Embedded and distributed systems
- Real-time operating systems and bus communication (e.g. QNX, RT-Linux, EtherCAT)
- Real-time software development
- Control strategy selection and implementation
- Sensor filtering and processing
- Safety components and protocols (e.g. FSoE)

## Software & algorithms



Design and implementation of sophisticated robotics software

- Software architecture and design
- Kinematics and dynamics
- Cartesian and force control
- Motion planning and control algorithms
- Telemanipulation and haptic feedback
- Human-robot collaboration
- Mapping and navigation for mobile robots, fleet management
- Implementation of application logic
- Robotics middleware, ROS

## Mechanics and electronics



Development of mechatronic systems and components

- From feasibility study to prototyping to mass production
- Integrated product development: Design for cost / manufacturing / serviceability / sustainability
- System dimensioning and optimization
- Consideration of obsolescence
- System identification, design verification
- EMC and climate chamber

## Mechanics

- Development of haptic input devices, manipulators, integrated sensor-actor systems
- Industrial design, housing
- Kinematics identification, workspace and load simulation
- EOL testing, test benches
- In-house workshop

## Electronics

- Circuit design and PCB layout
- Modular building blocks
- Bootloader, update strategies
- FPGA programming
- High-speed PCB design (USB3, Ethernet, DDR memory)
- Servo drives, dimensioning
- Power supply and battery management
- Electronics laboratory





# THE ROBOTICS ECOSYSTEM

Multi-layered development of tailor-made solutions

## Related technologies

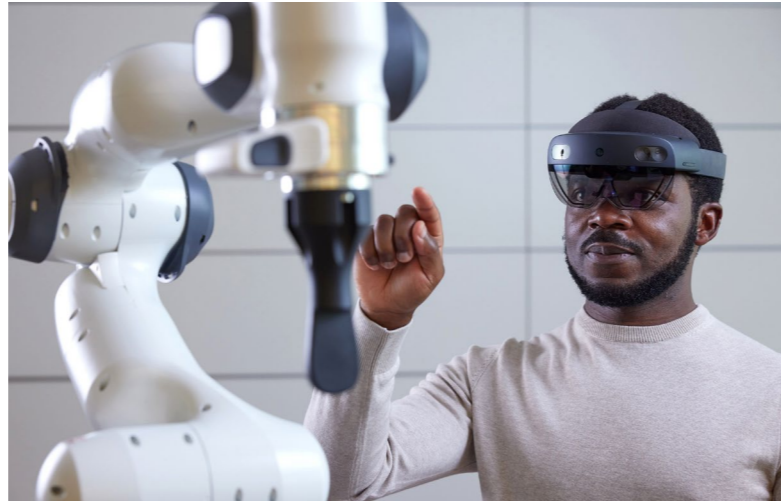


- Image processing, perception, cognition
- Artificial Intelligence
- User interfaces
- VR/AR for training, prototyping, service
- Video stream processing
- Connectivity and cyber security
- Remote maintenance and service diagnostics
- Data analytics

## Systems integration

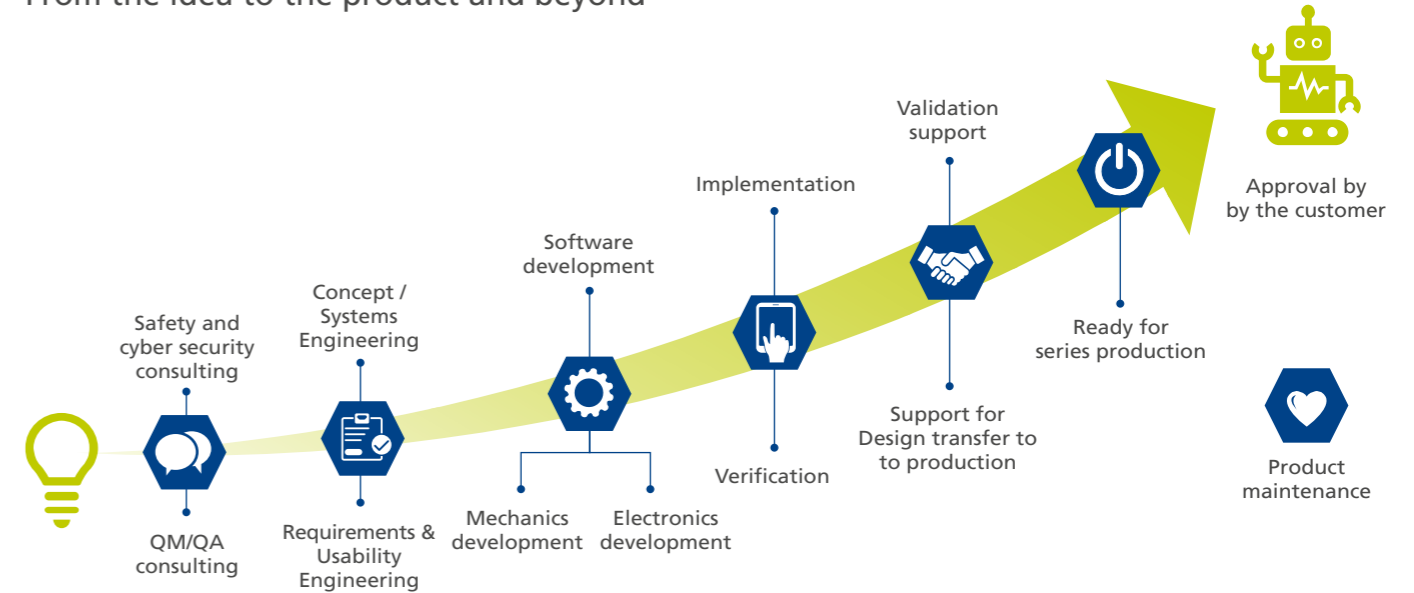


- Custom application development incorporating standard components
- Multi-vendor experience with industrial robots and cobots



# BRINGING YOUR VISION OF INTELLIGENT ROBOTICS TO LIFE

From the idea to the product and beyond

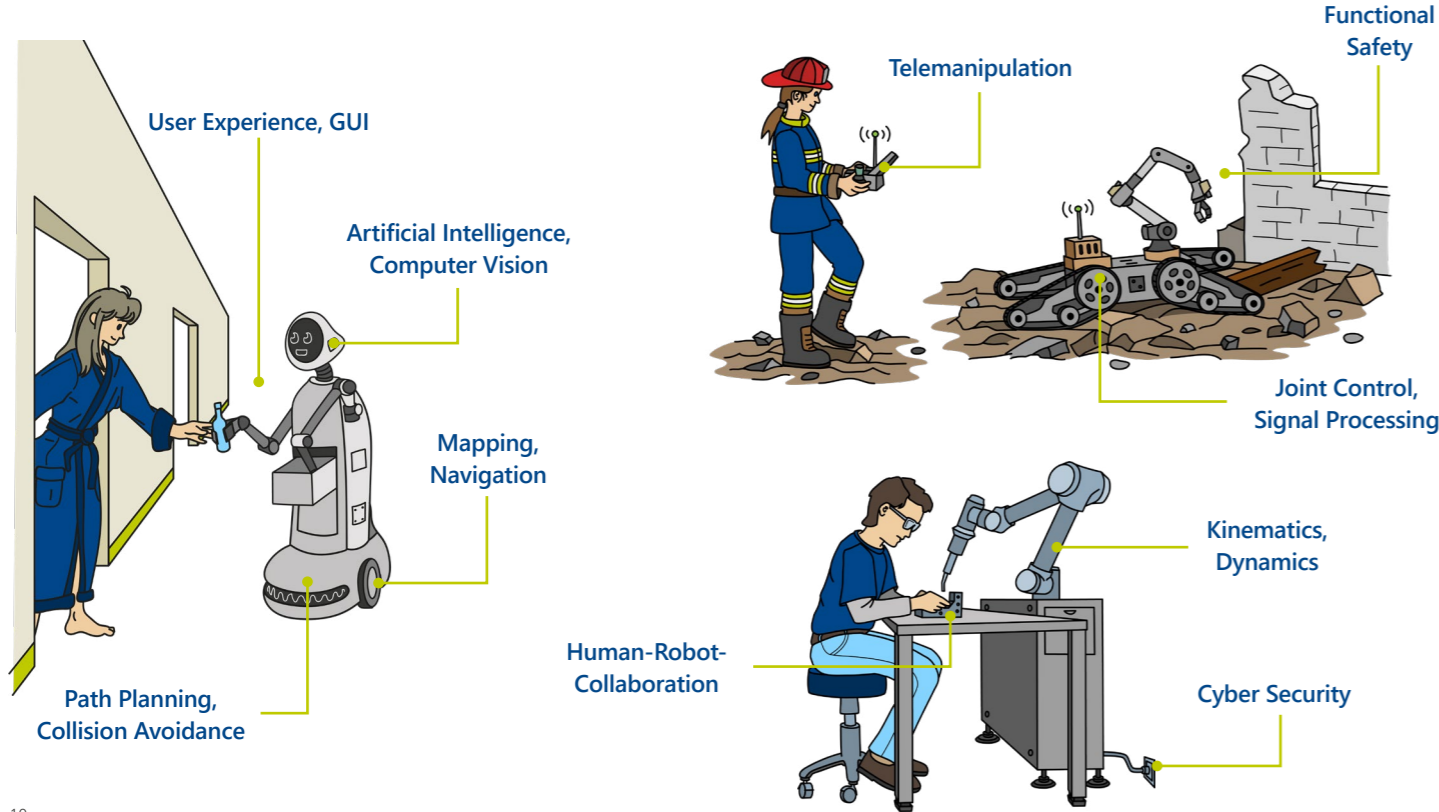


Whatever you may need, our support is yours for the asking. Count on us in all phases of product development, approval and maintenance. For example, we can assess your product idea in workshops, build prototypes or develop, document and verify software, hardware components and even entire systems in compliance with standards.



# IT'S ALL ABOUT YOUR USE CASE

Be it a service, special purpose or industrial robot



# MEDICAL ROBOTS: A PASSION OF OURS SINCE 1994

Developing solutions for tightly regulated healthcare use cases

- Penetrating insight into the medical systems industry  
Awareness of physicians and medical personnel's needs, integration of robots into clinic workflows
- ISO 14971-compliant risk management  
Experts on risk management and medical robots' functional safety
- Standards-compliant HW and SW development  
Documentation and verification
- Requirements engineering & process knowledge  
Siemens partner for Polarion
- V&V at unit/module/system level  
Certified CI/CD toolchain



## Quality Assurance

- MDR:2017, FDA regulatory affairs
- EN ISO 13485:2016-2021 QM system
- IEC 62366-1:2015-2020 usability engineering
- ISO 14971:2019 risk management
- IEC 62304:2006-2015 software lifecycle
- IEC 60601-1:2005-2020 basic safety for electrical medical devices
- IEC 80601-2-77:2019-2023 basic safety for surgical robotics
- IEC 80601-2-78:2020-2021 basic safety for rehabilitation robotics
- IEC 80001:2010 security
- IEC 61508:2010 safety



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**Founded in 1994 -**  
today ITK has branches throughout  
Germany and is represented  
internationally.

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