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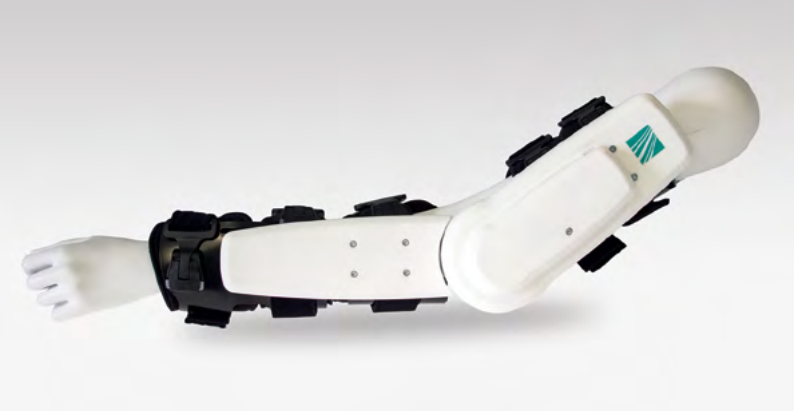
MANUFACTURING ENGINEERING AND AUTOMATION IPA

DRIVE SYSTEMS AND EXOSKELETONS



WHAT DRIVES US

Mobility is a basic human need. As the demographic change continues, this is increasingly becoming a focus of interest of science, politics and the economy. Employers, in particular, are taking more interest in keeping their workforce fit and healthy. One of the main reasons behind illness-related sick leave or a career change are disorders of the musculoskeletal system. These circumstances call for better technical support for humans in the future.

WHAT WE OFFER

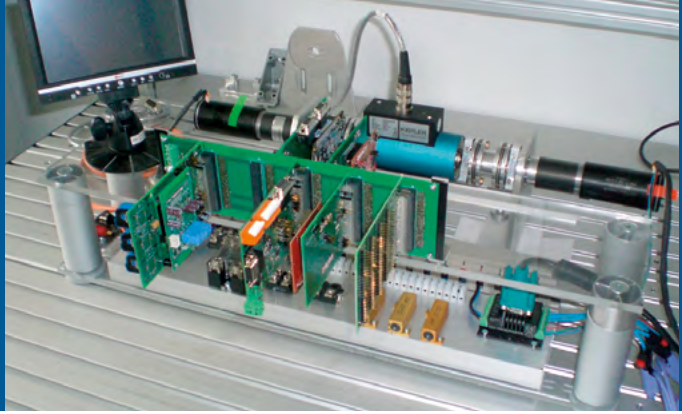
The group **Drive Systems and Exoskeletons** collaborates closely with companies to develop integrated technical assistive solutions. We start by investigating the movement that requires assistance, then draw up an appropriate concept and finally construct a functional prototype. Our interdisciplinary team is made up of specialists from electrical engineering, mechatronics, mechanical engineering, cybernetics and software engineering, thus ensuring that solutions are fit for the future. We develop innovative mechatronic systems for applications in industry, medical engineering, rehabilitation and trade. Our aim is to retain, restore and enhance human mobility using actively-driven technical systems while our development team is aided by experts within the department, specialized in orthopedics, ergonomics, physiotherapy and sports sciences.

OUR EXPERTISE

One of our strengths lies in developing **electromechanical drive systems**. We strive to achieve a balanced interaction between **electrical machines**, gears and control technology and the underlying electronic system, including communication interfaces for smart networking, in order to solve motion tasks – predominantly in close cooperation with humans.

Over the years, we have gained a wealth of experience in medical engineering. We have also acquired expertise in **embedded software**, serial bus systems and power electronics, as well as **in analog and digital signal electronics**. This qualifies us to develop actively-driven technical systems to enhance human mobility.

Our know-how in the field of **control technology** ranges from control devices for single drives, through adaptable actuators, right up to control architectures for complex multivariable systems.



For our solutions, we implement the following concepts:
– Physical models and simulation studies to guarantee a high degree of reliability
– Filters and observers to reduce the need for sensors
– Estimators and adaptive systems to improve accuracy and dynamics
– Multilayer control architectures to assure deterministic behavior and enhance user confidence
– Hardware-in-the-loop systems to speed up control design

Our skills in **design engineering** range from concept development, integrating actuators and sensors to building initial prototypes.

In the **simulation**, based on a given application scenario, real movement data are transferred to a multi-body human model, which is then put into operation coupled with the intended technical assistive solution. These simulations enable us to test and validate kinematics and motion control concepts in the early stages of development. We use a detailed musculoskeletal model of the human body to assess the ergonomic and physiological aspects of simulation results.

Drive Systems and Exoskeletons

YOUR ADVANTAGES

As a group of young, and experienced engineers, we help you to develop your products – starting with the idea through to the functional prototype. Thanks to our expertise and technical equipment in the form of a drive and exoskeleton laboratory, as well as our contacts in industry and science, we create innovative products when it comes to designing, developing, constructing and validating integrated mechatronic solutions to enhance human mobility.

We are ready for the execution of innovative projects and offer you the full development spectrum:
– Conceptualization and design
– Dimensioning and calculation
– Simulation and optimization
– Construction and prototyping
– Tests and measurements

We place great value in close cooperation with our customers, providing competent support with the development and implementation of your project:
– Scientifically substantiated
– Customer-oriented
– Product-specific and creative

We look forward to a pleasant cooperation with you.

CONTACT

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