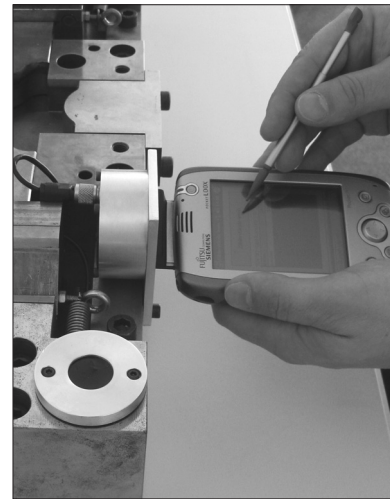
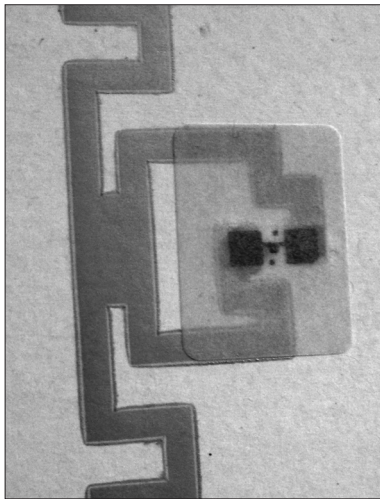


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## Consulting, Research & Development, and Training

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Production engineering services

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# The IPH

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We link production engineering to the manufacturing industry.

Since 1988, IPH – Institut fuer Integrierte Produktion Hannover (which literally translates into “Hanover institute of integrated production”), or IPH Hannover, has been providing production engineering services to the manufacturing industry. Key activities are consulting, research & development, and training. We continuously strive to advance and realize innovative ideas in the fields of process technology, production automation, and logistics. Throughout Europe, we are the sole research institution investigating large scale goods – such as airplanes, ships, and wind energy plants , e.g. – from an interbranch perspective.

As a mediator between science and industry, we work in interdisciplinary teams led by our three managing partners – professor Dr. Ludger Overmeyer, professor Dr. Peter Nyhuis, and professor Dr. Bernd-Arno Behrens (left to right). As a client, you and your business benefit from their longtime experience in the manufacturing industry and their research work at the University of Hanover, Germany.



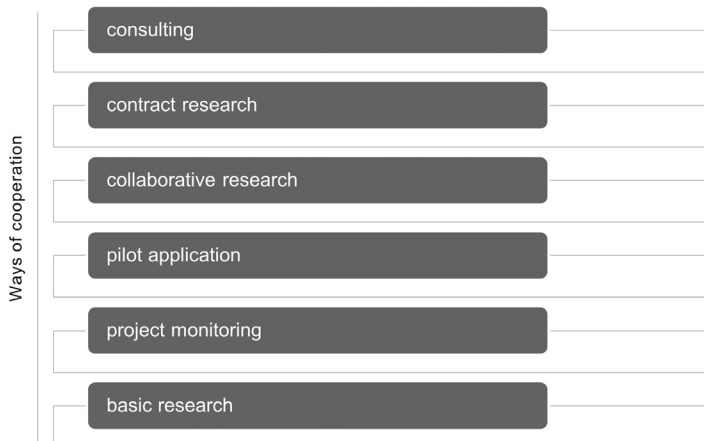
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# Research & Development and Consulting

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We provide practical research in the field of engineering and turn know-how into efficient solutions.

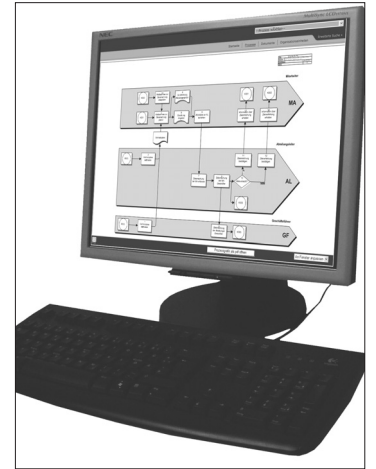
Continuous high-level research is the basis of our high-quality consulting services. Through research and developmental work, we steadily extend our knowledge of production engineering. Cooperating with other research facilities enables a manifold exchange and the establishment of new scientific approaches.



To manufacturing companies, we offer various ways of cooperation:

If you need a solution tailored to the individual needs of your company, we suggest our *consulting services*. You are interested in a particular research topic? We are glad to develop strategic innovations just for you (*contract research*). Companies of specific branches or supply chains often face the same problems. *Collaborative research* can help you and your partners to respond to challenges.

You want to be the first to benefit from new technologies about to hit the market? Our portfolio also includes *pilot applications*. If you wish to obtain information on new application-oriented developments on a regular basis, we suggest *project monitoring*. With little effort, you can also learn about tomorrow's technologies first: Join in our *basic research* to get the latest information about a particular research project.



Challenges faced by the production industry are manifold. Due to our three spheres of competence – logistics, production automation, and process technology – we are able to attend to a broad range of problems occurring in production engineering. Considering them from a holistic point of view, we are able to help you meet these challenges.

#### Interdisciplinary range of themes and services

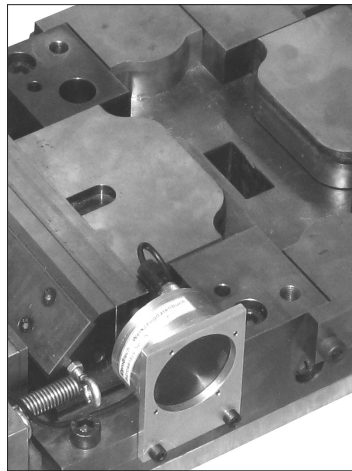
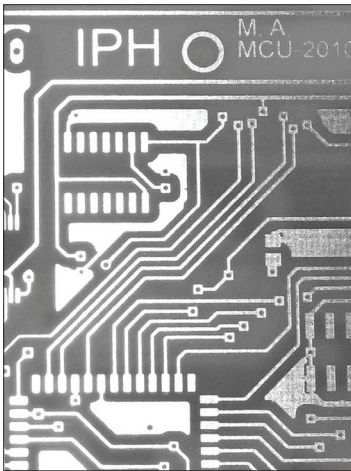
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An increasing number of small and medium-sized businesses (SMB) in the manufacturing industry are operating in decentralized production and logistics networks. Our logistics department conducts research on the interaction of these networks, focusing on the

- organization of production networks,
- decentralized regulation of production in such networks,
- secure flow of materials within these networks, as well as
- logistics efficiency, and
- economical use of resources.

Research efforts center on the increase of network efficiency. Amongst other factors, the regulation of costs and the economical use of resources are considered.

In addition to logistics, our research centers on production automation. An excellent way to increase efficiency in manufacturing is to automatize production processes. Hence, we strive to enhance existing knowledge and to find solutions for areas not yet automatized. Our aim is to enable manufacturing companies to realize automation in production both effectively and cost-efficiently.



In the field of production automation, we our focus is on

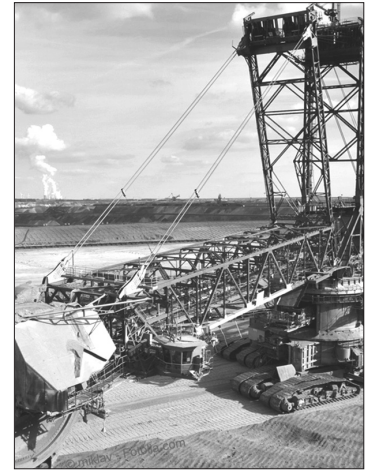
- distributed systems,
- wireless communication on production sites, and
- artificial intelligence.

With regard to process technology, we conduct research on advanced forming technologies. Emphasis is put on the further improvement of forging processes while reducing process chains and saving resources. Research efforts at IPH include e. g. flashless precision forging, warm forging, and the reduction of tool wear. Innovative pre-forming processes such as flashless and multi-directional forging and cross wedge rolling are also investigated. In addition to

- forging processes

research topics include

- hydro forming,
- hybrid forging (massive, sheet metal),
- process chain forming technology,
- multifunctional tools, and
- the cost-effectiveness of process chains.



## Large scale goods


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Our company's interdisciplinary focus is on large scale goods ('XXL goods'). The term does not only refer to particularly large-scale or heavy-weight devices, such as rotor blades of wind energy plants or engine components of utility and special-purpose vehicles. XXL goods also include complex products that are hard to construct due to their large number of single parts.



The development, production, and distribution of large scale goods are of great importance to Germany. Due to globalization, there is a steady increase in overall transport volume and demand for energy. Thus, throughout the world, the need for larger utility and special-purpose vehicles (e.g. container vessels) and technologies using renewable energies keeps growing. The manufacture of these products is carried out by both major industrial players and small and medium-sized businesses organized in regional networks.

Our aim is to optimize the entire life cycle of XXL goods. Through research and consulting, we strive to strengthen the key role of businesses in this particular sector. As an interbranch network for companies involved in the manufacturing of large scale goods, the working committee "Arbeitskreis XXL-Produkte" has been founded. It serves as a national forum for the professional exchange of ideas and experience, and provides companies with insights into the latest research findings.

 [www.xxl-produkte.net](http://www.xxl-produkte.net) (in German)

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# Training

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We qualify our clients and students.

In addition to consulting and research & development, training is another IPH key activity. We offer practical training based on recent technical and scientific standards and the expertise acquired through consulting projects.



On a regular basis, we organize practical training programs for middle and senior management. Great emphasis is put on linking theory to practical application. In our seminars we convey a high level of information within a short time period, thus developing the skills of attendees with utmost efficiency. Plant design, optimization of set-up time, and the use of RFID in production and logistics are just some of our topics.

To encourage a close dialog between businesses and research facilities, we run two working committees: “Arbeitskreis XXL-Produkte” addresses manufacturing companies producing large scale goods. “Arbeitskreis Werkzeug- und Formenbau” focuses on themes of the tool and mold industry.

Furthermore, the IPH takes responsibility for training and qualifying young researchers in engineering sciences. Besides the supervision of study or project papers and final theses, we offer internships and temporary assistance jobs as well as seminars and lectures to students.



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