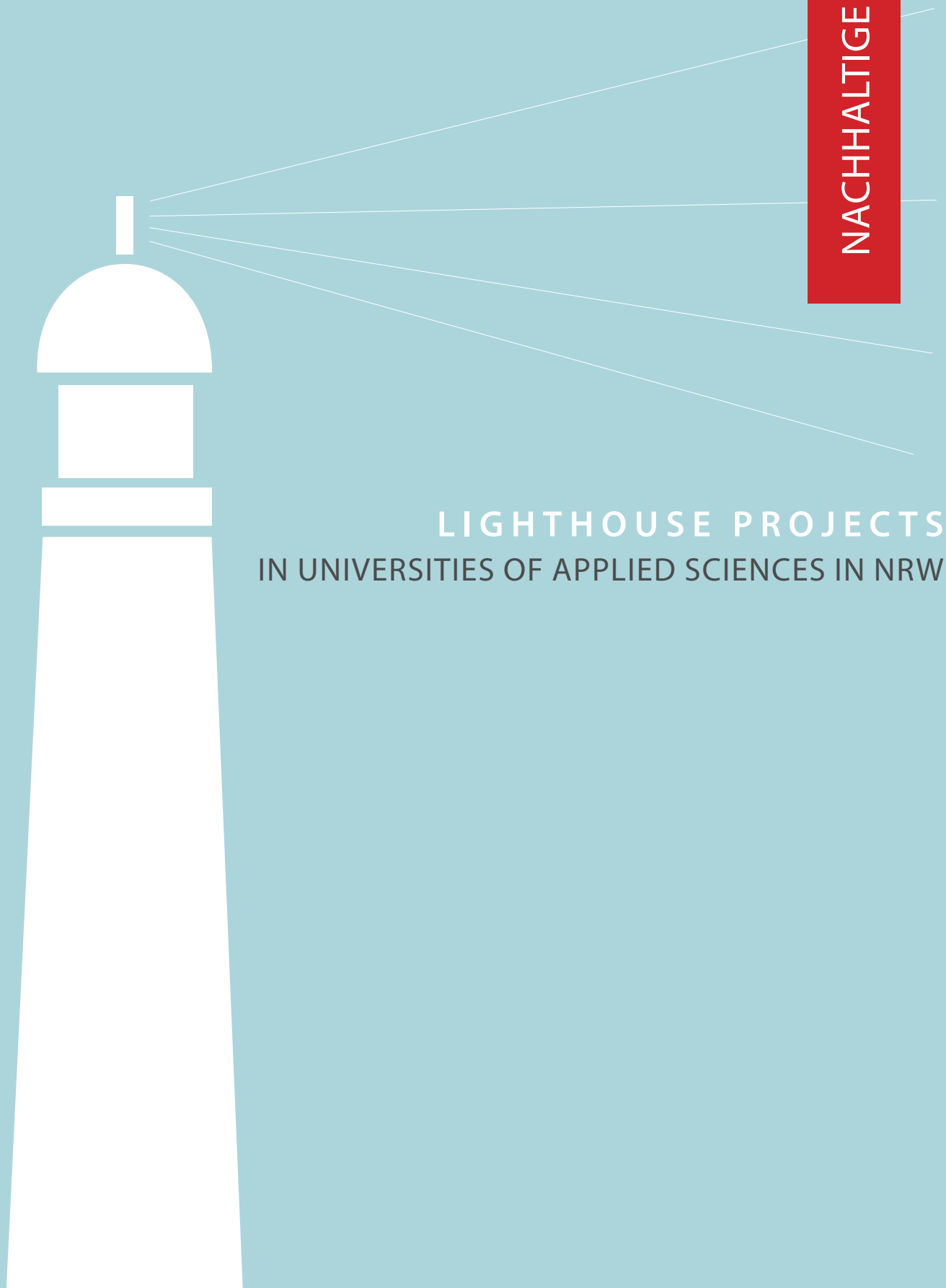
LEBENDIGE FORSCHUNG

NACHHALTIGE FORSCHUNG



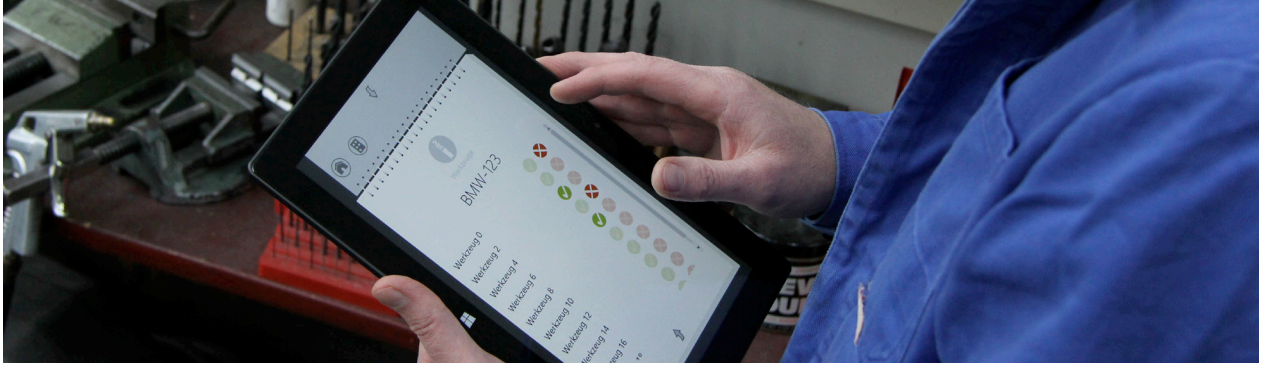
LIGHTHOUSE PROJECTS

IN UNIVERSITIES OF APPLIED SCIENCES IN NRW

CONTENTS

LIGHTHOUSE PROJECTS IN UNIVERSITIES OF APPLIED SCIENCES IN NRW

LEBENDIGE FORSCHUNG



PROJECT DESCRIPTION

KompUEterchen4KMU: Usability engineering network for mobile business software from SMEs for SMEs

To be without mobile devices such as smartphones and tablets on a daily basis has become unthinkable. These devices, along with the appropriate apps, are now even provided to employees by their companies. To gain success in the fast growing market for mobile business apps, software developers must to take into account the specific features of mobile software. Only then will the products have high usability. This presents a problem for small and medium-sized enterprises (SMEs): neither current approaches to software development nor usability engineering methods are suited to mobile systems for SMEs. The specifics of SMEs, such as limited resources, are not taken into account and practical templates and support is lacking.

The kompUEterchen4kMU project – part of an initiative sponsored by the German Federal Ministry of Economics and Technology on digitalisation for SMEs – is developing SME-based approaches to software development as well as establishing a network of usability expertise for mobile business software. The aim is to help SMEs remain competitive by disseminating usability engineering expertise.

COMPANY DESCRIPTIONS

m2c lab
The mobile media and communication lab (m2c lab) headed by Prof. Thomas Ritz at Aachen's University of Applied Sciences is involved in innovation for mobile and internet--based information systems. The m2c lab carries out publically funded projects and also offers SMEs advice on mobile software for businesses.

GRÜN Software AG
GRÜN Software AG is an Aachen-based software supplier for specialist sectors such as membership organisations and charities. Its GRÜN VEWA software processes membership and donations in Germany worth around one billion euros annually making GRÜN the leading supplier of software in Germany for this sector. The company is becoming increasingly involved in developing mobile applications.

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PROJECT DESCRIPTION

Ideas for the car of the future: Power from four motors

Energy efficiency and driving safety are the dominant issues within the car industry. Prof. Dr. Hermann Gebhard and Prof. Dr. Klaus Eden from the University of Applied Sciences and Arts in Dortmund are beating a new path. Four individually controlled electric motors are positioned directly at the wheels, delivering direct power transmission. They replace conventional powertrains made up of combustion engines, gearboxes, differentials and exhaust systems. The result is an innovative, electronically controlled drive system without the complexity of a mechanical system.

"The principle has already been used successfully in warehouse vehicles but not yet on road vehicles", said project head, Prof. Dr. Hermann Gebhard. This is what researchers from the university, in cooperation with the engineering firm of Creative Data AG, want to change. Their project is developing energy management systems as well as drive control units that synchronize the four drives. The project also aims to simplify the interfacing of electrical components. Two control units are being developed; one uses sensors to acquire actual motion data and to deliver speed data to each of the motors, the other is responsible for overall energy management. Furthermore, energy generated from braking is refed into the battery system.

This design of the drive system enables new types of stability programmes (ESP) to be experimented with and optimised. Until now, these could only be theoretically tested. A special feature of the new ESP systems includes braking as well as acceleration of each individual wheel. Creative Data AG is the business partner whose tasks include the chassis and suspension systems and all things associated with road worthiness.

COMPANY DESCRIPTION

Creative Data AG
Creative Data AG is a private company established in September 2001 by a small group of people. It has grown continuously since then and has overcome many hurdles to make a name for itself among its customers. The company offers developmental support services and integrated solutions for the engineering sector. More than 160 people are currently employed by Creative Data AG and its subsidiaries CD Services GmbH, CD projects GmbH and Creative Data Inc. The backbone of the company is made up of highly qualified engineers, technicians, IT specialists and economists with a range of expertise.

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PROJECT DESCRIPTION

Development of industrial dryers

Modern industrial dryer development is characterised by increasing technical demands and the need to keep investment and operating costs low. Many development projects involve new innovations that carry with them high technological risks. Against this background, computer-based developmental methods are being increasingly applied that are required to reliably predict drying efficiency and energy consumption.

Over recent years, the Fluid Mechanics Laboratory at Münster's University of Applied Sciences and Münstermann GmbH & Co. KG have been successfully working together on this topic in joint R&D projects. A direct consequence of the collaboration is a new type of strategic partnership.

The aim of the R&D partnership is to establish new developmental approaches for industrial drying systems based on computation fluid dynamics (CFD) and experimentation. Complex physical phenomena, such as ventilator performance, heating registers and fluid flow components, are examined under experimental conditions using, for example, laser measuring techniques, and then converted into mathematical models. These models are embedded into CFD to provide reliable output – even for complete systems – as well as computing times that make the use of CFD in development work economically viable. This enables the fast development of new, highly efficient generations of dryers.

The partners claim this provides increased planning security, quicker decision making processes, better knowledge transfer and therefore shorter development times and lower costs.

COMPANY DESCRIPTION

Münstermann – specialists for special needs
Bernd Münstermann GmbH & Co. KG is one of the leading manufacturers of industrial dryers, thermoprocessing equipment, complex material processing and high quality systems for dedusting, extraction and filtering. The products and services offered by Münstermann generally concern tailor-made systems for specific customers or applications.

The company has decades of experience in applications for a range of different industrial sectors. Its main customers include manufacturers of construction materials, offshore sea cabling producers, the aerated concrete, ceramics and refractory industries, steel and metal production, and automotive suppliers. They combine thermoprocessing, material processing, air purification and the control and automation technologies associated with these, and are therefore able to offer partial as well as complete system solutions. Production takes place in Germany at their site in Telgte.

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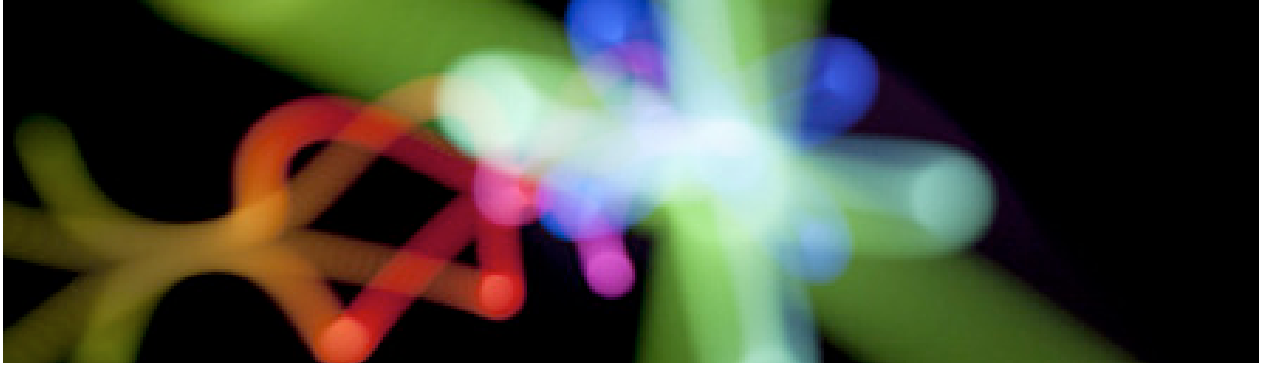

PROJECT DESCRIPTION

Teletherapy for post-stroke aphasia

Around 200,000 people in Germany suffer from a stroke each year. In the acute stage, 38% present speech disorders (aphasia); 18% then become chronic. Teletherapy offers aphasia sufferers an innovative opportunity to intensively train their communication skills independently while still under the supervision of a therapist. A web-based programme of treatment (Diatrain) has been developed that can be used to practice typical dialogues using structured video sequences.

A pilot study on five patients has already demonstrated the effectiveness of such video-based aphasia treatment. The aim is to further examine the effectiveness of Diatrain using a controlled group study. Special focus is given to improving general communication skills as well as to the acceptance of media-based training over conventional aphasia treatments. Quality of life issues for sufferers and support for relatives are also to be investigated.

The study covers a three week treatment phase and three control examinations. During the treatment phase, either teletherapy (Diatrain) or conventional aphasia treatment is to be offered. Test persons are allocated on a random basis. Cisco, the business partner, is to provide the video conferencing system for the teletherapy.

COMPANY DESCRIPTION

Cisco Systems Deutschland
Networks are now an important technological part of business and daily life. Cisco products use the internet protocol (IP) which forms the basis for these networks and has made the company the worldwide leader of network systems for the internet. The internet now already connects around 10 billion elements – but that is just one percent of what is possible. Cisco champions the continued networking of people, processes, data and things and speaks of an "Internet of Everything". The Internet of Everything will give businesses almost unlimited opportunities. The interplay of people, processes, data and things via the internet will enable businesses to optimise processes and to use resources more efficiently to gain competitive advantage. Cisco estimates the potential for businesses at 14.4 trillion US dollars. In 2012, Cisco had a turnover of 46.06 billion US dollars. The company currently has 66,639 employees worldwide, with John T. Chambers as its CEO and president since 1995.

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PROJECT DESCRIPTION

Differential diagnostics using microchip technology

A research project by the Hamm-Lippstadt University of Applied Sciences and the Dortmund-based company iX-factory GmbH aims to develop a microchip to enable fast and simple diagnosis of leukaemia from just a few drops of blood. Using "Lab-on-a-Chip" technology, specific antibodies will enable diagnoses of acute myeloid leukaemia (AML) and acute lymphatic leukaemia (ALL). The micro system under development will receive bone marrow and/or blood samples; antibodies then bind to the diseased cells and, following further processing, a signal is emitted. The main benefit over conventional laboratory analyses is a significant gain in time. The earlier a precise diagnosis can be made, the earlier treatment can begin against such an aggressive disease. The research project has been made possible by €175,000 of funding from the German Federal Ministry of Economics and Technology as part of its innovation programme for SMEs.

Characterisation of the surface molecules for the microchip is taking place at the university's laboratories. The project head, Prof. Dr. Lara Tickenbrock, is collaborating with Prof. Dr. Thomas Kirner and Dr. Antje Hascher on the development of the chip's "identification system". The microchip technology development is in the hands of the Dortmund-based company iX-factory GmbH. The product is being supported by Prof. Dr. med. Carsten Müller-Tidow who heads the department for leukaemia at Münster's University Clinic. The project runs until January 2015.

COMPANY DESCRIPTION

iX-factory GmbH
iX-factory GmbH is already an independent and leading provider of technical services for micro and nano technologies. These services include MEMS Foundry Service, its developmental and project work, prototype development and series manufacturing. The company was established in 2007 and is based in Dortmund's aspiring MNT cluster. iX-factory GmbH specialises in the manufacture of innovative and high quality silicone and glass MEMS/NEMS and MOEMS/NOEMS products. Its core areas of activity are Lab-on-a-Chip, MEMS structures, BioMEMS and applications for integrated optics. iX- factory GmbH advises its customers on the right source materials for the technology being used as well as on the glass and silicone structuring. The team is highly qualified and motivated and always has the success of its customers in mind.

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PROJECT DESCRIPTION

Steel worm: Copper and tin free worm gears with increased efficiency and power density – substituting bronze for steel

A total of 13 partners from industry and universities are involved in a research project to develop a new design of worm gear. The alternative gear is to have the benefits of a worm system, and to have bronze replaced by steel while still retaining the wear properties of bronze. The new combinations of material and surface treatment process should drastically reduce production costs while increasing efficiency.

Using steel instead of bronze in drive systems has clear advantages. Steel is produced in Germany removing the dependency on imports. A steel-to-steel gear pair is more efficient than a steel-to-bronze. And steel-to-steel pairings have greater mechanical resilience than bronze. However, the current state of technology does not permit the manufacture of highly resilient worm drives using steel-to-steel pairings.
The steel-worm project follows the high-tech strategy of increasing the competitiveness of the German economy. It takes an innovative holistic approach to value creation and the use of worm drives. The required expertise is obtained from partners in a range of different industrial sectors and universities. If the project is a success, savings on capital costs, the securing of jobs in high-wage Germany and a reduction in energy consumption can be expected across a range of sectors.

COMPANY DESCRIPTION

Bonfiglioli Vectron GmbH
With annual volumes exceeding two million drives, motors and frequency inverters, Bonfiglioli is one of the world's leading manufacturers of components for drive technology. Bonfiglioli Vectron GmbH is a subsidiary of Bonfiglioli Deutschland GmbH and part of the Bonfiglioli Group. Bonfiglioli has production sites in Germany and Italy. Its headquarters for the advanced development of drives is in Krefeld, Germany. Bonfiglioli is a member of the German Research Association for Power Transmission Engineering FVA, underlining its research credentials. As an internationally operating company, it has also established itself as a major supplier of systems focusing on the production of gear and drive systems with an annual turnover of around €650 million and employing some 2,500 staff. A total of 300 work in Germany with 130 of these at the Krefeld site.

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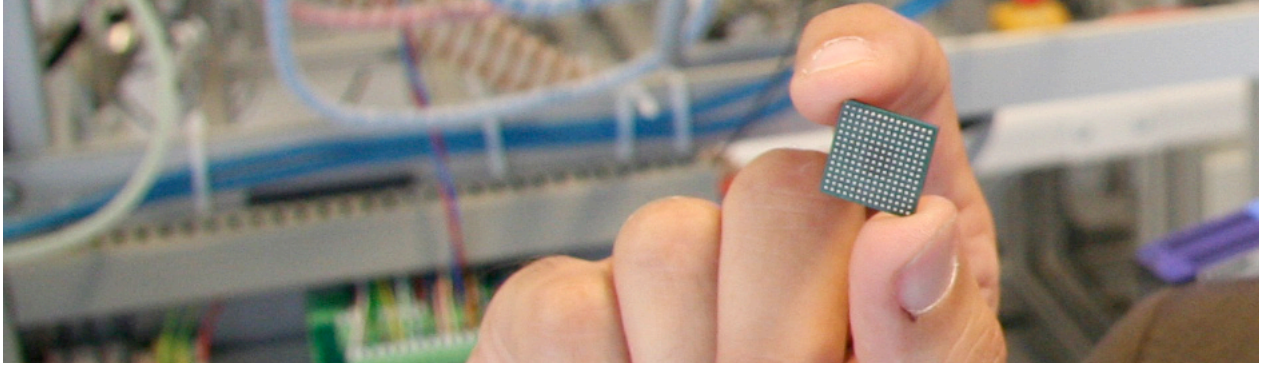

PROJECT DESCRIPTION

Tiger chip: High-tech made in Ostwestfalen-Lippe

The Ostwestfalen-Lippe University's Institute for Industrial IT (inIT) and the Fraunhofer Application Center for Industrial Automation (IOSB-INA) have jointly developed a technological milestone: the Tiger chip. The silicone chip holds a complete computer with 30 million transistors on an area spanning just 15mm by 15mm. It enables large volumes of data to be transferred within fractions of seconds between machines, complex systems and the internet. This makes automation technology very flexible.

The clients for the €6 million project were Phoenix Contact, the number 1 in electronic connector technology, and the Nuremberg Siemens company, the world's number 1 for industrial automation. The companies use the Tiger chip themselves which is freely available on the market.

The vision of both research institutes of an internet for machines where information is available at any place, any time and at the required quality has been brought closer by the chip. It has created a basis to create transformable and reconfigurable production systems that can respond better to the changing needs of customers and fluctuating levels of demand.

COMPANY DESCRIPTIONS

Phoenix Contact
The company's headquarters are in Blomberg (Ostwestfalen-Lippe). It has developed into a multinational company since its founding in 1923. Five German production sites and seven international manufacturing facilities make up the company's production network.
Phoenix Contact operates in five business areas: industrial connector technology, device connection systems, surge suppression, signal conditioning, and automation technology. In 2014 the company employed some 14,000 personnel. Around 80 agencies manage domestic sales within Germany while global sales are carried out by a network of 50 subsidiary companies and around 30 European and overseas agencies.

Siemens
Siemens is an integrated technology company with four main activities: energy, medical technology, industry, and infrastructure and cities. It has representations in 190 countries and it's one of the world's largest companies for electrical engineering and electronics.

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PROJECT DESCRIPTION

Automotive expertise in South Westphalia

The Automotive Center Südwestfalen (ACS) in Attendorn and the Vehicle Electronics Centre of Excellence (KFE) in Lippstadt, South Westphalia are two pioneering and future-oriented platforms for research & development in the automotive sector. The platform enables close collaboration between companies and universities. The automotive supply industry is one of South Westphalia's most important economic sectors and employs more than 40,000 personnel. The challenge facing companies is for vehicle manufacturers to increase involvement of their suppliers at the pre-development stage of production so that they take on more of the risks associated with new developments. Industry and academia is to open up new forms of collaboration via even closer integration. This means products for the next-generation of vehicles are to be developed near to where they are used. This will also secure future jobs in the South Westphalia region. Both centres are joint ventures involving the automotive supply industry, universities and regional government. They were set up in 2011 as part of the "Regionale 2013" structural development programme and funded by the NRW state government, the EU and other stakeholders. These stakeholders include regional companies, the South Westphalia University of Applied Sciences, University of Siegen, and Hamm-Lippstadt University of Applied Sciences.

COMPANY DESCRIPTIONS

ACS – Automotive Center Südwestfalen GmbH
ACS in Attendorn provides developmental support for lightweight construction in the automotive manufacturing sector. The company provides state-of the-art infrastructure, equipment, software and specialist personnel for pre-production projects, and specialises in bodywork and chassis systems as well as efficient production processes for metal, plastic and hybrid material combinations. In conjunction with both the South Westphalia University of Applied Sciences and the other universities, predominantly small- and medium-sized companies are able to undertake projects on the cost-efficient production of lightweight automotive parts and thereby meet the demands specific to electromobility.

KFE – Fahrzeug Elektronik GmbH
KFE in Lippstadt focuses its activities primarily on electromobility and in particular research into components and systems for hybrid and electric vehicles. Its development work covers hybrid concepts for electric vehicles including alternative versions of battery and fuel-cell technology. One element common to all these versions is the electrical drive system which requires high-voltage; and high-voltage systems require new types of solutions. At KFE, all areas of innovation related to electromobility are catered for under one roof. Its laboratories are fully equipped to deal with anything associated with electric vehicles.

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PROJECT DESCRIPTION

Secure eMobility (SecMobil)

Electromobility is heavily reliant on information and communications technology systems (ICT) so modern IT security is increasingly becoming a key general purpose technology. In electromobility's next developmental phase, all those involved will want systems that can be trusted. From an economic perspective, IT security will have to be closely linked to business models and subjected to legal scrutiny. The current project therefore offers not only the piloting of crucial security technologies, but also the development of new business models whose long-term stability is assured by comprehensive IT security. The project is to develop the following technologies which will open up the market potential of secure electromobility:

- Technologies that provide reliable and secure power supplies
- Basic in-vehicle security technologies that provide additional services (such as function enabling, application (app) store, identification using the new personal ID cards and software updates) to enable new business models
- Basic security technologies for infrastructure and functions to pilot, for example, identity management and accounting procedures between different domains

A special feature of SecMobil is a holistic approach to IT security. It addresses all levels of the system, from energy capture through to cloud networking, with both technical and legal aspects being considered. The Westphalian University of Applied Sciences Gelsenkirchen Bocholt is partnered by the Institute for Internet Security if(is), with if(is) being responsible for developing the security framework (www.secmobil.com). if(is) is involved in a wide range of internet security topics and has established itself as a global research institute. Its fields include:
early-warning internet systems, trusted computing, identity management (new personal identity card, federation concepts, trust models, etc.), email security, "Security for Smart Car, Smart Grid, Smart Traffic, Smart Home" (security requirements for the Internet of Things and its Smart Objects), web-service security, and IT security in distributed systems.

COMPANY DESCRIPTIONS

ESCRYPT GmbH – Embedded Security
ESCRYPT – Embedded Security is the world's leading system supplier for embedded security. It possesses extensive expertise in embedded security and is familiar with all relevant sectors of the industry. The company provides a range of services from security product consultation and manufacture through to systems tailored to the needs of specific industries. ESCRYPT is a subsidiary of ETAS GmbH, a wholly-owned subsidiary of the Bosch Group.

Daimler AG
Daimler AG is one of the most successful automotive companies in the world. Its activities cover Mercedes-Benz Cars, Daimler Trucks, Mercedes-Benz Vans, Daimler Buses and Daimler Financial Services making it one of the largest producers of premium vehicles and the world's largest commercial vehicle producer. In the field of alternative drive development, Daimler is the only vehicle manufacturer to invest in hybrid as well as in electric and fuel-cell engines with the goal of realising sustainable emission-free driving. The IT security group of the Research & Development unit at Daimler AG boasts wide-ranging experience and expertise in all aspects of IT security. This includes in-vehicle V2X security structures and reference implementations for test sites as well as project management.

smartlab Innovationsgesellschaft mbH
Sharing ideas, pooling resources, experiencing the future: smartlab Innovationsgesellschaft, a company owned by the municipal utilities of Aachen, Duisburg and Osnabrück, is bringing green electricity to our roads via its initiative ladenetz.de.
„ladenetz.de – experience the future" is a joint venture set up by the municipal utilities and dedicated to introducing, developing and promoting electromobility. Local energy providers can join the ladenetz.de initiative as partners to gain cost-effective and future-oriented access to the electromobility business segment. Twenty-eight municipal utilities from Sylt to Munich are already part of the ladenetz.de brand. ladenetz.de uses a common IT system to offer easy and customer-friendly use of all charging stations owned by partner municipal utilities. Wherever municipal utility customers recharge their electric vehicles, their own municipal utility remains their official contact partner and power supplier. smartlab is continually expanding cross-border electromobility via its e-clearing.net initiative.

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PROJECT DESCRIPTION

Inclusive Quality of Life (LEQUI): Innovative assisted living concepts for older people with disabilities

The number of older people with mental disabilities is set to rise significantly in the future. This demographic trend coincides with a shift in support for people with disabilities, a shift associated with inclusion and self-determination. More and more people with mental disabilities are staying in their own homes well into old age and want to determine their own retirement with home care support. Providers of care for the disabled, senior citizen employment and local authorities therefore need to be prepared. The objective of the LEQUI project – financed by the German Federal Ministry of Education and Research (BMBF) and jointly carried out by the katHO NRW (Catholic University of Applied Sciences of North Rhine-Westphalia) and the Landschaftsverband Westfalen-Lippe (Regional Association of Westphalia-Lippe) – was to develop the foundations for living and support services for people with disabilities as a response to the demographic shift and the principles of inclusion and self-determination mentioned above. Researchers first predicted how the demographic shift would affect adults with disabilities, and then determined the needs of this ageing social group. Their recommendations show how home care services can work flexibly alongside different support systems and how older people with disabilities can be helped to lead a self-determined life in their own homes. Particular focus is given here to the responsibilities of health care services as well as to maintaining informal, personal social relationships in old age. Partners and children are often not around so contact to neighbours or friends, for example, is vital for quality of life.

COMPANY DESCRIPTION

The Catholic University of Applied Sciences of North Rhine-Westphalia (KatHO) specialises in vocational training and applied research and focuses on personal and professional approaches based on the Christian world view. With Campuses in Aachen, Cologne, Münster and Paderborn, it is Germany's largest church-supported private university with state certification. It was founded in 1971 by the five Catholic dioceses of North Rhine-Westphalia and is financed in large part by the state of North Rhine-Westphalia. The Catholic University of Applied Sciences provides a personal setting in which approximately 4,500 students can study. Around 100 professors and 240 lecturers impart knowledge, expertise and methods in the fields of social services, health science and theology. The University has an important research role in these fields, developing solutions and putting its research findings into practice. It specialises in nursing, substance abuse prevention, health, social psychiatry, gender, transculturalism, ageing and disability.

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