Log*Dynamics* News May 2016

Prof. Dr. Till Becker receives a grant by German Research Foundation DFG

The German Research Foundation (DFG) has selected a project application of the 'Production Systems and Logistic Systems' group of Prof. Dr. Till Becker for funding. The project entitled 'Stochastic Complex Networks as Forecasting and Causal Model for the Dynamic Development of Logistic Systems' is scheduled for three years and aims at anticipating structural changes in supply chains and material flow networks. 'The distinct feature of the pursued approach is the aim to achieve good forecasts with sparse data. We want to predict likely changes in networks by applying statistic methods solely to the observable network topology' says Professor Becker.

The 2014 established team at the Bremer Institut für Produktion und Logistik (BIBA) and the Department of Production Engineering is supported by the Excellence Initiative and focuses on the investigation of topology and dynamics of manufacturing systems. Companies that are interested in participating in field tests of the forecasting approaches are invited to get in touch with the research group.

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Foto: Uni Bremen/Kai Uwe Bohn

Projects

BIBA Research Division IPS Started Brazilian-German Cooperation Project AdaptiveSBO

The research division 'Intelligent Production and Logistics Systems' (IPS), headed by Prof. Dr.-Ing. Michael Freitag at the BIBA – Bremer Institut für Produktion und Logistik GmbH started a German-Brazilian cooperation project in April 2016. Within the Brazilian-German Collaborative Research Initiative on Manufacturing Technology (BRAGECRIM), the project AdaptiveSBO – 'An adaptive simulation-based optimisation approach for the scheduling and control of dynamic manufacturing systems' is funded by the German Research Foundation (DFG). The central aim of the project is the development of a simulation-based optimisation method for the scheduling and control of dynamic job shop manufacturing systems. The method will be cooperatively developed by the BIBA in Germany and the research group of Prof. Dr.-Ing. Enzo Morosini Frazzon at the Industrial and Systems Engineering Department of the Federal University of Santa Catarina, Florianópolis in Brazil. Moreover, the developed method will

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be evaluated by means of an application to the job shop system of a Brazilian producer of mechanical parts.

The traditional approach of simulation-based optimisation is suitable for solving complex, stochastic scheduling problems. Within the project, this approach will be extended to additionally incorporate the dynamics of job shops, so that scheduling decisions and the configuration of the shop floor control can be optimised with respect to the current system state. The approach bases on the development of an iterative optimisation algorithm allowing changes of the objective function during the optimisation.

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Startup ‘DiPlant‘ Brings German and Indian Manufacturer together via an Internet Platform

The aspiring entrepreneurs Padmaraj Pattanashetti and Sören Brockmann have received an EXIST- Start-up grant for their idea to use an Internet platform for initiating international business.

By means of the web-based platform specifically designed for manufacturing companies, first with a focus on Germany and India, relevant information will be newly prepared and thus the identification of potential production sites much more simplified. For this purpose, an intelligent search and matching algorithm was developed, which allows not only a semantic search, also a role-based ranking of search results. Furthermore, the Internet platform has a special dialog module, which systematically structures a simple contact request option, further requests and creation of quotations. This greatly accelerates the business processes. In addition, there is the option to perform virtual factory tours via the Internet in a three-dimensional environment and thereby avoid costly business trips, for example, to India. The extensive search for a suitable supplier will belong to the past. German companies, which want to source casting components from India, are currently sought for pilot testing. The young entrepreneurs are supported by the BIBA - Bremen Institute for Production and Logistics at the University of Bremen and accompanied by Prof. Dr. Till Becker and Dr.-Ing. Michael Lütjen of BIBA.

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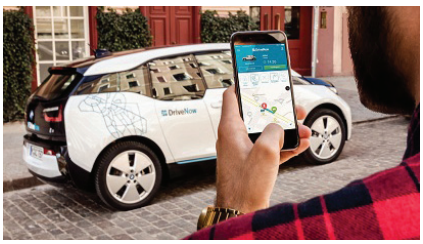
Research for City of the Future: Scientists from Bremen Involved in European Research Project



IT systems can observe traffic flows and fine dust pollution as well as control traffic lights, snow shoveling services and power supply. Moreover, they can guarantee safe ways to school and optimized waste disposal as well as inform about available parking spaces or e-car charging stations. In the City of the Future, these IT systems, which already ease our lifes nowadays, have to collaborate together. A European project with 22 partners from 10 countries should establishthe basics for City of the Future. The BIBA – Bremer Institut für Produktion und Logistik of the University of Bremen is one of these partners.

The joint project is called bIoTope – ‘building an IoT open innovation ecosystem for connected smart objects‘. It aims at developing an open Internet-of-

Internet
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Things (IoT) Ecosystem in order to include intelligent objects universally and to connect the countless and still isolated working networks and systems. Life in the City of the Future should be greener, saver and easier, is the vision of bIoTope as also declared as the main goal of the EU. Therefore the European Commission supports this project under the scope of Horizon 2020 programme.

For sustainable development of IoT projects like bIoTope, the BIBA has founded together with the University of Bremen and its strategic partner Holonix (amongst others) the iotfablab, a fabrication laboratory for IoT components. iotfablab should assist IoT projects and ease access to new technologies for small and medium-sized companies. In addition to this network, the worldwide operating standardization company 'The Open Group', in which BIBA Institute participates, supports this EU-joint project. It is considered that the global standardization as an essential cornerstone for the use of IoT and for the realization of visions like the one from bIoTope.

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Photo: BMW AG

DETHIS Project to Increase Innovative Capability in Small and Medium-sized Companies

In the next three years, scientist from the University of Bremen and six other partners from research and the industry will work on the research project 'DETHIS – Design Thinking for Industrial Services'. The joint project aims at increasing the innovation capability of small and medium-sized firms. The focus is particularly on companies that offer services in the industrial sector. Especially adapted to the innovation of industrial services, a Design-Thinking-Approach and a supporting online platform will be developed, tested and evaluated. In the course of the project, the University of Bremen's tea, led by Prof. Jens Pöppelbuß explores how service innovation processes in practice can be improved by the gradual introduction and testing of methods from the adapted Design-Thinking-Methodology Toolbox as well as using the DETHIS platform.

Besides the University of Bremen, project partners are: the Technical University of Braunschweig, Jacobs University Bremen gGmbH, the University of Duisburg-Essen and the companies HPKJ Hydraulik-Pneumatik-Kontor Jade GmbH, Kothes! Technische Kommunikation GmbH & Co. KG and Virtimo AG. The project is funded by the Federal Ministry of Education and Research (BMBF) with about 1.5 million Euro. The coordinating institution is the German Aerospace Center (DLR).

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German-Chinese Joint Project DaBrEM – Innovative Mobility Concepts for the City of the Future

Efficient, technologically advanced and green cities need sustainable city and traffic planning. In order to test innovative mobility concepts in urban areas on the basis of an extensive data collection, the Robotics Innovation Center of the German Research Center for Artificial Intelligence (DFKI) and the Fraunhofer Institute for Manufacturing Technology and Advanced Materials (IFAM) cooperated with Chinese partners in the joint project DaBrEM (Dalian – Bremen Elektromoblität).

DaBrEM arose in the scope of the 'Modellregion Elektromobilität' Bremen/Oldenburg, which was started in 2009 by the Federal Government within the framework of national development plan of electric mobility and was supported by the Federal Ministry of Transport and Digital Infrastructure (BMVI). The close cooperation with Bremen's Chinese partner city Dalian and an extensive research data exchange with Chinese partners were an integral part of DaBrEM. Whereas the researchers from Bremen especially took an interest in data concerning user's behavior, Chinese partners particularly explored technical data relating to the drive and the energy supply. The project partners not only exchanged their research data, but also their experiences regarding the method of data collection.

The DFKI researchers integrated semi-autonomous features in four conventional electric vehicles to test the innovative concepts and technologies of electric vehicles. This allowed an active track guidance, where several vehicles can drive automatically together one after another without deviating from the track. For example, these so-called 'Roadtrains' could make Carsharing more efficient and in line with demand. The achieved results of DaBrEM can help to solve traffic-wise problems and challenges and they can be important for sustainable city and traffic planning.

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Photo: EO smart connecting car 2 (DFKI GmbH/Timo Birnschein)

ISL Project NOTIERT Successfully Completed

Temperature-controlled transports are essential in many industries and guarantee proper conditions of transported goods. In the actively temperature-controlled area, certain containers or even trailers are powered by electrical energy to maintain the required temperature range independent of external influences. In the passively temperature-controlled area only thermally isolated containers are used. The developed technical solution allows steady recording and almost real-time evaluation of measured values on road vehicles, whereby the type of recorded data can be chosen freely. While today the cargo hold temperature is only captured in actively managed transports, the newly developed system, for example, makes it possible to additionally record air humidity and mechanical hits on the level of transported goods in passively managed transports. In principle, the basic system allows an extension of various, application-specific sensors.

In the project ‘Standards for sensor-based data capturing systems within temperature-controlled transports‘ (NOTIERT), funded by the Federal Ministry of Economics from September 2014 to April 2016, tests and expert discussions took place to validate the norm standards. The norm standard is a fundamental step for a transfer into a DIN-standard. It has been finished successfully on the basis of the achieved findings and validation by partners from the industry. During the final event, held on the 28th of April 2016, all achieved results were explained and discussed. The NOTIERT project was lead by the Institut für Distributions- und Handelslogistik (IDH). Partners of the project include Institute of Shipping Economics and Logistics (ISL), Brehmer GmbH & Co. KG, scemtec Sensor Technology GmbH as well associated partners from the industry.

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Tool for Production Planning and Control in Small and Medium-Sized Companies

Constantly changing order situations and new product variations, deadline and cost pressure – this extremely challenges small and medium-sized companies (KMU) in particular. When they are also involved into complex production networks, as suppliers and contract manufacturers, modern production planning and control (PPS) will be needed. A tool, being currently developed by researchers at BIBA - Bremer Institut für Produktion und Logistik of the University of Bremen, is intended to help KMU finding suitable methods for each case in the future.

The ‘Decision Tool for adaptive design of PPS-methods for contract manufacturers in dynamic order networks in the aerospace industry‘ (JobNet 4.0) is a two-year project, funded by the German Ministry of Education and Research (BMBF) under the KMU-Innovativ programme framework. Within this initiative, the BMBF targets to promote participation of small companies in such important research fields of the future, like Industry 4.0. The JobNet 4.0 developed tool is designed for the aerospace industry, however it should be also modifiable for other industries.

With the JobNet 4.0-Tool production planners, KMU can flexibly choose the right PPS-methods depending on each dynamic order situation. The goal of this project is to develop a compatible tool, which can be quickly integrated into processes of production planning and control as well as help decreasing stocks and lead times and improving delivery reliability.

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Photo: AIRBUS

Cooperation Agreement between University of Bremen and Universities in Kiew, Odessa and Uman

The partnership between Germany and Ukraine in research and technology gains in importance due to recent political developments. For this reason the project German-Ukrainian Master Program in Logistics (GUMLog) was initiated and has started beginning 2016. The project aims to develop master programmes focussed in logistics at three Ukrainian universities in Kiew, Odessa and Uman. The four-year project is supported by the DAAD with 200.000 Euro under the framework of funding program 'Subject-related Partnership with Universities in Developing Countries'. Dr. Irina Dovbischuk and Prof. Hans-Dietrich Haasis from the Workgroup of Maritime Business and Logistics represent this project.

A cooperation between the universities of Kiew and Odessa and the University of Bremen already has been developed for more than ten years. With the DAAD-support, existing activities such as exchange of students, doctoral candidates, Post-Docs and lecturers can be developed further. The project goal is a mutual development of curricula and establishment of a master program in logistics, on the basis of a very high technological stage of development in transport and logistics. Through this project, it envisages a long-term German-Ukrainian network of interdisciplinary experts for solving transport and logistics challenges. The project results should – in the long term – represent a contribution to a sustainable development in the Ukraine. It is encouraged especially young researchers to develop new knowledge in logistics. Therefore, half of the exchange is intended for young people aged below 35.

In April the Kick-off Meeting and a workshop was held, where the project consortium discussed of current situation and future prospects of educational opportunities in Ukraine. Within this occasion, the ukrainian guests also attended some lectures and took part in an excursion to bremenports GmbH & Co. KG.

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It was a Luck to Get a Place

The International Graduate School for Dynamics in Logistics (IGS) is partner of three Erasmus Mundus mobility projects: cLINK, FUSION and gLINK. FUSION and gLINK offer scholarships for research and explorative learning in Bremen as well as for staying at one of the Asian partner universities. Goal of the projects is to generate a sustainable research and education network. Therefore, it is helpful to experience the actual conditions directly at the partner universities.

Dr Ingrid Rügge, local coordinator of these three projects in Log*Dynamics*, stayed for one month at different locations of the Royal University of Bhutan, among others, at the College of Science and Technology (CST). The Bhuta-

nese concept of ‚Gross National Happiness' and the transfer of the underlying qualitative values into the IGS's academic support programme have been mostly interesting for her: ‚The world is completely different there. I will question some substantial assumptions to improve the academic support of international scholarship holders of IGS in the future.'

Up to date Log*Dynamics* has received and supervised 36 incomings from the three Erasmus Mundus projects. The Asian students and researchers at all levels of qualification used the opportunity to stay at the University of Bremen for 1 to 27 months. Until now, there were only two outgoing mobilities. Thus, there are still some scholarships available for staying at one of the Asian partner universities

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Strengthening Existing Cooperation between IGS and Zhongyuan University of Technology

Prof. Dr. Jürgen Pannek, Junior Professor for Dynamics in Logistics, University of Bremen, was invited beginning of April 2016 by Zhongyuan University of Technolgy (ZUT), as an external expert to present about research, education and training programmes offered by Log*Dynamics*, as well as to exchange idea for further collaborations opportunity.

The visit was performed as part of promotion of cooperation in teaching, research and consultation according to recently signed Cooperation Agreement between International Graduate School (IGS) of University of Bremen and ZUT. The cooperation includes, among other things, exchange of students and researchers, joint research activities as well as joint organization of seminars and scientific meetings. During this occasion, Prof. Pannek had also the opportunity to speak about Log*Dynamics* research activities and IGS training program at the ShanghaiTech University as well as to attend the 'China – International Investment and Trade Fair', where he made contacts with some chinese industrial representatives.

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Events

Digitalisation in Logistics: People – Technology – Organisation

What are the challenges when it comes to transfer of research of logistic processes into practice and how does digitalisation of processes change the interaction between people, technology and organisation? Related to these topics, Log*Dynamics* held interesting lectures

and exhibitions in cooperation with Bremen Chamber of Commerce, VIA BREMEN Foundation and the WFB Wirtschaftsförderung Bremen, on the occasion of Day of Logistics 2016 on the 21st of April 2016.

Expert presentations from industry and research addressed different aspects of digitalisation in Logistics. Beside of the possibilities and challenges of digitalisation from customised products and Big Data to automatisation of various processes, the event focused on the integration of people into these processes. This should start with introducing young adults to the digital professional world, as indicated by Harald Emigholz of Bremer Chamber of Commerce. Uwe Will, Via BREMEN, also highlighted the significant management and development of young employees in the logistics sector. Once entered the professional world, employees have to be included and integrated into digitalisation processes. Furthermore, it is increasingly important to support the social and methodical competences of employees, explained Prof. Dr. Harry Spatz (HIWL – Hochschule für internationale Wirtschaft und Logistik). These competences are also important, because more often companies must provide services in hybrid service bundles in addition to their products, known as Product Service System. Industry 4.0 will not deal only with movement of goods but it will strengthen the dialog between industry and research, concluded Prof. Dr. Thoben (BIBA) the presentations session.

At the end, a get-together in a relaxed atmosphere was provided to about 150 visitors, where they had the opportunity to visit some exhibitors and inform themselves about current projects and developments. The exhibitors were BLG LOGISTICS GROUP AG & Co. KG, GVZ Entwicklungsgesellschaft Bremen mbH, HEC GmbH, STUTE Logistics AG & Co. KG, Ubimax GmbH, Willenbrock Fördertechnik GmbH & Co. KG, as well as Log*Dynamics* Lab and several BIBA Demonstrators.

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Foto: Bundesvereinigung Logistik (BVL) e.V

Augmented Reality Glasses as Part of Industry 4.0

On 7th of April 2016 the VDI regional association in Bremen organised an information event at BIBA - Bremer Institut für Produktion und Logistik GmbH. Together with Frank Bischoff (AnyMotion GmbH), Moritz Quandt (BIBA) presented possible applications of current technical developments of Augmented Reality Glasses relating to Industry 4.0. Augmented Reality describes the computer-aided extension of the perception of reality through insertion of additional information in the user's field of view.

The topic Augmented Reality in industrial environments gains interest due to numerous upcoming product, such as Microsoft Hololens, Google Glass 2, Epson BT 200, Brother Airscouter 2 etc., which will introduce a wide range of new application possibilities and which have substantially higher ergonomics than the last generation of AR Glasses. Besides the presentations, participants were offered to try different developed applications from BIBA projects, such as AR-Maintenance und MESA. AR-Maintenance support maintenance processes of wind turbines and MESA, on the other hand, relates to media use in the education of welders. The subsequent discussion showed that besides the wide range of new application possibilities the topics usability and data protection are most important to the participants.

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LDIC Best Paper Awarded for the Second Time

Increasing dynamics confront the logistics sector with completely new challenges: it must be possible to describe, identify and analyze the process changes. Logistics processes and networks will have to be newly designed, quickly and flexibly adaptable to constantly changing conditions. The 5th International Conference on Dynamics in Logistics (LDIC 2016) dealt with recent challenges in the logistics sector. The event is a platform for discussion about progress in the area of dynamic aspects in logistics processes and networks. This fifth conference of the conference series, initiated by Log*Dynamics*, took place from the 23rd to the 25th of February 2016 at the University of Bremen and was held together with the seventh IFAC Management and Control of Production and Logistics (MCPL 2016). More than 130 participants from all over the world were guests in Bremen.

An additional highlight of the conference, along with various interesting presentations, was the Internet of Things-Workshop (IoT-Workshop). Participants learned about prototype solutions and business models and were able to develop own IoT-applications with Hands-on-Tutorials. Moreover, for the second time, the best scientific contribution was honored by the 'Log*Dynamics* Best Paper Award'. The winners are Xiao Lin, Rudy Negenborn and Gabrial Lodewijks with their paper titled: 'Quality-Aware Predictive Scheduling of Raw Perishable Material Transports'.

Furthermore, some participants were honored with the 'Commended Award'. They are:
• Ana Paula Noletto, Sergio Louriro, Rodrigo Castro, Orlando Dontes Lima Jr. – 'Packaging and the Internet of Things in Brazilian Food Supply Chains: The Current State and Challenges';
• Aseem Kinra, Raghava Rao Mukkamala, Ravi Vatrapu – 'Methodological Demonstration of a Text Analytics Approach to Country Logistics System Assessments';
• Hans-Christian Pfohl, Yahsi Burak, Kurnaz Tamer – 'Concept and Diffusion Factors of Industry 4.0 in the Supply Chain';
• Shree Ram Khadka, Till Becker – 'On Upper Bound for the Bottleneck Product Rate Variation Problem'.

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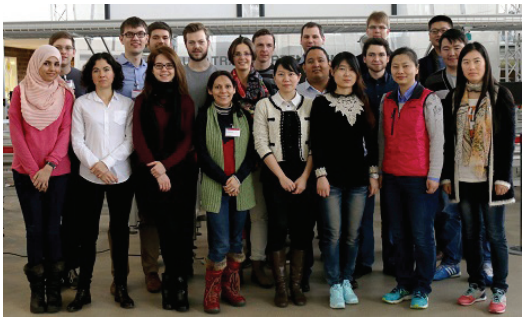
First Log*Dynamics* Summer School Accepted Internationally



The 1st Summer School (LOGISS), organized by Log*Dynamics*, took place from 29th of February to 4th of March 2016 in Bremen. The background of the Summer School is to forge a seed of young researchers from different disciplines, who share the interest in mechanism for coordination logistics decisions of autonomous agents. The aim of LOGISS 2016, having the theme of 'Control Interface in Logistics: Data and Algorithms' was to introduce master

and PhD students methods and tools to develop distributed control algorithms and interfaces. The event was attended by participants, with different research background, 12 of them came from Bremen, 5 from other German cities and 5 international guests.

The program offered intensive lectures delivered by international lecturers from renowned universities, a tailor-made lab session after each lecture session and a ‘speed dating‘ for scientific purpose. Additionally, a field excursion to the Steelwork of ArcelorMittal in Bremen and several social events such as a get-together and a dinner were also in the agenda.

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Call for Participations

91st Chapter Meeting – Value-Added Services in Logistics

Date: 13th – 14th of June, 2016
Venue: Bremen, Germany

BIBA – Bremer Institut für Produktion und Logistik and the AFSMI GC e.V. invite to the 91. Chapter-Event, which will be held on 13th and 14th of June 2016 in Bremen. Referring to the key topic ‘Value-added Services in Logistics for Industrial and Technological Services‘, high-ranking subject specialists from the logistics sector, the software industry and other high-tech industries – among others, speakers of the companies Axtrion, Viastore and Willenbrock will deliver a presentation. The AFSMI (Association for Service Management International) is a worldwide networked association for executives from all sectors of the service industry. The Chapter Meetings take place several times a year regarding various key topics all over Germany.

The event will take place at the BIBA and start on Monday, 13th of June 2016 at 5 PM with initial discussions about the key topic. It will be continued with a networking event ‘Get-together‘. Expert presentations will take place on Tuesday. Detailed programme and speakers are available on the AFSMI website. A registration via E-Mail is necessary to participate in the 91. Chapter Meeting

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3rd International Conference on System-Integrated Intelligence

Date: 13th – 15th of June, 2016
Venue: Paderborn, Germany

The 3rd International Conference on System-Integrated Intelligence (SysInt 2016) focuses on integration of new, intelligent functionalities into materials, components, systems and products to enable future technologies with enhanced capabilities.

The conference provides a forum for academia and industry, centered around 5 main topics:
1. Intelligent Systems: Enabling Technologies
2. The Future of Manufacturing: Cyber-Physical Production and Logistic Sys-

tems
3. Pervasive and Ubiquitous Computing
4. Structural Health Monitoring
5. Systems Engineering in Advanced Mechatronics

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33rd International Supply Chain Conference - Driving Change

Date: 19th – 21st of October, 2016
Venue: Berlin, Germany

A basic and underlying thought of the International Supply Chain Conference is to spread logistic knowledge between experts with corresponding publicity work and for a wider range of people as well. From the start, the congress has been intended to be a decisive platform for contacts and businesses. No other event in Germany makes the ‚logistics market' more concrete than the International Supply Chain Conference. Since 1985 it is held in conjunction with a special exhibition. During all the years, the number of booths increased tenfold from 20 to recently 200. Additionally, there is a wide range of meetings and company meetings. Today, the International Supply Chain Conference is the most important annual logistics event in Europe. It has turned out to be a central meeting point of German economy. But also more foreign guests take part every year to profit from knowledge exchange and concentrated communication possibilities.

The Log*Dynamics* Research Cluster with BIBA will be again this year represented at a booth at the 33rd International Supply Chain Conference. We cordially invite all congress participants, who are interested in innovative solutions for logistics, to visit our booth. The focus of this year's presence will be set on technologies for the realization of Industry 4.0.

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