



## LogDynamics News

### PhD Thesis of IGS Alumnus and CRC 637 Scientist Arne Schuldt Awarded with Logistics Science Award



This is what the future might look like. Containers are being operated autonomously by so-called software-agents. Concerning the choice of warehouses where goods need to be unloaded or even the means of transportation for the way there. By rail, truck or inland vessel, whatever is minimizing costs. While doing so, the software-agents on the containers are able to communicate with each other, therefore being able to avoid idle capacities. Utilizing methods of the artificial intelligence, Arne Schuldt of the Technology-Centre Informatics und Information Technology (TZI) of the University of Bremen, in collaboration with Tchibo, developed a solution that automates standard cases. His dissertation "Multiagent Coordination Enabling Autonomous Logistics", based on this practical example, has now been awarded with the renowned Logistics Science Award. The conferment took place in the course of the German Logistics Congress of the German Logistics Association (BVL) in Berlin. Sponsored by Oskar Schunck AG & Co. KG of Munich in 2010, the award includes prize money of 10.000€ for both the recipient and his institute.

As an example for the advantages pointed out by the system, it might be reasonable for the containers to stay by the terminal some days longer. This would save large amounts of pallet storage capacity and therefore reduce costs immensely. Additionally, it would enable expeditors to look after special cases like if a container is stuck in customs. Arne Schuldt prepared his work at the International Graduate School for Dynamics in Logistics (IGS) and the collaborative research centre "Autonomous Cooperating Logistic Processes" (CRC 637) of the University of Bremen. Supervisor of the PhD thesis was Prof. Otthein Herzog of the TZI.

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### Virtual Logistics Lab and LogDynamics Lab Present at IoT2010 in Tokyo



Besides talks and presentations on the topic of the Internet of Things

(IoT), a demonstration session with a "vote for the best demonstrations" will take place at the Internet of Things 2010 Conference on November 30th in Tokyo, Japan. The project Virtual Logistics Lab (VLL) will also be presented to the

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professional audience in this context.

The objectives of this student research project at the University of Bremen comprise the integration of LogDynamics Lab's components of the conveyor technique into a single system and its monitoring and control via a web interface. In the near future, an international community will be able to use VLL for the online preparation and conduct of custom experiments in the domain of production logistics without the need of being on site. For instance, experiments on the dependency of RFID identification rates from the speed of conveyor belts could be conducted while the experimenter oversees the scheduled experiment live on his screen via the VLL video streams. The VLL student research project has a duration of two years. It constitutes a cooperation of the Center for Computing and Communication Technologies (TZI) and the Bremer Institut für Produktion und Logistik (BIBA) and is due to run until September 2011.

After an implementation time of approximately one year, the first capabilities of VLL will be presented at the IoT2010 conference as part of the demonstration of a prototype of the Billing integrated EPCglobal Network of Bremen's LogDynamics Lab. This system is based on an open source billing software and the Electronic Product Code Information Service (EPCIS). A beverage supply chain scenario is used to visualize the EPCIS-enabled synchronization of the flows of material, information and money. This approach allows a flexible and scalable solution for cost benefit sharing and may enable new business models for the Internet of Things.

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Details: [www.virtual-logistics-lab.de](http://www.virtual-logistics-lab.de); [www.ilot2010.org](http://www.ilot2010.org)

### International Recognition of Autonomous Cooperating Logistic Processes „made in“ Bremen



On the "International Conference on Logistics and Maritime Systems Logistics" (LOGMS 2010) in September 2010 in

Busan, Korea the Best Paper Award was given to the scientist Jakub Piotrowski. Within the paper "Approaches for Realization of Autonomous Logistics in Practice" he introduces the implementation of mechanisms for autonomously cooperating logistic processes. These mechanisms have been developed by the Collaborative Research Centre (CRC) 637 "Autonomous Cooperating Logistic Processes – A Paradigm Shift and its Limitations". The CRC 637 at the University of Bremen consists of 13 sub-projects on the theoretical frame of decentralized and dynamic control methods. The aim is to answer fundamental questions concerning approaches to the development of models, new methods as well as technological conditions and limitations of logistic processes.

Jakub Piotrowski works as researcher for the Collaborative Research Centre 637 and in the department Planning and Control of Production Systems (PSPS) at the University of Bremen, both being led by Prof. Bernd Scholz-Reiter of the Bremer Institut für Produktion und Logistik (BIBA). On the LOGMS 2010 more than 100 papers have been presented to

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the 150 participants. The event in Busan contains three components: the "International Conference on Intelligent Logistics Systems (IILS)", the „International Symposium on Maritime Logistics and Supply Chain Management (MLOG)“ and the "German-Korean Workshop". While the IILS has already been held in Busan, Korea (2005), Brisbane, Australia (2006), Kitakyushu, Japan (2007), Shanghai, China (2008), and Gold Coast, Australia (2009), the MLOG was first carried out in Singapore in 2008. The "German-Korean Workshop" has been initiated 2008 and is co-organized since then by the LogDynamics member Professor Dr. Herbert Kopfer. The LOGMS 2012 will be held in Bremen.

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**ECITL 2010 in Bremen:  
When Cargo Actively Control the Processes - Two New Demonstrators from the EURIDICE Pilots Available**



It is a must for every single partner in a supply chain to deliver the expected good at the right time and place in the right quality. Is it perishable food, is it also necessary to track and trace temperature information during the entire transportation time. Due to the asynchronous information and material flows in supply chains, this is still a very challenging topic for any logistic service provider. The CRC 637 has been dealing with the basic concepts of intelligent objects and containers for years. The EURIDICE (FP7-ICT-2007-216271) project, in which the research unit IKAP at BIBA is involved, takes a more user centric approach. However the research is not only concentrating on developing the right technical solution, but also on preparing the organization and the individual stakeholders, so that they can efficiently select the right technology, integrate into the processes as well as use it in an optimal way. According to this objective, training activities go along with the research and development activities.

At the European Conference on ICT in Transport Logistics (ECITL) 2010, the EURIDICE project was heavily involved, both as a co-organizer as well as with accompanying activities like the EURIDICE booth and three additional training sessions on EURIDICE pilot implementation, the architecture as well as the domain knowledge formalization and modelling from a pilot perspective. New on these trainings was that we for the first time had the possibility to integrate the newly released pilot demonstrators in the training. The use of the demonstrators in the training decreases the barriers of understanding the real impact of implementing the Intelligent Cargo concept in the operative processes as it clearly shows that Intelligent Cargo contributes directly to a higher safety and security of the goods during transport and storage as well as how it can support active re-routing by unexpected events and changing weather conditions, and consequently contribute to a more efficient and more secure freight transport. The presentations can be accessed via the EURIDICE learning portal.

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## The Intelligent Container: New Transportation Technologies Heading towards Practice



The joint research project "The Intelligent Container – Networked Intelligent Objects in Logistics" of Bremen University was initiated in order to be able to meet the consumers' claim for fair prices, freshness and quality in future. The project size of more than 9 million Euro enables partners in logistics, sensor technology, information and communication technology, as well as food science to implement new technologies in the transportation of foods. The research project "The Intelligent Container" is funded by the Federal Ministry of Education and Research.

The transportation systems implemented within the project are able to autonomously measure various environmental parameters, such as air temperature and humidity inside the container, and autonomously analyze and interpret these data. This is done during transportation via sea, air, road or rail. Based on this data and by means of quality models it is possible to estimate how long perishable goods, e.g. fruits, will keep fresh during transportation. Miniaturized gas phase chromatographs measure the gas ethylene as an indicator of ripeness to directly gain information on the process of ripening.

The intelligent container is able to introduce the displacement of the logistics paradigm FIFO: First In First Out. At the same time, implementing the intelligent container in logistics enables the start of a new paradigm FEFO: First Expire First Out. By doing this, the researchers involved in this project are transferring the concept of autonomous control in logistics, which has been long-researched at the University of Bremen, into practice. "Consumers benefit from these new solutions in terms of better food quality, and so do food and transport industry, as well as the environment, because loss is prevented and fewer transports are required", says Prof. Walter Lang of Bremen University, initiator of this project. The idea for the intelligent container based on the investigated approach of autonomous processes in logistics in the context of the CRC 637. Furthermore, the CRC 637 transferred this approach to a demonstrator. The implementation of the intelligent container into real scenarios is founded on the co-operation of the two research associations MCB (Microsystems Center Bremen) and LogDynamics (Bremen Research Cluster for Dynamics in Logistics).

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## European Project TARGET: Acquiring Competences Playfully



The global competition for highly skilled

people causes the need to retain and re-train existing staff through some kind of tailored competence development. This business strategy reduces the lead-time for a learner to achieve target productivity: the “time-to-competence” (TTC). Today, the main route to shorten TTC is a bespoke (hand-crafted) face-to-face or blended course, which tends to be resource-intensive (expensive to create and deliver). The main aim of the TARGET project is to research, analyse, and develop a new genre of Technology Enhanced Learning (TEL) environment that supports rapid competence development of individuals, namely knowledge workers within the domains of living labs (innovation) and project management.

The TARGET environment is conceived as a complex learning process supported by the TARGET platform, which consists of a set of innovative and advanced tools and services. Here, the learner is presented with complex situations in the form of game scenarios: interacting with the game results into enriched experiences that are gradually leading to knowledge acquisition. With the aforementioned focus, the TARGET project explores and integrates five relevant research fields:

- Threshold Concepts, resembling knowledge gateways that transform a person’s understanding of a knowledge domain
- Knowledge Ecology, which defines knowledge as a “living organism”
- Cognitive Load Theory, according to which a learner’s attention and working memory is limited and therefore learning processes must be designed to allow effective internalization without overload
- Learning Communities, where members of a community develop their competences by leveraging the experience of their peers
- Experience Management, to allow learners to accumulate lessons learned through real and theoretical situations.

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## Grasp Logistics!

“Grasp Logistics!” was the central theme of the presentation of the „Logistikfabrikttisch“ (logistics factory table) on the KLB-booth at the German Logistics Congress (20th -22nd October) in Berlin. BIBA and eventV GmbH created in a one-year research project a multitouch-capable application that presents the logistics in and around Bremen exemplarily and makes logistic processes understandable. The research project is financed by the Bremen Development Agency (WFB) and supported by the Logistics Competence Center Bremen (KLB).



The “Logistikfabrikttisch” shows an abstracted map of Bremen and Bremerhaven that includes the most important traffic routes. There are four exemplary transport routes located on the map that represent logistic scenarios and invite the user to get an insight into the logistic chain. Furthermore, a variety of commercial enterprises from Bremen, associations and providers of education and training are represented. Each protagonist presents himself in a content window using text,

pictures and video. Their role in the logistic chain and their cooperation with other protagonists is visualized in addition to possibly individualized and integrated information of the user. Thus, the "Logistikfabriktisch" provides the dialogue between the protagonists and covers the logistics competencies in Bremen.

A further aim is to use the "Logistikfabriktisch" as a dynamic planning tool. This will be shown on the basis of different transfer scenarios. By using a multitouch-capable table several users can operate at the same time. To uncouple the content and the table the application can also be used via Internet ([www.logistikfabriktisch.de](http://www.logistikfabriktisch.de)). Soon the "Logistikfabriktisch" will also be available in English.

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### **Logistic for Life Moves Forward towards an Improved Framework and Roadmap for ICT Supported Freight Efficiency - Call for User Participation**

Logistics for Life is a coordinated action, aiming to bring together leading logistic companies, technology providers and research organizations working on innovative ICT solutions to ensure long-term sustainability of the logistic industry by increasing its operational efficiency. The project is motivated by freight transport's heavy reliance on fossil fuel, its contribution to CO<sub>2</sub> and NO<sub>x</sub> emissions and by its impact on the environment and quality of life. These issues are counterbalanced by considerations specific to the logistics industry, where attempts to direct cargo towards environment friendly transport modes are failing to meet expectations and firms face problems of volatile fuel prices, infrastructure saturation and low margins typical of a commoditized sector.



Based upon the results and the contribution from the Best Practice report as well as from the Arktrans 7 framework, which serves as a starting point for the Logistics for Life framework for ICT supported efficient freight transport, small groups defining the requirements on such a framework at different levels were established during the annual meeting of EURIDICE held in Bremen on November, 2nd and 3rd. The four levels are (in line with Arktrans 7)

1. Strategical level
2. Organizational and role level
3. Process and functional level
4. Communication and technology level

The outcome of these initial discussions will be twofold: firstly, the defined requirements will serve as input for a roadmap under development. A first version of the roadmap will be available at the beginning of the next year, Secondly, these discussions will also serve as a starting point to collect requirements at the four different levels, so that the Arktrans framework can be adapted and extended to meet the defined needs. For this, the consortium believes that it is important to

involve the user of such potential solutions, since they know their requirement on ICT-based systems for energy efficient freight transport best. Consequently, the consortium has, together with the EURIDICE project, launched a forum: the Intelligent Cargo Forum. In this forum, all results are published as well as there is the possibility for taking part in the discussions on the topic. The result of the Bremen discussion will be inserted as starting point for further discussions. This forum can be visited at: [www.intelligentcargo.eu](http://www.intelligentcargo.eu). You are also welcomed to join our group at LinkedIn.

Logistic for Life is a coordination action supported by the European Commission in the 7. Framework (Logistics for LIFE Coordination Action – ICT 248338).

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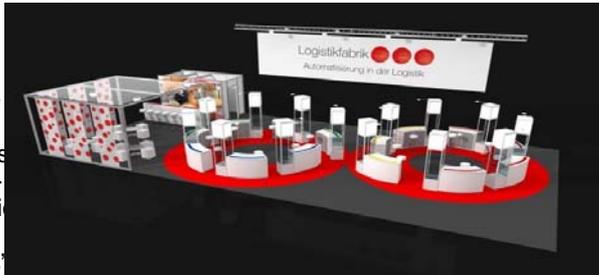
## Events

### Partner Booth at the CeMAT „Automation in Logistics“

Date: 2nd - 6th of May 2011

Venue: Hannover

At the CeMAT 2011 the topic "Logistics Factory - Automation in Logistics" will be



presented on a 200m<sup>2</sup> booth to the expert audience by experts' lectures and exhibits. The platform focuses on the presentation of technical logistics. The CeMAT is the biggest international trade fair for intralogistics.

On the booth the material and information flow will be shown on the basis of the functional process chain. We offer all associates to place their products in this chain and to present their competencies at a workstation. The challenges and potentials of automation in logistics will be explained and discussed at the booth forum during the fair. Additionally, there will be presented research approaches for the technical logistics of tomorrow. Please do not hesitate to contact us, if you are interested to **participate on the partner booth!**

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### Logistics Day 2011 – Preannouncen

Date: 14th of April 2011

Venue: BIBA, Bremen

In April 2011 the "Logistics Day" will take place for the fourth time. Themed "Logistics Enables" industrial, trade and logistic enterprises as well as scientific institutes will open their



doors to introduce their work and projects, thereby contributing to the illustrative presentation of this important business sector.

The BIBA - Bremer Institut für Produktion und Logistik GmbH - will also participate in this initiative. Together with its industrial partners and in collaboration with the Logistics Competence Center Bremen (KLB) BIBA will organize an event on the subject of "Intelligent Logistics". It will give the public an opportunity to take a closer look at logistic innovations.

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## Calls

### IESM 2011 - Call for Papers



Management [www.iesm11.org](http://www.iesm11.org)  
 25th - 27th of May 2011, Metz, France  
 Deadline: **25th of November 2010**

### **Innovative Approaches and Technologies for Networked Manufacturing Enterprises Management**

The global economy and the recent developments in IC technologies have significantly modified the business organization of enterprises and the way that they do business. New forms of organizations such as extended enterprises, networked enterprises, supply chain networks, etc., turn to appear and they are quickly adopted by most leading enterprises. The evolution from single enterprises with a high vertical range of manufacture towards enterprise networks offers new business opportunities especially for small and medium enterprises that are usually more flexible than larger companies are. This edition of IESM aims to bring researchers and professionals from all industrial engineering and service sciences disciplines together to discuss issues and share their research and development results and experience. Authors are invited to submit their original and unpublished work.

Prospective participants are invited to submit papers electronically (full paper of 10 pages maximum), written in English, according to the format instructions. A list of special sessions and tracks on specific focus will be open. Proposals for special sessions/tracks are welcome. All accepted papers will be published in the conference proceedings in the form of a CD-ROM with ISBN reference number, under the responsibility of the International Scientific Committee. Extended versions of the best papers will be submitted for potential publication in special issues of numerous high quality international journals.

Original contributions are sought in the following **topics**:

- Artificial Intelligence and its applications in industrial engineering
- Customer service systems design and management
- Cleaner and sustainable production systems and services
- Project management
- Data warehousing and data mining
- Decision analysis and decision support systems
- E-Services and Technologies for distributed manufacturing

- Facilities design, planning, and layout
- Heuristics and meta-heuristics for advanced manufacturing
- Human factors and ergonomics
- Human-computer interaction and cognitive engineering
- Information systems and management
- Health care systems
- Service sciences management and engineering
- Industrial engineering and systems management
- Innovation management and entrepreneurship
- Intelligent control, holonic and product-driven systems
- Logistics, transportation, and distribution systems
- Maintenance and reliability
- Manufacturing executive systems and standards
- Monitoring of manufacturing systems
- Production planning and scheduling
- Product life cycle management
- Quality management
- Supply chain design and performance evaluation
- Warehouse and inventory management

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