

Latest developments in the design and operation of logistics and intermodal transport in the ports hinterland: new challenges and new solutions

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Based on a short overview on the state of the art of transport infrastructure and related bottlenecks within this paper intelligent solutions for the design and operation of logistics and intermodal transport in the ports hinterland will be outlined.

They are mainly based on real examples and practical experiences of companies in Germany.

The solutions cover four present and future challenges, and focus essentially on the topics security, climate and energy, meso-logistics and knowledge regions as well as control logic and autonomous control of cargo flows.

For facing these challenges major tasks of the public and the private sector are mentioned.

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ISL – Institute of Shipping Economics and Logistics



1954 - 2008

more than 50 years of innovation in maritime economics and logistics

www.isl.org

Logistics Systems

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Bremen, Bremerhaven, Lübeck

70 employees

Services for you: research & networking, consultancy,

planning & simulation, analysis & forecasting,

software development, information hub

CEC, Federal Ministries, regional institutions, **Clients:**

industry, commerce, LSP, NGOs





EIA - Intermodal transport promotion centre, Bremen



since 2005

Promotion and dissemination of best practices **Networking and initiation of cooperations and** strategic alliances

Business models development and controlling



Know-how transfer and knowledge management

Search for intermodal multiplicators Supporting new products/services



since 1998

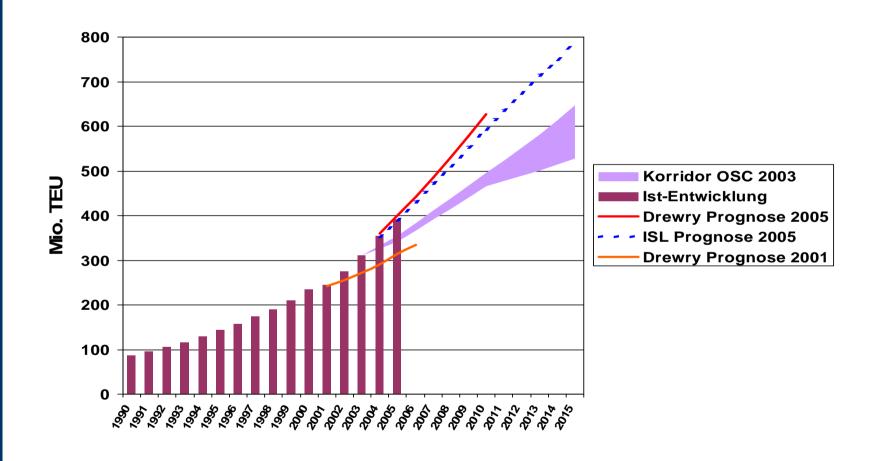




Source: GVZE Bremen

Logistik Logistics Seeverkehrswirtschaft und and **Economics** Shipping of Institut für Institute

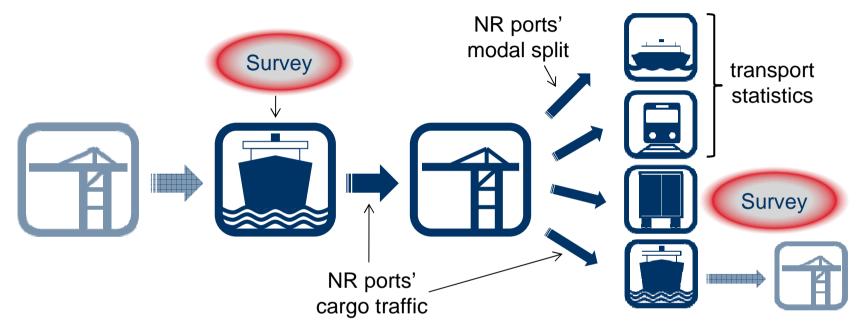




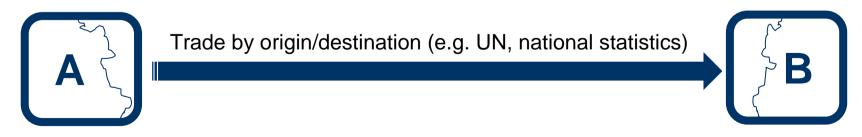
Institut für Seeverkehrswirtschaft und Logistik



Transport statistics



Trade statistics



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Introducing the Container Traffic Model

The North European Container Traffic Model developed by ISL and Global Insight:

- Differentiates transhipment volumes from hinterland traffic.
- Identifies the volumes and modal split of container traffic with the various corresponding hinterland regions of the North range ports,
- Assesses the container traffic volumes between the North range ports and corresponding shortsea destinations,
- Provides the basis for forecasts of port traffic and hinterland transport volumes.

The Modell was implemented successfully for the years 2003 and 2005 so far!

Logistics **Economics and** Shipping o

Container Traffic Model



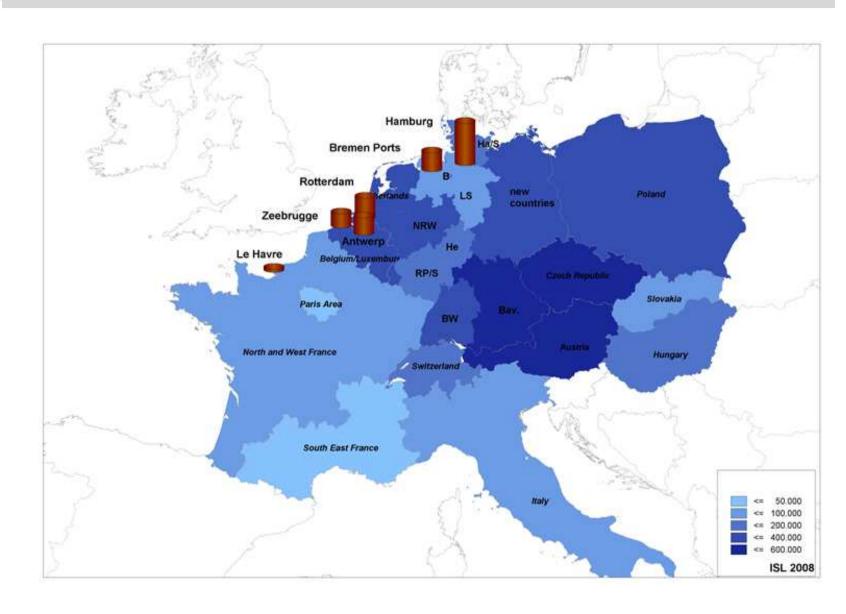
Featured Ports and regions



- 6 Ports within the Hamburg-Le Havre Range
- 32 Hinterland regions:
 - 13 European Staates
 - Germandy (by federal districts)
 - Poland (two regions)
 - Denmark (two regions)
 - France (three regions)
- For all Regions Volumes are identified and split into mode of transport (road/rail/river)

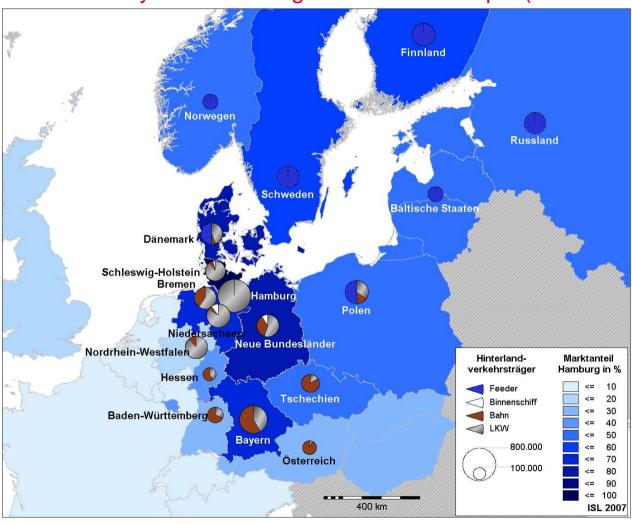
Railway Container Hinterland Transport Volumes 2006





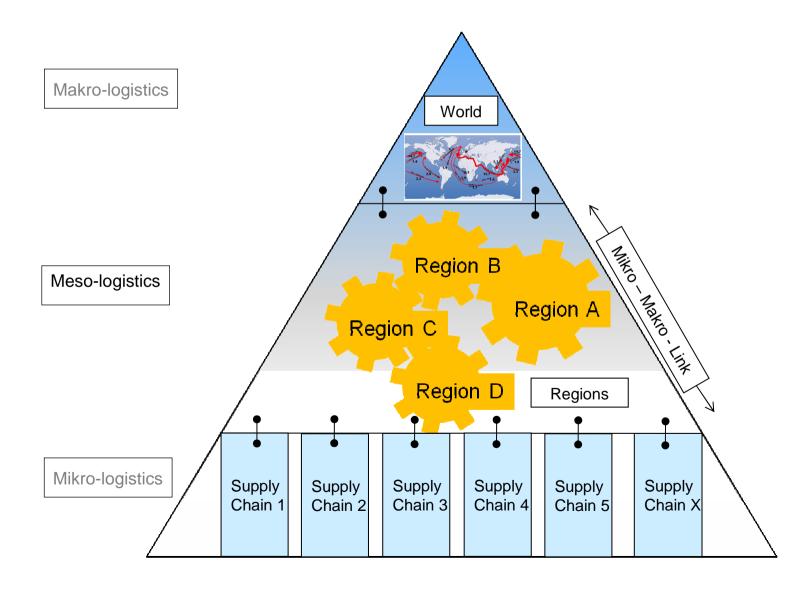


Market shares by hinterland regions and modal split (ex.: Hamburg)



Source: ISL/Global Insight, Containerverkehrsmodell zur Bestimmung der Marktposition des Hafens Hamburg in europäischen Hinterland- und Transhipmentregionen, study for the Hamburg Port Authority, Bremen 2007

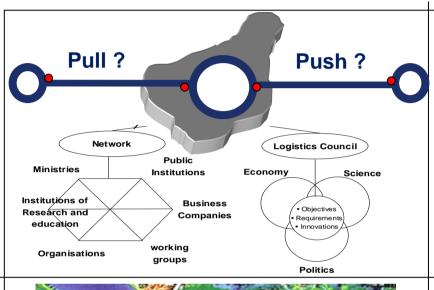
Mesologistics: Mikro-Makro-Link



Logistics and Economics Shipping o

Meso-logistics





Meso Logistics

The performance of supply chains can be improved through co-operation and communication between various supply chain partners on a regional level. Meso Logistics analysis operative and strategic business processes between companies and institutions in a supply chain region. By this, amongst others a regional knowledge management is obtained.



References:

- Bremen The "Logistics Family"
- MAREDFlow: Regions of Knowledge Pilot Action.
- **LOGALL: Strategic Logistics** Alliance Hanse-Passage
- Start up of new intermodal solutions



Communications

Gewerbepark Flughafen

Dachser GmbH & Co. KG Air & Sea Freight DHL Global Forwarding Kopf∟& Lübben GmbH

Bremen Nord

Egerland Car Terminal GmbH & Co. KG Gebr. Stahl Gmbh Parsiegla GmbH & Co. KG

Bremische Häfen chts der Wese

Beluga Shipping Grapper Rolandmühle Erling GmbH & GMSHPI Rolation in the Ening Gribh & Contide Logistik GmbH
Diersch & Schröder GmbH & Co. KG
Griepe Container GmbH
Hansa Holz Wilhelm Krüger GmbH
J.Müller-Weser GmbH & Co KG henus Weserport GmbH

Svstemführer

Carl Ungewitter Trinidad Lake Asphalt GmbH Hanseatic Lloyd Reederei GmbH & Co. KG

Ipsen Group GmbH & Co. KG Karl Gross Internationale Spedition GmbH

Berthold Vollers GmbH

Kühne + Nagel (AG & Co.) KG Lexzau, Scharbau GmbH & Co. KG

Peter W. Lampke GmbH &

(Röhki@ & Co. Holding GmbH & Co. KG

Bremische Häfen links der Weser

BG Trans Bremer Gütertransporte GmbH BHS Spedition & Logistik BTG Internationale Spedition GmbH BLG Cargo Logistics GmbH & Co. KG Dettmer Logistics GmbH & Co. KG Fiege Net Division der Fiege Deutschland Stiftun Heinrich Langhorst Gmbh & Co. KG Hellmann Worldwide Logistics GmbH & Co. KG Kieserling Spedition + Logistik GmbH Packing Centre GVZ Bremen (PCG) Roland Umschlaggesellschaft

für komb. Güterverkehr mbH & Co. KG Terratrans Internationale Spedition GmbH

Verein Bremer esamthafenbetriebsvei mschlagsbetriebe e. ande Bremen e.V. (GHB mittelständischer reinigung Bremer Schiffsma Unternehmen in den und Schiffsagenten e.V. tadtbremischen Häfe mische Hafenvertretung derverein Pro A22 sverhand Verkehrsg Bremen (LVB) e.V. ein Bremer Spediteure eine Arbeitgeberv von Bremen und Bremerhaver chaftsverband Wese Fischereihafen Betriebsgesellschaft Bremer Reederver mbH Z Entwicklungsges Bremen mbH

Gewerbepark Hansalinie und

Hemelinger Hafer

DL Dettmer-Logistics GmbH & Co. KG Hirsch Bremer Reinigung und Recycling GmbH Johnson Controls Headliner GmbH Kraft Foods Deutschland GmbH Schedl Automotive System Service GmbH Schreiber Baumaschienen GmbH &

Fischereihafen

Am Lunedeich 143 Grundstücksgesellschaft G Bredo Bremerhavener Dock GmbH Brüssel & Maass Logistik GmbH

Columbus Spedition GmbH

Deutsche See GmbH & Co. KG

Frigolanda Tiefkühlcenter Bremerhaven GmbH

Georg Grube GmbH

J. H. K. Anlagenbau und Service GmbH & Co. Ke

Multibrid Entwicklungsgesellschaft mbH Nord Ceram Fliesenproduktion und Vetriebs Gm

Würfel Spedition GmbH

Überseehafen und

Addicks & Kreye Container Service GmbH & Co Atlantik Hafenbetriebe Geuther & Schnitger

BLG Coldstore Logistics GmbH

BLG Logistics Automobile

D. Heinrichs Logistic GmbH

EUROGATE Container Terminal Bremerhaven GrabH

GCD Glomb Container Dienst GmbH

Heuer Internationale Speditionsgesellschaft bmH MSC Gate Bremerhaven GmbH & Co. KG

Neutrales Transport Kontor GmbH

North Sea Terminal Bremerhaven GmbH & Co.

Noske Kaeser GmbH

Rhenus Midgard GmbH & Co. KG

Schnellecke Group AG & Co. KG

tar Container Service GmbH



Structure and process modelling are not enough: Knowledge Management





Interface problems within heterogeneous IT-Infrastructure

Missing insight in business processes of partners within the supply chain

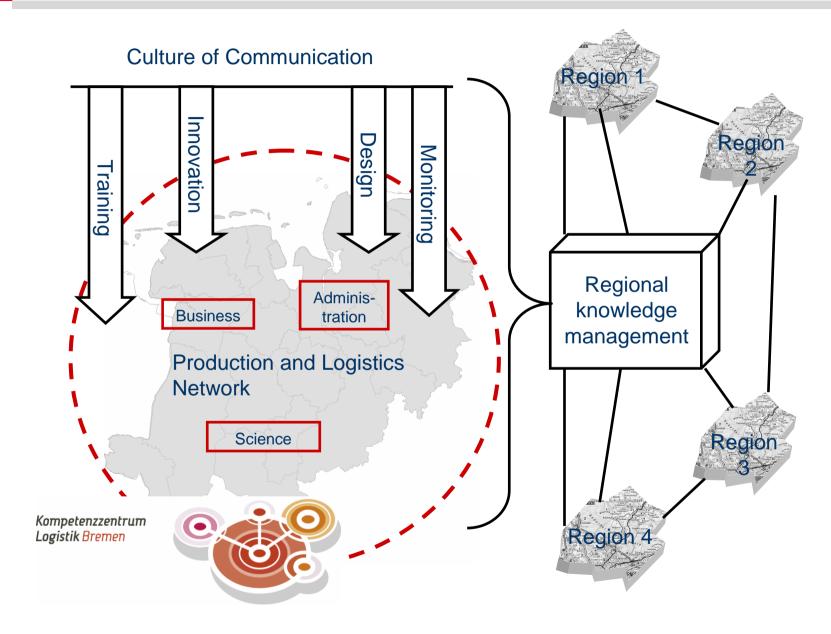
Missing exchange of information between partners and inside a company

Know-how of relevant key actors is not documented

No incentive system to think beyond the existing solutions

shipping companies
terminal operators
port operators
forwarders
warehousing companies
logistics service providers
services
regional authorities
railway companies
industry, commerce





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How to secure the chain?



Certification of partners Data reporting and analysis Securing the container integrity Securing the container environment Inspection and scanning

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Certification



C-TPAT (Customs Trade Partnership Against Terrorism)

- voluntary certification in the US trade
- US Customs promised to offer accelerated procedures for those parties being certified
- Part of the new Customs Code of the European Union, this approach can be found as "Authorised **Economic Operator**" (AEO)
 - This status can be achieved from beginning 2008
 - Although also the AEO certification is voluntary, it is expected that is will become de-facto mandatory in such a way that it is quite likely that shippers will use only **AEOs as their partners**
 - A mutual recognition of AEO and C-TPAT is actually in discussion.
 - Freight forwarders, inland transport operators, etc. are still quite reluctant because the benefits are not obviously at this point of time.

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Technologies



Electronic seals

- combining the strengths of a high security seal with an RFID transponder
- allowing to check the number and status of that seal automatically e.g. when passing a container terminal gate

CSDs (Container Security Devices)

- More sophisticated
- allowing to register the opening of doors, light falling into the container, detection of special substances, obtaining the actual position, communicating via **GSM** or satellite

Challenges

- Standardisation required!
- Who is willing to pay for?
- Making the use of technologies mandatory?



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Advance data reporting

- **CSI (Container Security initiative)**
 - Customs Cooperation between the US and the rest of the world since 2002
 - presence of US Customs forces in all major ports exporting cargo to the US who together with their local colleagues assess the risk of containers and jointly decide on further measures e.g. on X-ray scanning or even opening and cargo inspection
 - Basis for this risk assessment are IT systems analysing data – primarily from shipping manifests. Data must be provided well before the container is to be loaded
 - The Advance Manifest System and the related 24-hourrule require exporters and shipping agents to provide the vessel manifest 24 hours before loading in electronic form
- From 2009, this method will be also applied for all transports heading to the EU
- For the exporting companies their flexibility of rescheduling cargo containers, will be quite limited

Technologies



Project CHINOS

- funded by European Commission DG Research
- using RFIDs and damage documentation along container transport chains
- trials in Bremerhaven, Thessaloniki, Graz Freight village and Warsaw railway station













INTEGRITY

- Intermodal Global Door-to-door Container Supply Chain Visibility
- Funded by the European Commission, DG Research
- Duration: 06/2008 05/2011





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INTEGRITY Partners



Terminal and **Transport Operators**

Logistics Providers & **Shippers**

Customs **Authorities**

Academia & **Technology Providers**





















Yantian International **Container Terminals**

Trimodal Container

Duisburger Container-Terminalgesellschaft Multimodal Container Network

Terminal Venlo





UNIPART EXPERT PRACTICES







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Strong continuing growth in global container transport

Motivation

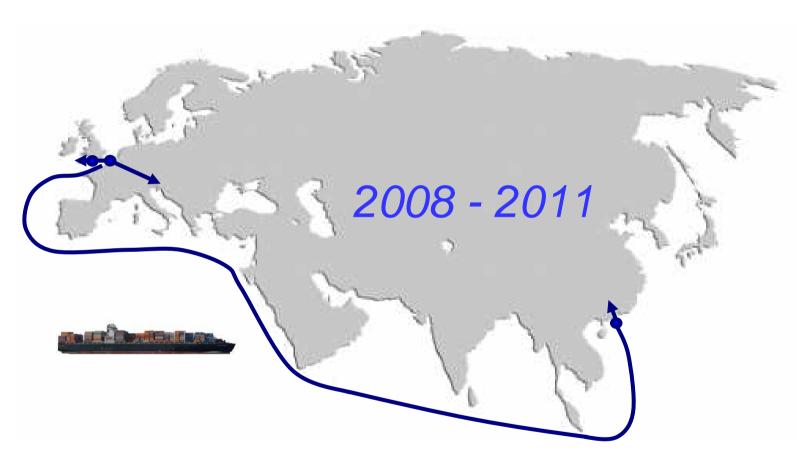
- Increased bottlenecks in **European deep sea ports** and hinterland connections
- **Complex logistics chains** with multiple actors
- Information gaps along the chain
- **New security regulations** (ISPS, EU-COM 2003-0229, 2004-0076, US CSI, US C-TPAT)





INTEGRITY Corridor





- Door-to-door: China Shenzhen Rotterdam/Felixstowe European Hinterland
- Monitoring of 5,000 containers
- Cooperation with EU/China Customs Project (SSTL)

Logistics Shipping Economics and

INTEGRITY = Supply Chain Visibility



Customs

Support of new EU Customs Code

Support of AEO concept

Support of Advance Manifest Reporting

Shifting security checks to export countries

Mutual recognition of security check procedures

Offering pre-arrival clearance

3PLs Cargo Owners

Predictability

Reliability

Reduction of uncertainty

Optimisation of speed

Reduction of goods in stock and in security process

Supply Chain Visibility Consensus building

Intelligent data sharing and evaluation platform SICIS

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INTEGRITY – Example security pipeline



Precarriage

- · AEO Packing Centre / Warehouse
- · E-seal application after stuffing
- · AEO Truck / Rail / Barge Operator
- · ISPS certified Port of Loading operator
- · Scan, radiation and e-seal check in the Port of Loading

Sea transport

- · ISPS certified vessel
- · Satellite tracking

Oncarriage

- Customs control based on data from Port of Loading
- · Pre-arrival clearance
- ISPS certified Port of Discharge operator
- · AEO Truck / Rail / Barge operator
- · E-seal check at final destination

ISL.









Energy consumption in transport and logistics







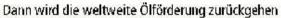


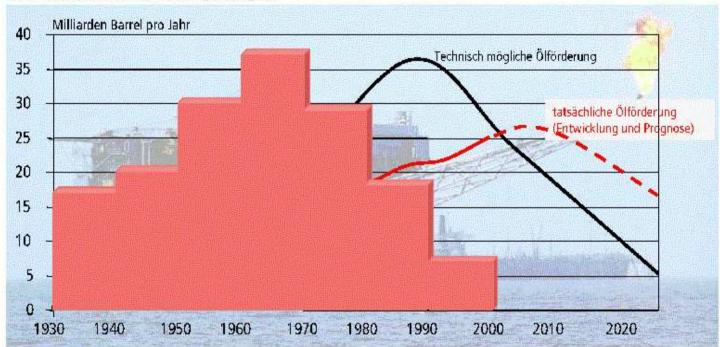


MOIN-Group

Die weltweite Ölförderung nähert sich ihrem Maximum

In 5-10 Jahren werden die weltweiten Ölreserven zur Hälfte verbraucht sein





Quelle: C.J. Campbell, Petroconsultants



Jährliche Erdölfunde (10 Jahresmittel)



Technical optimisation

- > air pressure in wheels
- > innovative technologies
- engine optimisation
- **>** ...

Optimisation of logistics

- > avoidance of transports
- > bundling of cargo
- > ...

Knowledge management

- > qualification
- > motivation
- > training

Reduction of energy and of CO2 emissions

Use of alternative engines

> gas, hydrogen, electricity

- > from road to ...
- > from air to ...
- > ...

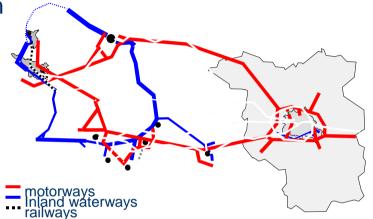
Shifts

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Intermodal Supply Chains

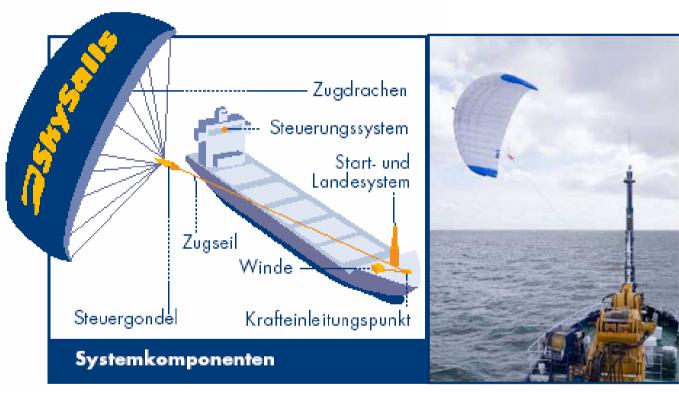


- Design of cooperative intermodal solutions
- Location planning and process optimisation
- Promotion of intermodal transport
- Controlling of intermodal interfaces
- Simulation and software support
- Networking between partners
- Communication of best practices



- Elaboration of value adding activities and chain design
- Developing of business models
- Performance management for intermodal SC
- Knowledge management within the SC
- Consultancy in mass customisation for SC





Quelle: http://www.skysails.info/

ogistics and

ISL-AMATRAK: Stute Verkehrs-GmbH/Kühne & Nagel **CRC University Bremen**



Conventional control

- Hierarchical structure
- Global information
- Central planning and control

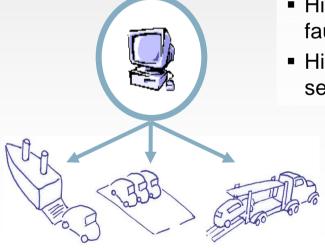
Multi Agent Technology

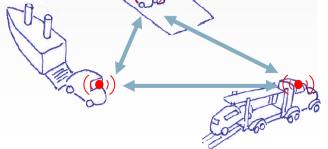
Advantages / Benefits

- Higher flexibility by higher and faster adaptability
- Higher robustness and fault tolerance
- Higher performance by self-optimisation

Autonomous control

- Heterarchical structure
- Local information
- Decentralised control
- Intelligent objects





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Innovative Solutions for Logistics