Modelling of seaport hinterland traffic and its integration in trimodal transport networks

Background
The world container traffic has become the backbone of the world’s economic development. All forecasts predict a further strong increase. Thereby, up to 80% of the total costs for the transport of containerized goods via seaports result ashore, only about 20% from sea transport itself. For the integration and operation of the hinterland traffic, depending on the actual relation different transport modes have to be combined in intermodal transport chains in an optimal manner.

Goal of the project
The modelling of intermodal transport is a highly complex task, due to the huge number of actors, processes and interfaces involved. The part-project A13 has developed a new modelling approach for this purpose, which is based on the combination of infrastructure data, using Geographical Information Systems (GIS), with detailed process analysis.

The concrete goal of the project is the examination of the feasibility of trimodal transport chains for seaport hinterland traffic, combining barge, rail and road transport within one transport chain. For this type of transport, possible network structures are investigated and suitable transport means and departure frequencies are defined.

Results so far
For the computer-based investigation of alternative transport chains for intermodal transport detailed information on the available infrastructure for all transport modes and the transhipment terminals is necessary. In inland navigation, e.g., the river or channel to be used defines the possible types of barges and their loading capacity. Up to now, however, the use of Geographic Information Systems (GIS) in the area of intermodal transport has been limited to display transport flows; the definition of possible transport means based on infrastructure information is not yet in use.

Therefore, attributes of road, rail and inland navigation infrastructures as well as transhipment terminals have been defined and the availability of this data has been analysed. A sample implementation has been realised in the Fraunhofer-developed software tool DISMOD, which now allows for a detailed route planning on the German inland navigation network.

Furthermore, the model developed contains detailed information on processes in seaport terminals, based on a process chain approach, and calculation schemes for the transport cost and time of the main haul via barge and rail.

Future research topics
The transport modes considered will be amplified by Short Sea Shipping, which has a high importance in Feeder-transport of containers from the major seaports to smaller ports, especially to and from Eastern Europe, as well as in intra-European transport.

Having in mind the expected increase of road transport cost and container volume, a methodological basis for the modelling of trimodal transport networks is laid and insights into design possibilities of different network types and their performances are gained.