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1 Table of Contents

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2 Executive Publishable Summary

Introduction

ALSO DANUBE (Advanced Logistics Solution for the Danube Waterway) started on 01/05/2000 and was concluded 37 months later on 31/05/2003. The consortium was founded in 1999 and consisted of 27 partners from 8 European countries. The group included all types of enterprises (small, medium and large) from different branches (authorities, transport operators, forwarders, IT-developers, industry, freight forwarders, universities) representing every potential actor along a transport chain.

The basic motivation for this research and demonstration project is linked with the European transport policy to integrate the environmental friendly and cost effective inland waterway transport into modern industrial supply chains on the Rhine-Main-Danube axis. Currently, only 15% of the overall available capacity of the Danube is being used, with a total volume of just 12.4 million tons being transported along the Austrian section of the waterway in the year 2005.

The enlargement of the EU by 10 new member states, 2 of which are situated on the Danube, and 3 further candidate states that also have access to the waterway, as well as the elimination of the Pontoon bridge in Novi Sad, can all be regarded as the starting point for a continually growing transport demand with an average growth rate well above that of the EU 15. The development of a highly efficient transportation network alongside the major industrial axis from Central Europe to the Black Sea is therefore of keen political importance. The integration of inland waterway transportation on the Danube has to be a key goal in order to archive an efficient and sustainable multimodal transportation system in this region.

Nowadays inland waterway transportation on the Danube is primarily used for low cost bulk material and is the subject of a modern industrial supply chain with a high demand on:

- reliability
- controllability
- flexibility
- cost efficiency and
- competitive transport operation.

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The transportation statistics show that medium term the transportation demand for "low service quality" bulk material will not increase at all. High potential volumes on container transport, roll-on roll-off, packed goods on pallets are forecasted. Therefore, the focus has to be on the research and development of new concepts in order to provide industry, haulers, fleet operators, and logistics operators with solutions customised to meet their specific requirements. The work program of ALSO DANUBE focused on this objective.

The overall objective of ALSO DANUBE was to prepare concepts, tools and best practise for the use of inland waterway as a key mode within intermodal door-to-door transport chains focusing on the Rhine-Main-Danube axis. ALSO DANUBE aimed at:

- developing and implementing an advanced European concept to manage intermodal transport chains with inland navigation as a core transport mode
- setting up and running highly integrated logistics networks and operational platforms to enlarge the current range of logistic services
- integrating advanced traffic and transport management systems
- introducing new systems and technologies in the area of data exchange and communication
- creating independent logistic information and communication services
- demonstrating the solutions developed on the level of traffic management, transport logistics management and data exchange in order to convince the industry to follow
- stimulating the extension of waterway transport relations to port hinterland
- improving the efficiency of waterway transport which shall contribute to the development of the Danube waterway as a backbone for European transport, promoting the sustainable integration of the accession countries into the European Union

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Approach

To reach the ambitious goals, ALSO DANUBE was structured into four major project areas:

- development of innovative concepts for transportation services on the Danube
- development of IT-solutions tailored to this concept
- demonstration of the services and IT-solutions in real business environment
- and performance of socio-economic evaluations of the developed concepts, solutions and demonstrations within the project

Achievements

The key challenge in ALSO DANUBE was the development of the concept of flexible container liner services with an integrated door-to-door supply chain management application linked to a traffic management system on the Danube to gain real time transportation data in order to control the supply chain process. The link between transport (logistics planning) and tracking/tracing of vehicles and goods via a traffic management system is the primary innovation not realised yet in any other land transport mode.

The application of this concept to the inland waterway transportation will close the existing gap (on information level) in order to compete with other land transport modes.

Conclusions

In this respect the developed concepts and the implementation of the developed IT-system and its demonstration have proven that inland navigation

- is competitive if it is integrated in managed logistics chains
- is also attractive for short distances (< 100 km)
- is a transparent mode of transport (security relevance)
- is an appropriate means of transport for intermodal container services
- gains significant savings in logistics costs

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Recommendations

To obtain these positive results on a European level and to strengthen inland navigation in the transport market, the following recommendations were elaborated:

- Support of extensive use of ICT-solutions to simplify and improve administrative and logistical processes
- Stimulate the application of IWT based door-to-door supply chains during a starting period up to a level of being commercially competitive
- Support the development of container liner services on inland waterways
- Implementation of River Information Services (traffic management system)
- Creation of harmonised regulations on the implementation and usage of River Information Services (RIS) and support Danube countries in implementing RIS
- Provide funding of innovative inland waterway development projects in a starting period
- Use of synergy effects between information technology (logistics, telematics) with the upgrading of waterways

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3 Objectives of the Project

Inland navigation represents the only means of land transport which does not suffer congestion problems like that of rail or road within Europe. In general, inland waterways are underused, but inland navigation is not considered as a truly competitive alternative to other means of land transport. Estimates suggest that inland navigation would carry up to 425 million tons[1] per year, including the accession countries, in the European inland waterway network, if the necessary action towards an integration of inland navigation into managed intermodal logistics chains were undertaken.

In general European waterways are characterised by high capacity but low density of the network. This implies that most of the door-to-door relations require pre- and end-haulage by other means of transport. Due to this fact, it is inevitable that all the links and actors of a logistics chain[2] must be brought together. This can best be managed by logistics service providers, who have gone through a very dynamic development in recent years. The figure below shows this tendency[3].

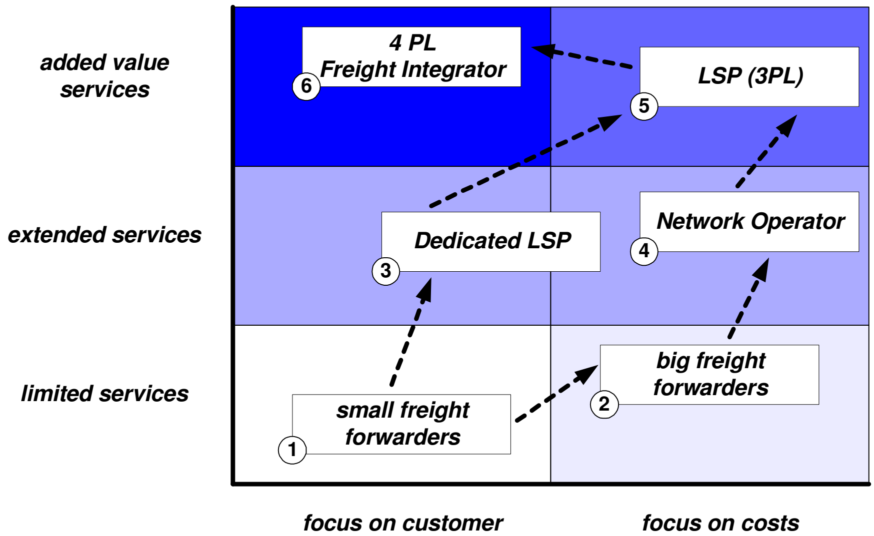

Figure 1: Development of logistics operators' service portfolio

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[1] European Commission, White Paper- European transport policy for 2010: time to decide, Luxembourg 2001, p. 41

[2] European Commission, White Paper- European transport policy for 2010: time to decide, Luxembourg 2001, p. 44

[3] PASS Consulting Group, Mr. Olivier Podevins, Portale als Instrument der Logistik-Integration, Aschaffenburg 2003, p. 161

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Due to the market demand, freight forwarders have enlarged their range of services. In general, small freight forwarders focused on specific customers and thus developed into dedicated logistics services providers (LSP). The extension of services of large freight forwarders helped them to develop into network operators. It was only a short step for them towards 3rd party logistics service providers (3PL). This was the result of the outsourcing process to save costs as the 3PL organised the logistics services of companies. Nowadays there is a trend towards 4th party logistics which means that a "4th party" functions as an intermediate between companies and logistics companies. Their focus is more *process-oriented* as they are in a *neutral position* when choosing the different logistic services and thus have a stronger focus on the overall process and on the optimisation of the whole logistics chain.

Modern logistics need a process orientated view of the transport chain. Optimisation of the whole process in terms of costs and efficiency also allows the use of the most competitive mix of means of transport in the whole logistics chain. Logistics chains furthermore require logistic chain management systems to recognise deviations and to provide data for deviation management systems to set up counteractive measures to avoid problems. Furthermore, modern resource management systems (e.g. for fleets, equipment, vehicles, traffic flow….) are necessary. It is not only the physical flow of goods, but also the (seamless) flow of information which has to be managed. New services for intermodal transport chain management and new software decision tools have to be developed. Provision of data should be gained by new telematics applications (identification, tracking and tracing, security and traffic information).

Today, inland navigation does not comply with these requirements of automated information exchange and does not use modern technology for sophisticated data management. Moreover, it is not integrated in managed intermodal door-to-door logistics chains. Furthermore inland navigation suffers from a lack of competitive intermodal services as well as a lack of process view in logistics in general. Due to the higher integration in organisational coordination (pre- and /or end-haulage necessary), inland navigation can gain its benefits only by taking into consideration a strong link to intermodal transport organisation to minimise the total costs of a logistics chain. Currently, the only solutions available are heterogeneous ICT solutions provided by logistics operators and the industry. These solutions are only of minor support for the logistical information networking process of actors in the field of inland navigation.

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Following these arguments, the objective of ALSO DANUBE was to establish inland navigation as an important transport mode in European logistics networks by the development of:

- Innovative intermodal transport management concepts
- Implementation of ICT solutions (information and communication technology) in waterborne logistics chains
- New intermodal logistics chain management solutions
- Logistics data platforms (e.g. the Common Source Logistics Database – CSL.DB)
- Integration of traffic and transport management by River Information Services (RIS)

Among these specific objectives of the project, the following general objectives were followed throughout the lifetime of the project:

- To promote the use of inland waterways as a key mode within intermodal door-to-door transport chains on the Danube axis
- To develop and implement an advanced European concept to manage intermodal transport chains with inland navigation as a key mode
- To set up and run highly integrated logistic networks and operational platforms
- To improve the efficiency of inland waterway transport, promoting the sustainable transport options between the European Union and the Eastern Danube countries (Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Ukraine)
- Demonstration of functionality within 4 logistic applications:
    - log chain CCS
    - log chain DDSG
    - log chain ILL
    - Common Source Logistic Database
- Promotion and lobbying for inland waterway transport

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4 Scientific and Technical Description of the Results

The aim of ALSO DANUBE to promote inland navigation focused not only on the development of an appropriate IT solution, but also on ideas for creating a "friendly" business environment for waterborne transport in managed intermodal logistics chains.

Thus the results of ALSO DANUBE can be categorised in five groups.

- Concepts
- IT-solutions (specification and implementation)
- Achievements of Demonstrations
- Assessment
- Dissemination and Exploitation

4.1 Concepts

One major goal of ALSO DANUBE was the development of concepts to support the integration of inland navigation into intermodal logistics chains.

4.1.1 Requirement Analysis for Inland Waterway Transport

The first step in the project ALSO DANUBE was the analysis of the requirements to identify the needs of the stakeholders of intermodal transportation. This analysis was supported by a relational database (RECON tool, developed by company BLSG), which enabled categorisation of the requirements. This tool RECON (relational database) was specifically developed within ALSO DANUBE to generate consistent requirements specification for the Common Source Logistics Database (CSL.DB) as the general logistics data platform.

The requirements have been collected via extensive user questionnaires, practical experience of logistics operators and the consideration of results of previous research projects of the EU FP4, FP5 (e.g. ARTEMIS, COMETA, INDRIS, etc.).

The major requirements are listed in figure 2:

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Co-operation and information sharing	online information of cargo, dangerous goods, ship locations and water levels common databases, use of EDI harmonisation of working routines work flow oriented data processing
Use of standards	communication standards (EDI-messages) standards for cargo handling equipment and transhipment service IT-architecture
Tracking and tracing of cargo and ships	online information service co-operation among stakeholders
New innovative services	new services in IWT service providers with complete services
IT-solutions	use of Internet and PC cheap and easy solutions for demand oriented data access common IT-architecture high availability of on-line data common data interfaces high reliability of data
Promoting of IWT	promoting the transport by competitiveness image improvement support of authorities (legal framework)

Figure 2: Major requirements of stakeholders

The requirements were grouped in four main categories:

- Business Management
- Generic Infrastructure
- Technology & Solutions
- Policy & Economics

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Over 40% of the requirements related to Business & Management, but the share of requirements in Technology & Solutions was also considerably high (29%). The requirements were mostly focused on the companies or inter-company relations and operations and the addressees were to a great extent transport or logistics service providers. The European wide co-operation among the partners was identified as a matter of highest importance.

Next, in accordance to their nature, strategic and tactical requirements were determined for each classification of requirement:

- The aim of the strategic requirements was to create conditions which would allow the future operation with inland navigation to become more competitive and effective, regardless of minor environmental changes. Strategic requirements were expected to be achieved in a long timeframe.
- Tactical requirements were to be achieved in a shorter period of time supporting the strategic plans in long term perspective.

Major strategic and tactical issues by main categories (figure 3):

	Strategic Requirements	**Tactical requirements**
Business and Management	• More efficient information sharing • Reliability of operation in all areas	• Web based solutions • More services and one stop shop providers • Online information transmitting
Policy and Economics	• Promotion of inland waterways	• Competitiveness and common rules
Generic Infrastructure	• Efficient use of infrastructure	• Capacity planning and fleet management • Improvement of service areas
Technology and Solutions	• Communication standards • Tracking and Tracing of cargo and ships	• New IT-solutions • Interfaces between company IT-systems • Automatic weather services • Use of EDI messages

Figure 3: Major strategic and tactical requirements by main categories

The main conclusion of the analysis showed that the operations on inland waterways need measures to improve the European wide co-operation on all levels, including traffic management (see chapter 4.1.2) as well as transport management (see chapter 4.1.3):

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- The first key measure proposed is to use efficient IT systems for transport management. This will ease information sharing and co-operation among the partners in the logistics chain. Important pre-requisites are the use of common standards for communication among partners and the application of tracking and tracing for the enhancement of reliability and timeliness of transports.
- The second key measure is the development of traffic information and management systems on inland waterways. This measure aims to increase the safety of inland navigation by providing additional information services to the skipper and to the traffic operator at locks and bridges.

Both key measures need to enhance processes and IT-systems for governmental and commercial actors in the logistics chain.

4.1.2 Set Up of Traffic Management Systems

ALSO DANUBE strived towards the link of traffic and transport management as described in 4.1.4.

Traffic management deals with measures to ensure safety of traffic. These measures are limited to the involved means of transport and the involved governmental actors. Traffic management is predominantly limited to one mode of transport, in the ALSO DANUBE case this mode is inland navigation.

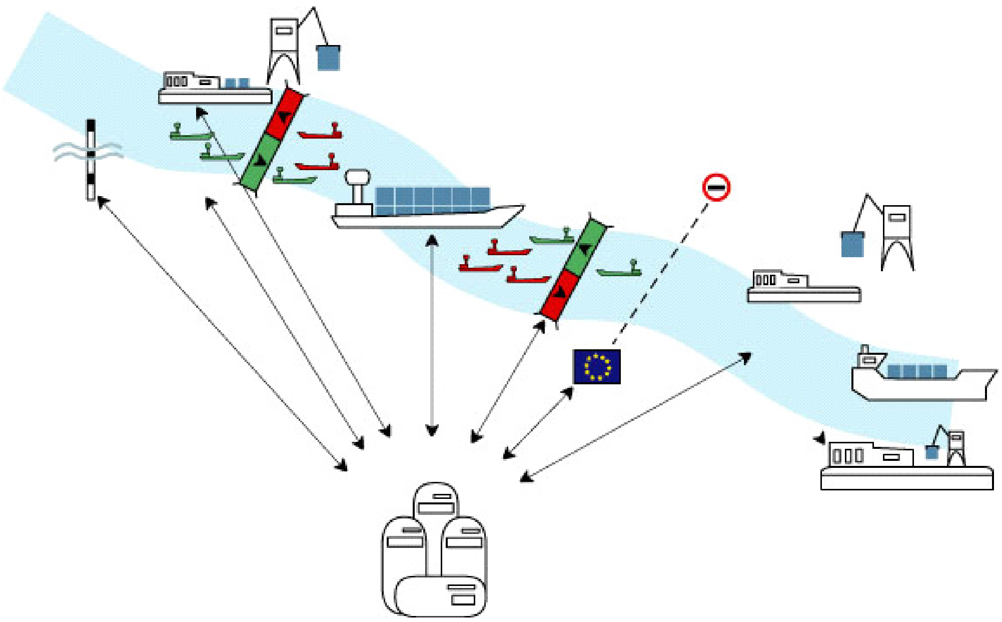

Figure 4: Traffic management for inland waterways

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For inland waterways, traffic management deals with the management of locks and bridges, the management of nautically critical areas and the movement of the vessel itself. Traffic management on inland waterways is one crucial element for River Information Services (RIS). According to the definition of PIANC and the Central Commission for Navigation on the river Rhine[4], River Information Services is a concept for harmonised information services to support traffic and transport management in inland navigation, including interfaces to other transport modes. RIS aim at contributing to a safe and efficient transport process and utilising the inland waterways to their fullest extent.

The system architecture of RIS follows strict standardised data processing rules to ensure inter-operability and availability of published and well documented interface specifications.

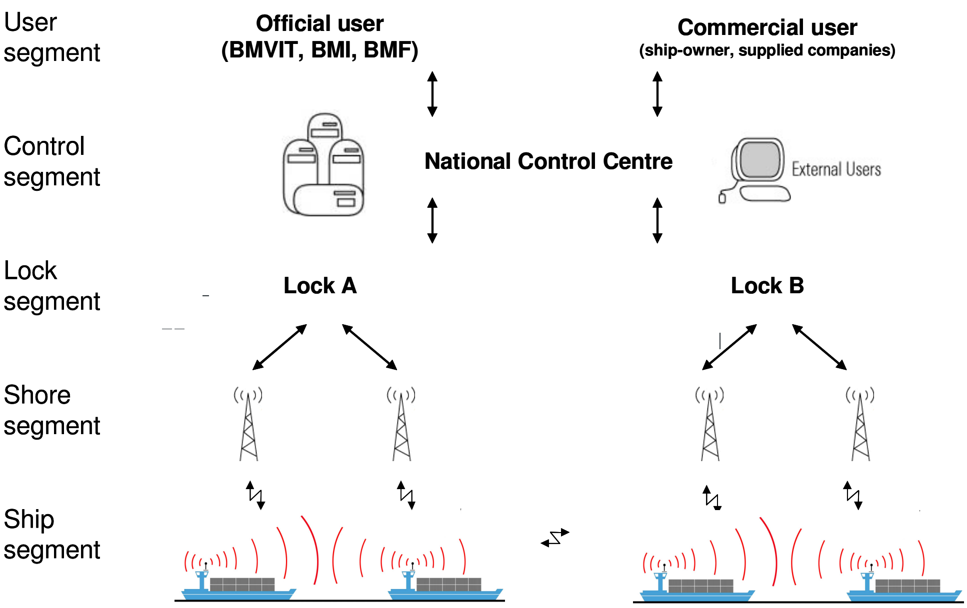

Figure 5: Traffic Management System Architecture

[4] PIANC and CCNR: RIS Guidelines 2004, Edition 2.0 from 5.February 2004

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4.1.3 Set Up of Transport Management Systems

Transport management deals with measures to ensure transport efficiency. Actors involved in the logistics chain are typically commercial companies (shippers, transport operators, etc.). Intermodal transport management is focused on more than one mode of transport.

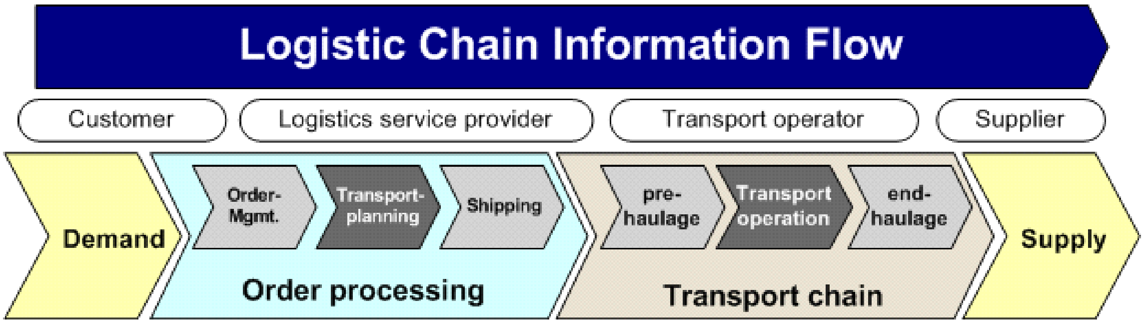

Figure 6: Information flow in the logistics chain

Logistic chain management describes the relations in the value added logistic chain between the supplier, the logistic service provider, the transport operator and the customer. It is a method for the seamless controlling and monitoring of the logistic chain among all the different stages in the value added chain. The main objective of logistics chain management is the provision of goods at the right place, at the right time in the correct amount and ensuring the correct quality.

The necessity for the use of information and communication technologies in logistics chain management is founded in requirement for a seamless information flow between the stakeholders in order to facilitate the physical goods flow. Information triggers the goods flow in advance, accompanies it and is used for the whole documentation.

The basic idea behind an information system for the management of logistics chains with inland navigation as the main haulage is to establish an interactive network between the logistic stakeholders. Via this network, powerful tools for the efficient planning, monitoring and management of multimodal logistics chains can be achieved.

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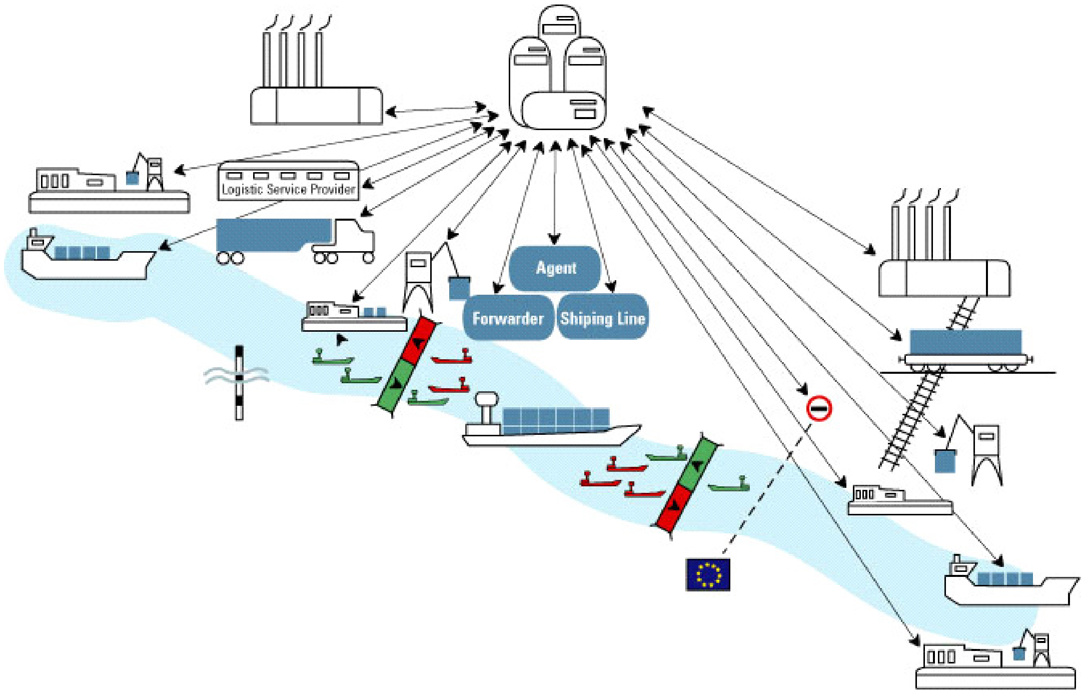

Figure 7: Transport management incorporating inland navigation

4.1.4 Set Up of Interlinked Traffic and Transport Management Systems

Within ALSO DANUBE, a technical and operational concept for the cooperation of traffic and transport management was developed. The traffic management system of the inland waterways shared information with the transport management system.

For those geographic regions where traffic management systems were not implemented, traffic information of vessels lwere generated automatically by tracking and tracing solutions on board the ships.

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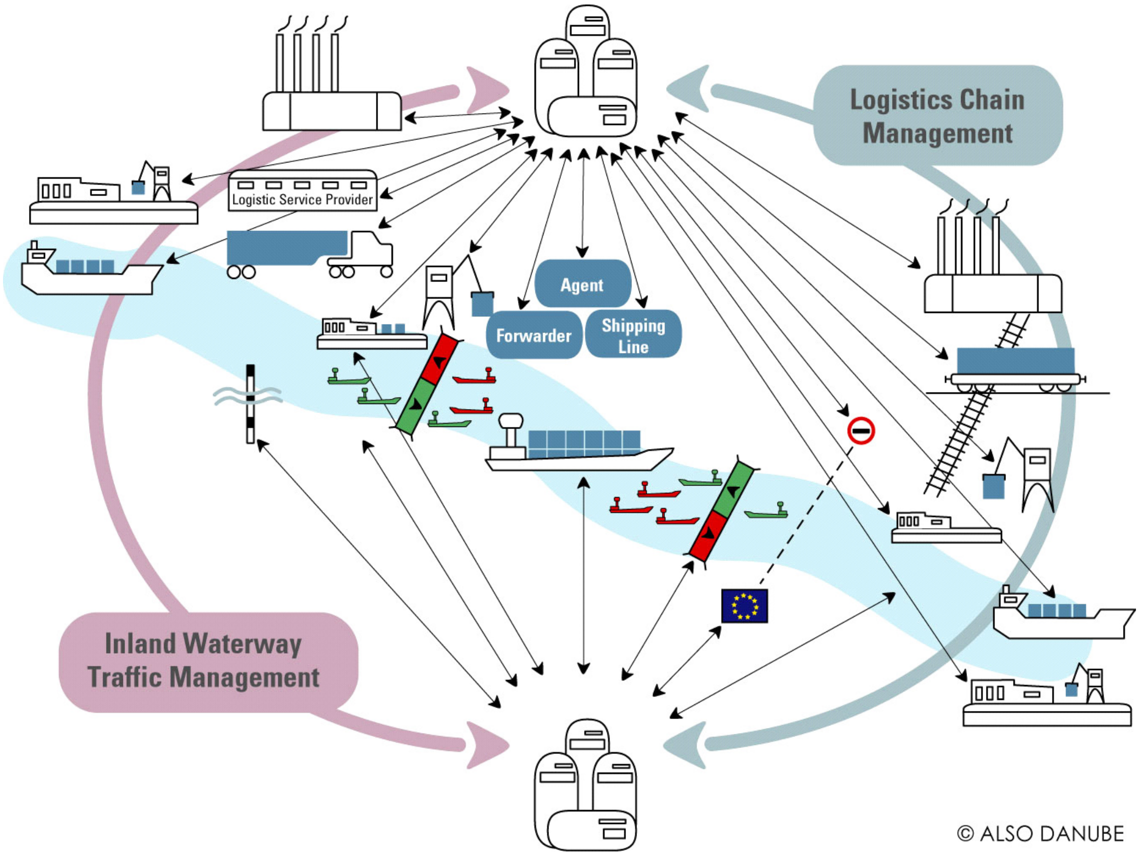

Figure 8: Linkage of traffic and transport management, ALSO DANUBE approach

The network, which interconnects (all) commercial actors in the logistics chain and obtains traffic information from the inland waterway traffic management system is, in the context of ALSO DANUBE, called Common Source Logistics Database, in short CSL.DB. Due to the intermodal character of the CSL.DB it was designed for operation in RIS environments as well as for operation in non-RIS environments.

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4.1.5 Concept for European-wide Interlinked Traffic and Transport Management Systems

The concept of interlinked traffic and transport management ensured that actors in the logistics chain could be integrated despite the fact that the actors were

- located in different countries
- had different levels of IT in use
- used proprietary solutions for logistics operation, fleet management, etc.

A European network could be set up under the following pre-conditions:

- Availability of low-level interfaces for actors without sophisticated systems: In order to enable the actors of South-East Europe's transport sector to participate in intermodal logistics chains, low-level interfaces (web-interfaces for manual entry) should be available.
- Usage of Interconnectivity Applications in order to guarantee a reliable data exchange with actors using EDIFACT and XML should be available.
- Linking of National Traffic Management Systems: Since seamless traffic information is considered as a pre-condition to managed logistics chains, information exchange between national traffic management systems should be established. This approach is taken into account for the European wide integration of River Information Services (RIS).
- Linking of Logistics Chain Management Applications: In order to guarantee seamless logistics chain management, regional logistics chain applications should be linked.

With the intention of adapting a European approach, various operating CSL.DBs could be linked to set up an interactive network, which allowed planning, managing and monitoring logistics chain activities at a European / global level according to the present and future requirements of modern logistics chain management.

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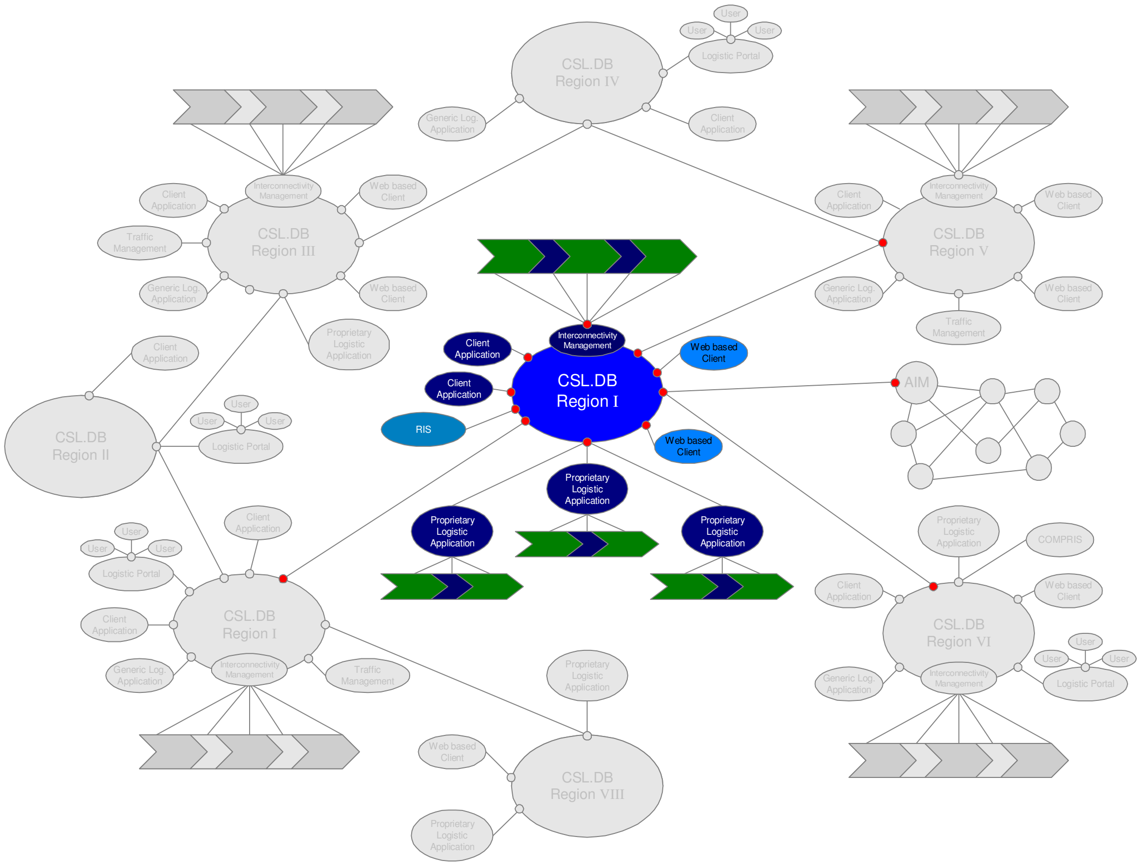

Figure 9: Concept for European-wide interlinked traffic and transport management systems

By now, similar logistics chains and traffic management systems with varying maturity in the technical and operational characteristics are in use throughout Europe. In connection with the ALSO DANUBE approach of the CSL.DB a wider European network of IWT will be created. All the elements and systems (regional- and trading systems) can be seen as part of a future European network of logistics platforms as shown in the figure above. The concept of the CSL.DB allows not only flexible access to its services, but also flexible integration in existing logistics networks.

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4.2 ALSO DANUBE IT-Solutions

Complex data management processes, as they appear in door-to-door supply chains can either be supported by monolithic software applications (like SAP, etc.) or by a well defined modularised concept embedded in a clearly described system architecture interface specification. The first approach needs to establish a stable, single data model over the whole process chain. Although the advantage of this data model is consistently high quality and highly reliable process management door-to-door, it nevertheless comes with the disadvantages that all the actors in the supply chain must use the same data model and even the same software application. This approach did appear in the mid 90's in the automotive, the chemical and the electronic industry and is now being replaced step by step by a more flexible, distributed data management concept using the capabilities of internet and XML.

This approach was the guide for the selected concept in ALSO DANUBE as well.

The Common Source Logistics Database (CSL.DB, see also 4.1.4 and 4.1.5) represents the core IT-solution. It is interconnected with the Austrian inland waterway traffic management system (DoRIS, Donau River Information Services), the systems of the demonstration partners (DCS, CCS-IRIS, ILL-ILLONET and DDSG), the generic logistics management application (ETNA, European Transport Network Application) and the Application Interconnectivity Manager (AIM). Moreover, a tracking and tracing solution was connected to the CSL.DB. A lock management system (LOMAX) was developed in order to improve the reliabilities of ETA (estimated time of arrival) calculations. The CSL.DB offers an interface for the interconnection with any external database system (External DB). Figure below shows the developed applications and their interconnection.

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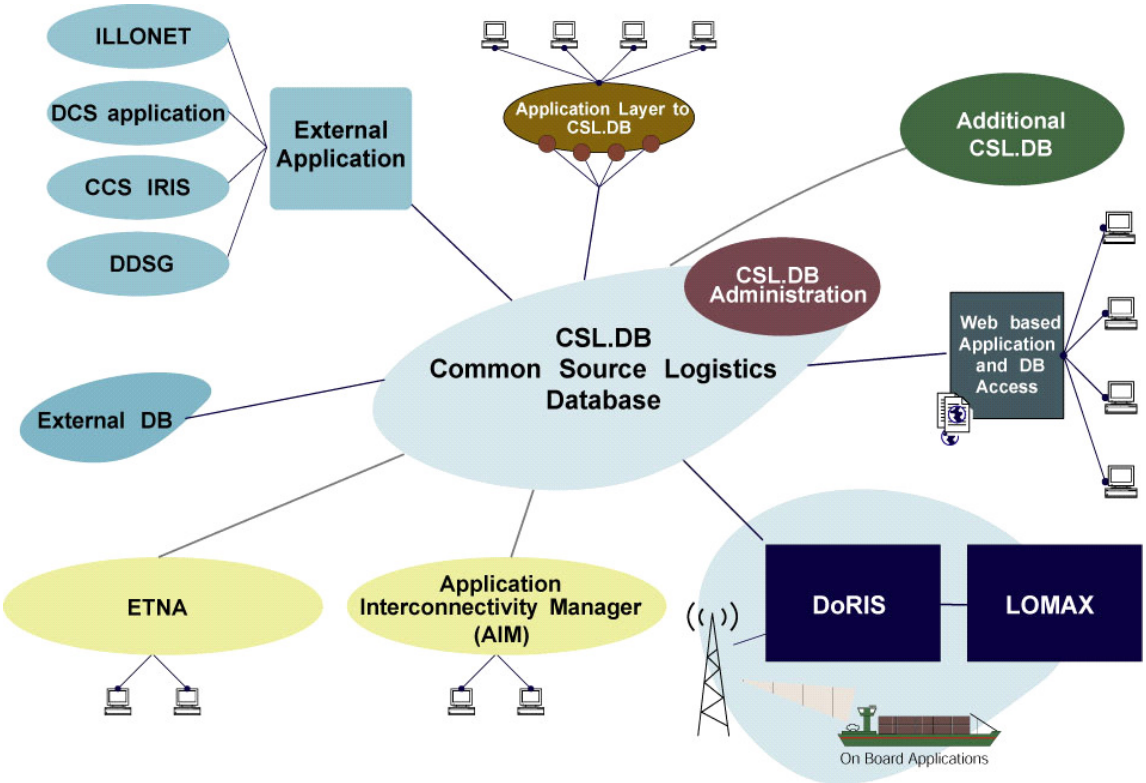

Figure 10: Context Diagram of the ALSO DANUBE IT-Solutions

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4.2.1 CSL.DB – Common Source Logistics Database

The Common Source Logistics Database (CSL.DB) had the objective of providing all the relevant data necessary to

- plan
- manage
- monitor
- administrate

intermodal logistics chains in terms of an integrated logistics chain management and in order to form a qualified baseline for highly qualified logistic management services.

The CSL.DB forms a common source to provide any requested data and information in the adjusted scope and on EDI based formats for operative actors as well as actual status information.

The CSL.DB can be interconnected with traffic management systems to allow tracking of vessel movements in the case of inland waterway transport, and/or to obtain traffic information from other tracking and tracing solutions.

Moreover, due to given interactive relational links between supply order data and transport operation data provided by the CSL.DB, a tracking of the logistics processes can be realised at the level of order positions.

The CSL.DB has the following general technical components:

- Relational Database (Oracle), where the respective data is collected, linked and assigned, stored and updated/maintained
- Access solutions (remote automatic access as well as interactive web based access solutions) in order to connect with client applications of the demonstration partners
- Interactive links to traffic management (on demand and/or event based upon user configuration)
- Interactive links to external information sources (e.g. schedules of transport services, port information, etc.)
- Possibility to operate with EDIFACT messages due to interconnection with advanced interconnectivity management tools

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The data model and data structure was developed with a CASE tool (computer aided software engineering) in order to generate consistent mind-maps and data specifications as the sole source for software development and testing in the next step.

4.2.1.1 Functional description CSL.DB:

The mind map presented in figure 10 indicates the different functions of the CSL.DB that are described in more detail below.

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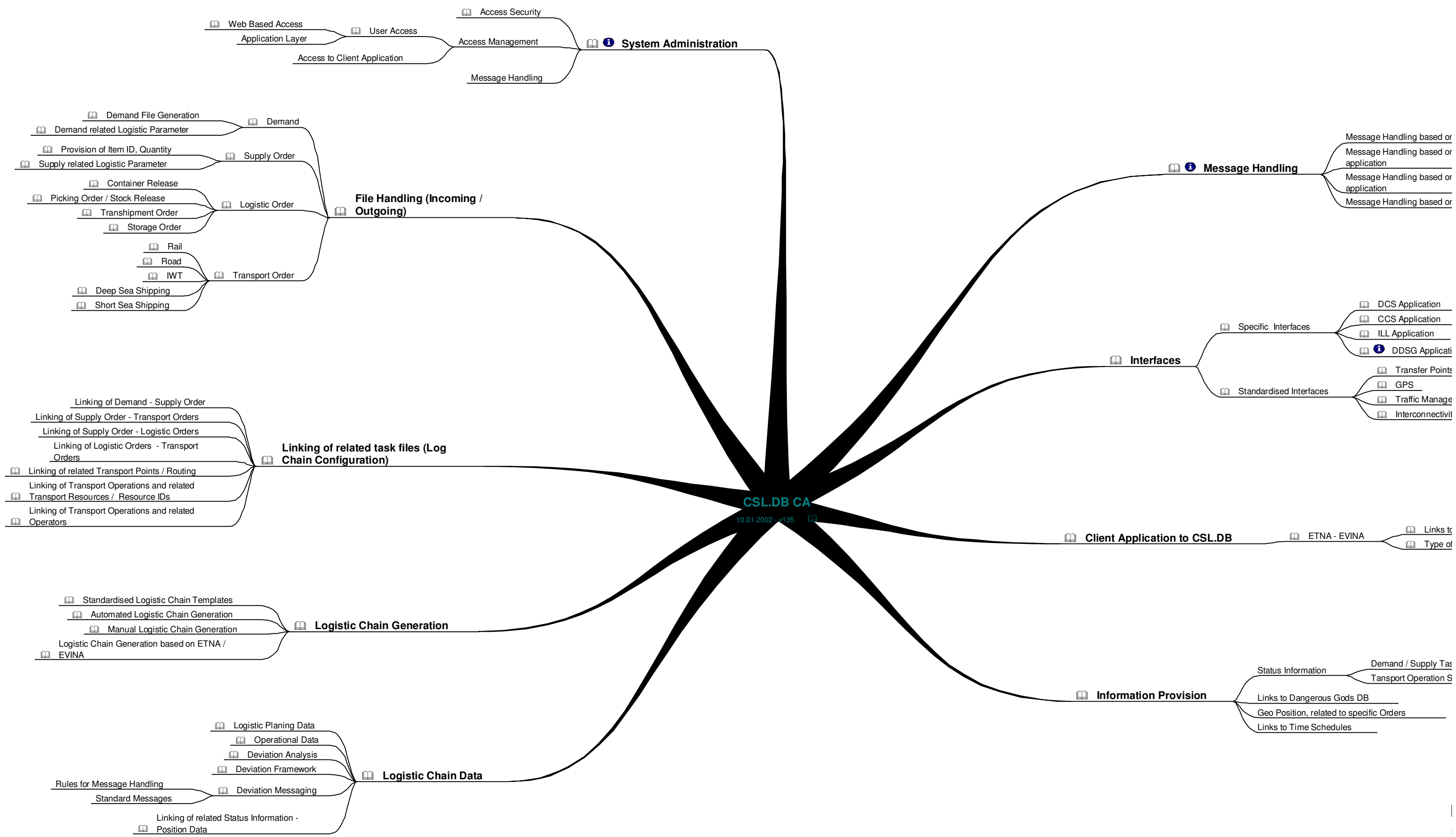

Figure 11: CSL.DB Common Source Logistics Database – Top level data diagram

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Message Handling

The *message handling functionality* is concerned with the handling of incoming and outgoing messages from and to the CSL.DB.

The following sources, which interact with the CSL.DB, have been identified:

- *Specific web application:* This application is used to perform the manual specification of the logistic template, or to perform the manual linking of files
- *Interconnectivity manager* (AIM, Application Interconnectivity Manager): This application is used to receive or transmit messages, which are EDI-based. Due to the various formats of EDI-based messages, it is necessary to provide such a specific function which is able to transform the messages into a format that can be read by the client's computer system
- *Specific demonstration application:* These customised applications, like the computer system of a demonstrator involved, contact the CSL.DB directly to exchange files
- *Generic logistic management application* (ETNA, European Transport Network Application): This application is used to automatically obtain information about logistic transport networks that are transferred into logistics chain templates

Interfaces

The *interface functionality* deals with the use of interfaces to exchange data with other applications.

The specific interfaces are dedicated to exchange data with the specific applications of the different demonstrators. The standardised interfaces are dedicated to exchange data with generic information resources like positioning data or transfer point information. The following sub functions have been developed to support the exchange of information:

- *Specific Interfaces:* The specific interface functionality is concerned with the exchange of data that occurs during the interaction with a specific client application of an involved demonstrator

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- *Standardised Interfaces:* The standardised interface functionality is concerned with the exchange of status information of the transport generated by tracking and tracing solutions and the traffic management systems.

Client Application to CSL.DB

This functionality of the CSL.DB was designed for the interconnection with the European Transport Network Application (ETNA). ETNA is the generic logistics management application which is used for the management of European-wide data regarding transport schedules of different transport modes. Its primary objective is to integrate the transport schedules of liner services at a European scale to allow better and easier planning of logistic chains through comprehensive multimodal information on available intermodal services. Chapter 4.2.4 offers a detailed description of this CSL.DB functionality.

Information Provision

The information provision functionality is supposed to provide relevant information that is additionally necessary for the logistic service provider and other involved actors, and which is necessary for the relevant tasks. This functionality enables the CSL.DB to function as a logistic portal that is able to provide additional information from external databases for involved actors.

It was planned to provide the following links after ALSO DANUBE:

- Links to information regarding status information
- Links to geographical positions related to a specific order
- Links to time schedules

Logistics Chain Data

The logistics chain data functionality is concerned with the handling of logistic plan data and operational data allowing the CSL.DB to monitor the current status of a certain intermodal logistic chain. This function is also responsible for the definition of a deviation framework and the message handling after a deviation has occurred.

The following functions were developed to support the management of logistic transport chains:

- *Logistic Plan Data:* This functionality is concerned with the handling of planning data that will supply the baseline for an accurate deviation management. The planning

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data will be used to describe any single process and sub process along the entire logistics chain.

- *Operational Data:* This functionality is concerned with the handling of operational data that occur during the different logistic processes.
- *Deviation Analysis:* This functionality is concerned with the comparison of the planned and the operational data. Based on the results of the analysis and the deviation framework, specific messages are generated to notify the organisation in charge about the deviation. This enables the organisation to react as early as possible to potential delays within the logistics chain.
- *Deviation Framework:* This functionality is concerned with the definition of a specific deviation framework that supports the analysis of a deviation. The framework is used to adjust the bandwidth within which a deviation is to be tolerated and to define the action to be taken in case of a deviation.
- *Deviation Messaging:* This functionality is concerned with the generation of messages that are based on the result of the deviation analysis.
- *Linking of related status information:* This functionality is concerned with the linking of relevant information and supporting specific activities in case of a deviation, like transhipment of freight in case of calamities or delay.

Logistics Chain Configuration

The *logistics chain generation functionality* is used during the planning phase of an intermodal logistics chain. It deals with the composition of specific logistics chains from the different transport and logistics (transhipment, storage) processes. These specific logistics chains are then transferred into a network plan that can be displayed.

The definition of an entire logistics chain template enables the user to perform an overall planning along a specific logistics chain, which has been configured to meet the requirements of a specific demand.

The planning data specified during this process are also used to perform a detailed deviation management.

The following functions were developed to enable the generation of logistics chain templates:

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- *Standardised Logistics Chain Templates:* This functionality is concerned with the generation of standardised logistics chain templates. These templates are able to describe logistic networks that can be used quite often in the same configuration and with the same resources. These standardised templates are manually specified once and stored in the database.
- *Automated Logistics Chain Generation:* This functionality is concerned with the automated generation of logistics chain templates. These templates describe logistic networks that can be used quite often in the same configuration and with the same resources. An automated configuration is performed based on the linking of the related logistic and transport operations.
- *Manual Logistics Chain Generation:* This functionality is concerned with the generation of manual logistics chain templates. The templates describe logistic networks that are set up for the first time or support single time requirements.
- *Logistics Chain Generation:* This function is concerned with the generation of logistics chain templates generated by the ETNA system (see chapter 4.2.4). These standardised templates can be specified within the ETNA system and stored within the intermodal transport network database of the ETNA system.

Linking of Related Task Files (Log Chain Configuration)

On basis of the *log chain generation functionality*, the log chain configuration defines the parameters of the processes in the intermodal logistics chain.

The CSL.DB is able to describe the entire logistic network from the consignor to the consignee. On the basis of the user configuration in the logistics chain generation, the CSL.DB describes only a certain fraction of the logistic network, for instance only the main haulage without the pre- and / or end haulage.

This function deals with setting up the link among:

- Actors in the logistic chain (consignor, consignee, logistics service provider, transport and logistics operator)
- Orders in the logistics chain (demand, supply, logistic chain order, transport and logistics orders)
- Information on involved transport and logistics resources

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File Handling (Incoming / Outgoing)

The file handling functionality is used to gather and distribute specific files and information relevant to manage logistic tasks within a logistics chain. The file handling functionality assures that detailed logistic information will be stored and forwarded in the right manner, to suite the needs of a specific task (generation of data sub sets). The following functions have been developed to enable the handling of incoming / outgoing files:

- *Order:* This functionality is concerned with orders that have been generated by a customer to trigger a certain supply providing a certain product or service.
- Supply Order: This functionality is concerned with the handling of supply orders based on a specific demand placed by the customer.
- *Logistic Order:* This functionality is concerned with the handling of information regarding logistic operations related to a specific supply order.
- *Transport Order:* This functionality is concerned with the handling of files regarding transport operations.

System Administration

The function "System Administration" is a set of functions that are mainly dedicated to the basic security of the CSL.DB, such as access security and access management. During the development, state of the art software operation principles such as access control, process logging, file and data protection, remote monitoring, management and update procedures were observed.

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4.2.2 Operational Concepts for CSL.DB

Practical experience has shown that fixed frame contracts between software development companies and their customers have become less important. Flexibility has become the key factor within customer relationships. Therefore, information service provision recently attracted worldwide attention.

In principle, there are two alternatives for information service provision of CSL.DB:

- Common Source Logistic Application Service Provision
- Common Source Logistic Remote Operating

In general, the CSL.DB can be installed at the information service provider and maintained remotely, or installed within the customer's system environment. In this case, the customer can operate the CSL.DB hardware and software in the company's own computer centre.

Both alternatives feature benefits and disadvantages. Thus, each company must decide which alternative is best for them. Both alternatives ensure that the CSL.DB system runs optimally, allowing the customer to focus on core competencies.

IT systems are expensive – flexible architectures are even more cost-intensive. From the purchase of hardware and software to the installation, operation and maintenance, large financial and personnel resources are required. Companies often face the dilemma of having to build up IT competencies rather than to focus fully on their day-to-day business. Not only in small and medium-sized companies do IT-related expenditures sometimes exceed justifiable dimensions.

Software for rent (via Internet) or the operation of client IT infrastructure by competent partners are possible alternatives for overcoming the dilemma described above. With *Common Source Logistic Application Service Provision* and *Common Source Logistic Remote Operating,* the Common Source Logistic Information Provider is able to offer two powerful IT solutions.

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4.2.3 Provider Concept for Logistics Information Provider

The Common Source Logistic Information Provider (CSL.IP) is designed to act virtually as a centralised organisation according to the strategic approach of ALSO DANUBE.

The CSL.IP

- ensures the availability of necessary data and information for the planning, management, monitoring and administration of integrated logistics chains and related logistic tasks and inter-modal transport operations with a focus on inland waterway transport
- provides demand and/or event triggered tracking information for vessels as well as other inland waterway traffic management information/actual traffic situation data
- acts as a communication platform and provides EDI oriented communication as well as data clearing services in order to support interactive networking and data exchange between the involved operational parties
- provides interactive access solutions to the common source logistic database in order to ensure the integration of actors with low level IT-infrastructure
- provides high level logistic management services by setting up relations and interactive links between supply order data and operational transport data, independent from the executing party as a qualified baseline for the monitoring of supply processes
- provides generally relevant information and data with a focus on inland waterway transport as well as qualified service information of operational platforms

The common service portfolio of the Common Source Logistic Information Provider can be presented via a matrix as shown in Figure 12.

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	Administration	File Handling	Linking of related task files	Tactical Logistic/ Transport Chain Template	Current Logistic Chain Data	Standard Information	Interfaces	Information Provision	Client Application of CSL.DB
Communication between Logistic and Transport Chain Actors	X	X					X		
Dedicated Message Handling and Distribution of Information	X	X	X				X		
Provision of full scope data sets for integrated logistic chain planning	X	X	X	X			X		
Provision of full scope data sets for administration and Operation	X	X	X	X	X		X		
Integrated status Monitoring of integrated logistic and intermodal transport chains	X	X	X	X	X	X	X	X	
Deviation Recognition and active Messaging	X			X	X	X	X	X	
Interactive Data Provision to promote intermodal Networking	X			X		X		X	
Added value of logistic information services	X		X			X		X	X

Figure 12: CSL.IP Service Portfolio

4.2.4 ETNA – European Transport Network Application

ETNA (European Transport Network Application) is a generic logistic management application within the scope of the ALSO DANUBE IT-solutions that is used for the management of European-wide data regarding transport schedules of different transport modes.

Its primary objective is to integrate the transport schedules of liner services at a European scale and to link with all relevant transport modes to allow better and easier planning of logistic chains through comprehensive multi-modal information on available intermodal services. Making schedule information available through a single application reduces the amount of time customers, suppliers, and/or logistic service providers have to spend planning multi-modal logistic chains. ETNA enhances the value of the schedule-related data and increases the competitive ability of any liner service providing schedule-related data.

ETNA supports the:

- Provision of multi-modal schedule-related data to customers and suppliers, analogous to a digital train schedule, including the generation of optimal multi-modal transport routes.
- Generation of multi-modal logistic chains for use as logistic chain templates within the CSL.DB

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- Simulation of transport networks, e.g. for detection of future bottlenecks.

To support the objectives of the use of ETNA, the following functionality is required (see Figure 13):

- Master Data Management,
- Transport Network Management,
- Multi-modal Route Planning,
- Network Simulation, and
- Logistic Chain Template Generation.

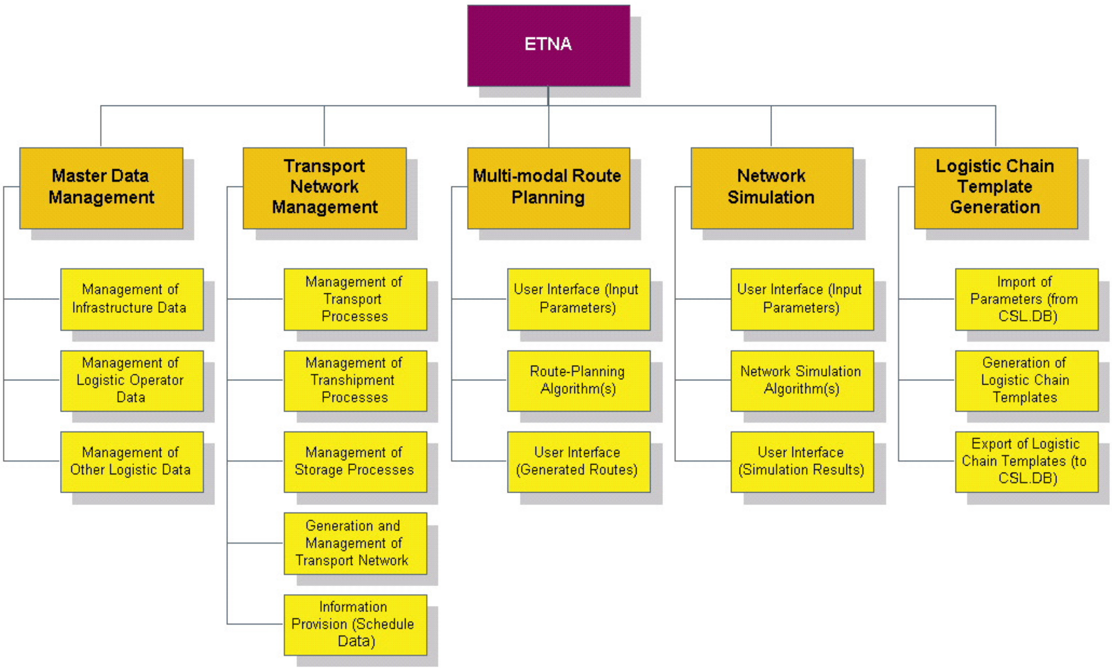

Figure 13: ETNA - functional specification (overview)

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4.2.5 LOMAX – Lock Management System

For inland navigation, locks represent one of the major 'bottlenecks' today. Limited traffic volumes, and especially the time consuming process of the lock operation, cause delays during the voyage. Vessels have to accept waiting periods before entering the lock. Due to the limited range of the VHF-radio, skippers can only request lock operation when in close distance to the lock. Outside the range of VHF-radio, vessels are 'invisible' to the lock operator. Therefore, lock operations are not always scheduled efficiently and even a number of 'empty' lock operations are executed.

Within ALSO DANUBE, the lock management system - LOMAX - was developed. LOMAX aims at minimising present weaknesses and improving the sequence of lock operations. Participants, lock officers as well as skippers have access to the system. Vessels are equipped with GPS/GSM equipment which allows localisation wherever necessary. Able to send an SMS, the skipper is no longer tied to the conventional VHF-radio. Thus, LOMAX offers the possibility to request lock operation sooner.

At the beginning of the voyage, the skipper specifies vessel data and registers with the LOMAX database. The headquarter processes the request-SMS and forwards the information received to the respective lock, where it is displayed on the monitor. This supports the lock officer in scheduling lock operations far in advance. The deadline for the arrival is communicated to the skipper. If the skipper misses the assigned timeslot and does not arrive on time, re-arrangements will be necessary. Knowing the planned time slot of the lock operation, the skipper is able to optimise velocity in order to arrive as scheduled. This has positive effects for the skipper (fuel saving) and the lock operator.

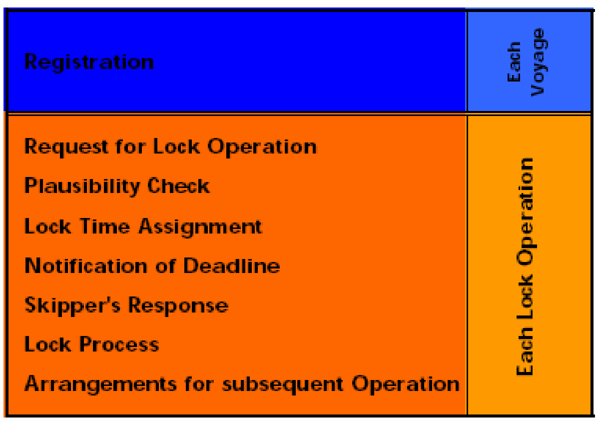

Figure 14: Sequence within LOMAX

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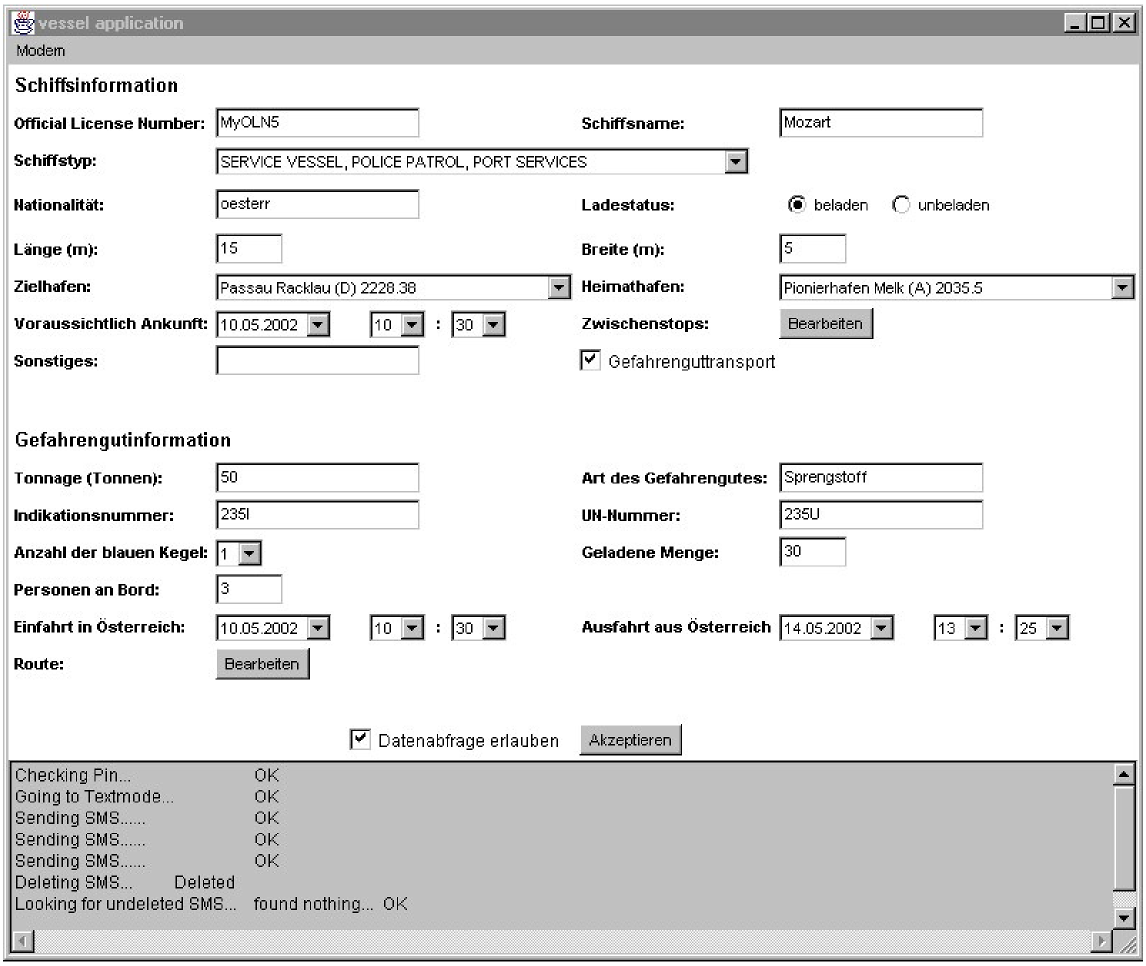

Figure 15: Sample screen of LOMAX (ship)

4.2.6 AIM – Application Interconnectivity Manager

The real world of software applications in the supply chain among the different actors shows a wide variety of products. Many of them act as a backbone for data processing within the mostly small and medium enterprise based actors and cannot be replaced within a reasonable period of time.

The introduction of new process modes for door-to-door supply chain management must consider easy data exchange with the great majority of these individual logistics software applications.

In order to set-up a communication platform as well as to provide respective data communication and clearing services, the Application Interconnectivity Manager (AIM) is used in relation with the Common Source Logistic Database (CSL.DB). The AIM consists of several components that can be combined to meet exact requirements and

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conditions. Due to the individual specific IT-infrastructure, adjusted solutions can be provided.

The main objective of the AIM system is to develop and realise an innovative approach in order to enable the direct exchange of information between existing application systems and to enable users without appropriate application systems to participate in electronic information exchange.

Within the ALSO DANUBE approach, AIM is able to provide interconnectivity between all related partners along the inland waterway logistics chain, to enable a consistent flow of information. Depending on user requirements and the application availability, the following degrees of interconnectivity may be applied:

- *AIM Direct:* Direct connection to communication databases, allows quick data transmissions
- *AIM Online:* Data transmission is performed via specific interfaces (in the context of ALSO DANUBE, this mode of connectivity is most likely be used)
- *Mixed Operation:* Mix between AIM Direct and AIM Online

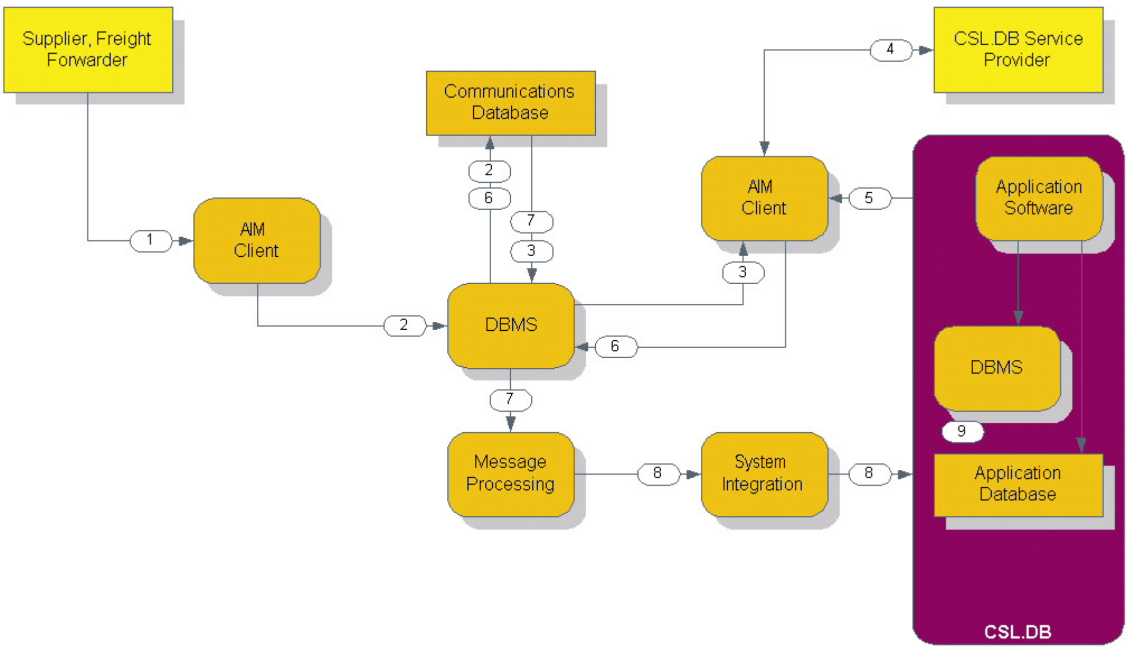

Figure 16: AIM – inter-relations between CSL.DB and AIM

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Figure 16 shows an example for the potential use of the AIM within the environment of the Common Source Logistic Database. The numbers assigned to information flows have the following meaning:

1. A supplier or freight forwarder is supposed to use the AIM client to prepare a message (e.g. resource allocation request).
2. The AIM contacts the dedicated database management system to store the related resource allocation request.
3. The CSL.DB service provider uses his AIM client to retrieve incoming messages.
4. The AIM is used to complete the incoming message.
5. The message completion process can be supported by the use of related reference data kept in the CSL.DB.
6. Upon completion of this process, the message is again stored in the communication database and flagged "ready to import".
7. The AIM message process generates a message file based on the data elements provided by the database.
8. The message file is forwarded to the CSL.DB.
9. The data integrated into the CSL.DB are now ready for further processing.

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4.3 Achievements of Demonstrations

The main objective of ALSO DANUBE was to prove the concepts and the specified and developed functions in a step by step approach. This approach was defined in several demonstration scenarios either on the level of the individual application or on the level of data exchange between the modulus up to this integration in the real operation environment of logistics operator.

The purpose of the demonstration scenarios was to test and validate solutions which were developed during ALSO DANUBE in real life business scenarios. Following the specific strategic targets and the state of the defined demonstration scenarios, customised solutions were developed and demonstrated within the scope of the project, taking the following objectives into consideration:

- To demonstrate the technical, operational and commercial feasibility of managed intermodal logistics chains with inland navigation in the main haulage
- To enhance conventional operations in order to reach best practise examples, from which other actors can learn
- Innovations in terms of new services and technical innovation yields for the commercial benefit of the actors
- Set up and/or improve organisational structures for operative platforms for intermodal transport services with focus on inland navigation
- Create innovative and added value logistic services in terms of efficient door to door services
- Improve and advance existing application systems for planning, management, monitoring and administration and/or development of new application system components
- Set up EDI-based Interfaces to related organisations (logistic service and transport operators, customers of industry and wholesalers, port authorities, national authorities, customs, etc.)

Within the demonstration scenarios, conventional operations were improved with the help of the research and development within ALSO DANUBE. The advanced operations were demonstrated in some cases during a period of 6 months and the effects for the involved business processes were analysed.

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Figure 17: Advanced operation through R&D

4.3.1 Overview of the Demonstration Scenarios of ALSO DANUBE

Traffic Management (TM) on inland waterways was demonstrated on the Austrian Danube in the vicinity of Vienna. In the demonstration scenario, traffic information was used as a support for the navigational decisions of the skipper and for governmental traffic monitoring and lock management. Moreover, the interface of the Traffic Management system to the CSL.DB was defined.

The **Reference Scenario of CSL.DB** demonstrated the full functionality of the Common Source Logistics Database using the experience of the other demonstration scenarios which used specific functions of the CSL.DB.

DCS, a new container liner service, was set up between Bavaria, Upper Austria and Central Hungary in 2001. The container line operator **Danube Combined Services (DCS)** provided regular door-to-door intermodal transports of 45'' containers on the Danube from Budapest (Hungary) via Enns (Austria) to Deggendorf (Germany). During the engagement of DCS in ALSO DANUBE, IT systems for the management of container liner services were developed. The use of these IT systems proved to be a crucial factor in guaranteeing high quality service for industrial clients. The concept of DCS proved that Danube container liner services were technically and organisationally feasible and could meet the customer requirements as soon as number of containers to be shipped gains the threshold to provide regular commercially viable services.

CCS (Combined Container Services) provides multimodal door-to-seaport transport on the Rhine and its branches. The CSL.DB functions were used within this project for

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tactical and operational route planning. Tactical route planning allowed the generation of alternative multi-modal transport chains in a strategic (mid-term) planning horizon, whereas operational route planning supported daily operations.

The designated demonstrator **DDSG Cargo Line** provided intermodal transport services from Austria to the ARA Ports. As a part of this scenario, the CSL.DB used traffic data of the telematics system River Information Services (RIS) and of the company's fleet management system for the purpose of deviation management.

In the **ILL – Steel Logistics case**, steel coils were shipped from VOEST ALPINE in Linz to Krems within a just-in-time supply concept of the company. The CSL.DB was used for processing inland waterway transport and transhipment operations, and for notifying the port of destination. ILL - Steel Logistics also used the CSL.DB for demonstrating another logistics chain from Linz to Antwerp.

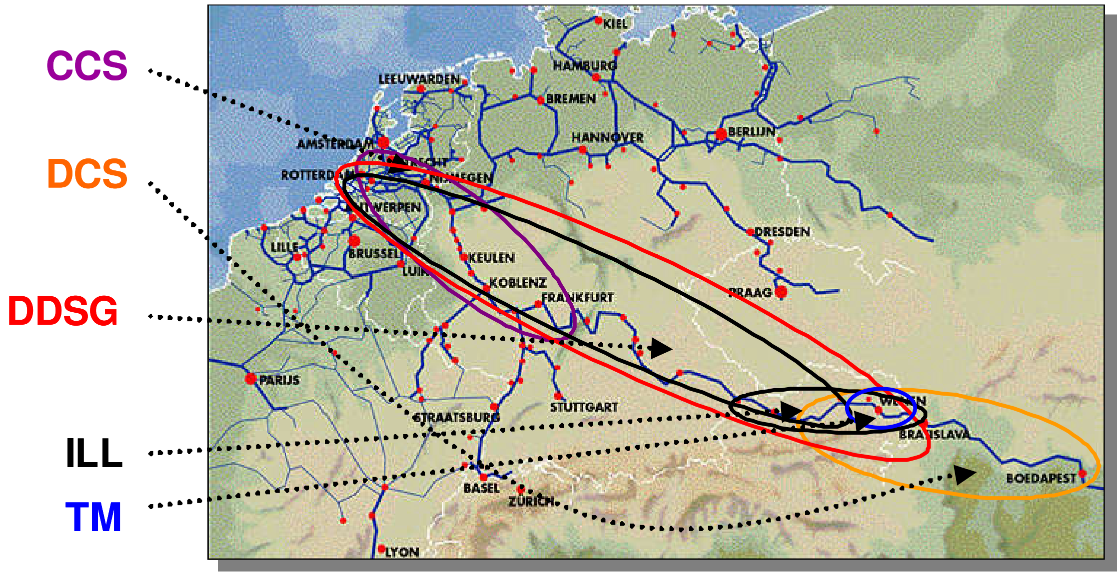

Figure 18: Area coverage of the ALSO DANUBE demonstration scenarios

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4.3.2 Traffic Management on Inland Waterways – Demonstration Scenario

In order to control logistical processes such as transhipment operations precisely, resource planning and allocation need to have all information from the means of transport and its identification at the earliest starting time of the process. For example the port of destination should know the time of arrival of the vessel in order to assign a crane for the transhipment operation. The time of arrival at the port can be derived from the position of a vessel. Therefore it is necessary for the control of logistical processes to have the traffic information of the vessels (vessel position, vessel identification, etc.) available.

There were two methods for the generation of traffic information on the Austrian part of the Danube which could be used during the project ALSO DANUBE. These were the governmentally operated Inland Waterway Traffic Management System (DoRIS) and Tracking and Tracing Solutions for areas where the Inland Waterway Traffic Management System had not yet been set up.

4.3.2.1 Austrian Inland Waterway Traffic Management System (DoRIS)

The Austrian Inland Waterway Traffic Management System was organised in a stepwise approach. In a first step, the DoRIS Test Centre (Donau River Information Services Test Centre) was established in order to prove the technical concept. In a second step, a test stretch (approximately 300 km of the Austrian Danube) was implemented. Finally the Austrian Inland Waterway Traffic Management System was extended to the entire Austrian segment of the Danube.

The DoRIS Test Centre covered approx. 30km of the Danube in the section between the locks of Freudenau and Greifenstein. It comprised 5 permanent AIS transponders which were mounted onboard two ships of the supreme shipping authority, two ships of the supreme shipping police and on one passenger ship. Additionally 10 mobile transponders in portable pilot-cases could be mounted on any ship participating in the system.

All ship borne AIS (Automatic Identification System) transponders continuously broadcasted tactical traffic information and received such information of the others. The 5 ships with the permanent transponder installations were also equipped with ENC (Electronic Navigable Chart) Viewers, so that tactical traffic information of the own

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vessel and other vessels in the vicinity could be displayed on an electronic navigational chart (=tactical traffic image).

By means of the ship borne AIS transponder, skippers could broadcast messages to other vessels and to the national control centre, where these messages were then displayed.

4.3.2.2 System Concept of the DoRIS Test Centre

Two AIS base stations were mounted ashore which received the tactical traffic information and forwarded such information to the national control centre located at the office of via donau. The AIS base stations were used to broadcast dGPS correction data enabling tactical traffic information to supply a position accuracy of between 2 and 4 metres. Messages could be broadcasted from the national control centre to the vessels equipped with a ship borne AIS transponder.

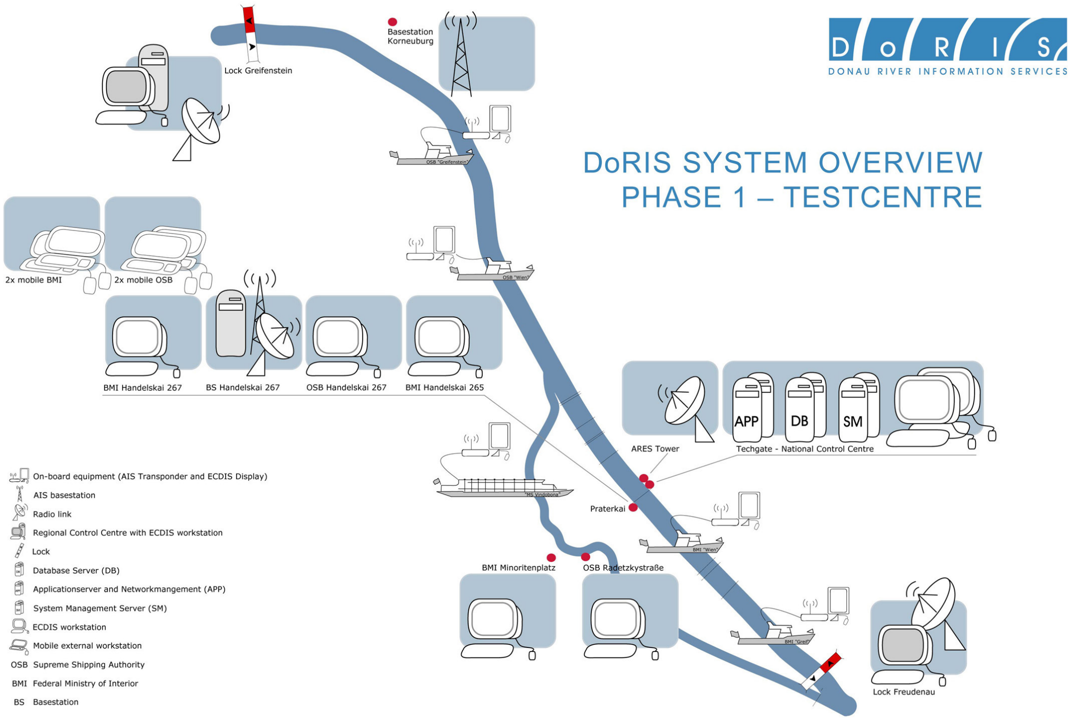

Figure 19: System Concept of the DoRIS Test Centre

Regional centres were installed at the lock of Freudenau and the lock of Greifenstein. The installed ENC (electronic navigational charts) viewers provided the lock operators with the tactical traffic image.

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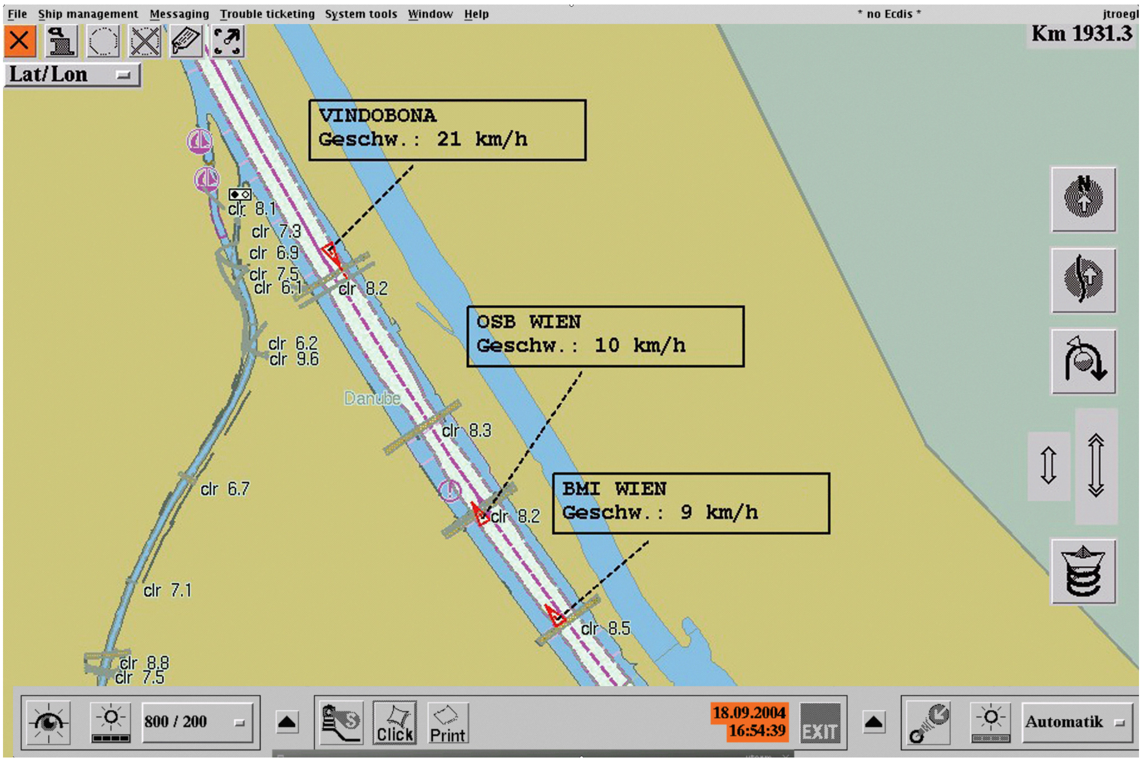

Figure 20: Example of a Tactical Traffic Image

At regional offices of the shipping police and at the local offices of the supreme shipping police, ENC viewers were also installed in order to view the Tactical Traffic Image (TTI).

A system management console enabled the operator of the DoRIS Test Centre to monitor and control the entire system.

4.3.2.3 Tracking and Tracing Solution

For those areas where the Austrian Inland Waterway Traffic Management System was not set up during the demonstration phase, the vessel's position and identification could be determined by means of GPS/GSM-SMS modules.

As a solution for uncovered areas, mobile modules were used on the vessel consisting of a GPS positioning device along with a communication device (GSM-SMS). These modules transmitted the traffic information to a central station and then further to the Common Source Logistics Database which used the traffic information for logistical processes, such as sending position messages to the port of destination for example, as well as for generating deviation messages for relevant partners in the logistics chain.

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4.3.2.4 Achievements of the Traffic Management Demonstrator

The set up of the Austrian System for Inland Waterway Traffic Management (DoRIS, Donau River Information Services) was in place until September 2002. Demonstrations were carried out during a period of 9 months (September 2002 to May 2003).

The concept of the Austrian Inland Waterway Traffic Management System DoRIS offers:

1) provision of an overview of the current traffic situation (tactical traffic image) onboard and on land to steer the Danube traffic = nautical component as well as

2) on-line availability of a comprehensive information system with a high accuracy (2-4m) and high actuality (update rate 2 sec) for all concerns of the operative inland navigation = logistics component

The core element of the nautical component is the Tactical Traffic Image (TTI). This term describes the electronic positioning of all vessels covered by the system and its HMI on an electronic navigation chart (Inland ECDIS). Beside the vessel position, further data like ship name, size of the ship formation and basic information concerning dangerous cargo is processed and made recallable by clicking a ship symbol on the Inland ECDIS. All DoRIS users (skippers, authorities, shipping companies, ports etc.) have access to this tactical traffic image.

The traffic information was also collected by the shore based AIS transponders for use in lock management as displayed in Figure 21 and in the CSL.DB for transport management. The national control centre collected the traffic information of the vessels.

Figure 21: Tactical Traffic Image in use for lock management

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The system users benefit from:

- increased traffic safety resulting from monitoring and controlling of the traffic (in particular for channelling and passage of critical stretches, such as fords, bridges, mooring areas, etc.)
- support for the skipper through a comprehensive overview of the current traffic situation, combined with safety related messages and other important information
- effective management of accidents
- better reconstruction of accidents
- comprehensive monitoring of dangerous cargo transports.

The link between the Austrian Inland Waterway Traffic Management system and transport management systems, such as the CSL.DB brings the following operational advantages to the commercial actors in the inland navigation sector:

- costs saving through minimising the non-productive time at the locks, in the ports and during customs clearance
- environmentally sound fuel saving through plannable and continuous vessel movement
- acceleration and simplification of logistics processes in the waterway traffic within intermodal door-to-door chains
- increased efficiency of the port facilities due to plannability and better resource allocation
- possibility of the close-to-real-time tracking of shipments by ship owners, logistics providers and stevedores, as a part of a comprehensive transport and logistics management.

4.3.2.5 Conclusion

From the technical point of view, the system configuration proved to be reliable for serving the high requirements in terms of safety relevant applications.

From the nautical viewpoint, the system proved that by means of additional information to the skippers (Electronic Nautical Charts and Tactical Traffic Image), safety of inland navigation could be enhanced. By means of the system set up, the requirements of the

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supreme shipping authority and the officers at the locks related to traffic monitoring were met. However, additional applications for lock management must be developed within a cooperation of the national authorities of the German Danube, the Main Danube Canal and the Slovakian Danube. This is planned within the framework of the FP 5 project COMPRIS.

From a logistical standpoint, automatically generated and therefore reliable traffic information was required for management of logistical processes in ports and at fleet operators. During several meetings with representatives of Austrian inland ports and fleet operators, it was identified that their information requirements could be met. However, the fleet operators remarked that additional services must be provided and the cost of AIS transponders should be reduced in order to ensure a quick introduction.

Summing up, the Austrian Inland Waterway Traffic Management System served the needs of the authorities and commercial actors involved in inland shipping. The solutions developed on the Austrian Danube can therefore be viewed as a reference for the entire Danube and most other waterways of Class IV and higher.

4.3.3 CSL.DB – Reference Scenario

It was decided by the consortium to set up a separate demonstration scenario, in order to demonstrate the full scope of functions of the CSL.DB. The reference scenario aimed at being also a promotion instrument of CSL.DB for future users.

4.3.3.1 Achievements of the CSL.DB Demonstrator

A reference scenario was designed on the basis of virtual business relations (all “companies” are just virtual actors and do not represent real acting companies).

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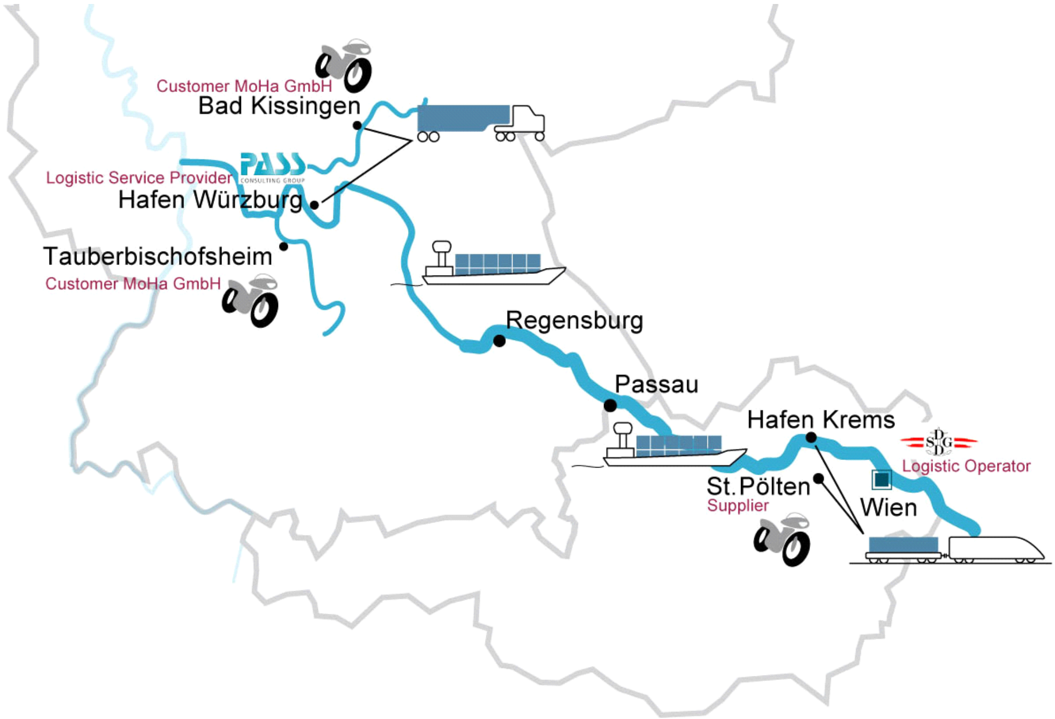

Figure 22: Reference scenario of CSL.DB

Within the reference scenario the customer Motorrad Handel GmbH (MoHa) - a motor-bike trading company – in Tauberbischofsheim ordered motor-bikes from its supplier, (Supplier) in St. Pölten. In the reference scenario one consortium member (the PASS Consulting Group, Würzburg) represented the Logistic Service Provider (LSP):

The Logistic Service Provider organised the entire logistic chain, starting at the Supplier production site in St. Pölten and ending at both MoHa shops in Tauberbischofsheim and Bad Kissingen, representing the customer. The LSP also made the decision among the different Logistic Operators as to who was responsible for the various transport and transhipment activities of the motor bikes. The Logistic Operators were the owners of transport resources like truck, ship, crane etc. and execute the physical operation.

This scenario included several transport and transhipment operations:

In St. Pölten the motor bikes were loaded (on the Austrian Rail Operator, ÖBB). The cargo was transported from St. Pölten to Krems via train. After transhipment at Mierka Donau Hafen Krems it was transported by DDSG Cargo on the rivers Danube, Main and the Main-Danube-Channel to the port of Würzburg.

At the port of Würzburg the motor bikes were transhipped onto trucks and delivered to the MoHa shops in Tauberbischofsheim and Bad Kissingen.

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The reference scenario included several order activities which were executed with the support of CSL.DB:

- Customer Order

The customer - the MoHa GmbH - sent an order to the Supplier.

This order consisted of data such as which products were to be delivered in what quality, to which place and at what time.

- Logistic Order

The Supplier received the order from MoHa and assigned a Logistic Service Provider to take care of the planning for the transport, transhipment or storage and of all aspects regarding the fulfilment of the logistic chain.

- Operation Order

The Logistic Service Provider instructed the involved Logistic Operators to observe certain operations to be executed to handle the transports, transhipments and storages within the logistic chain.

For this purpose the Logistics Service Provider (LSP) commissioned the Österreichische Bundes Bahn to carry out the transport from St. Pölten to Mierka Donau Hafen Krems. The LSP notified the port operator in Krems to carry out the transhipment.

The DDSG cargo was commissioned for transporting the motor bikes on the inland waterways. Afterwards the port operator in Würzburg was informed as well as the forwarder responsible for the transport from Würzburg to Tauberbischoffsheim and Bad Kissingen.

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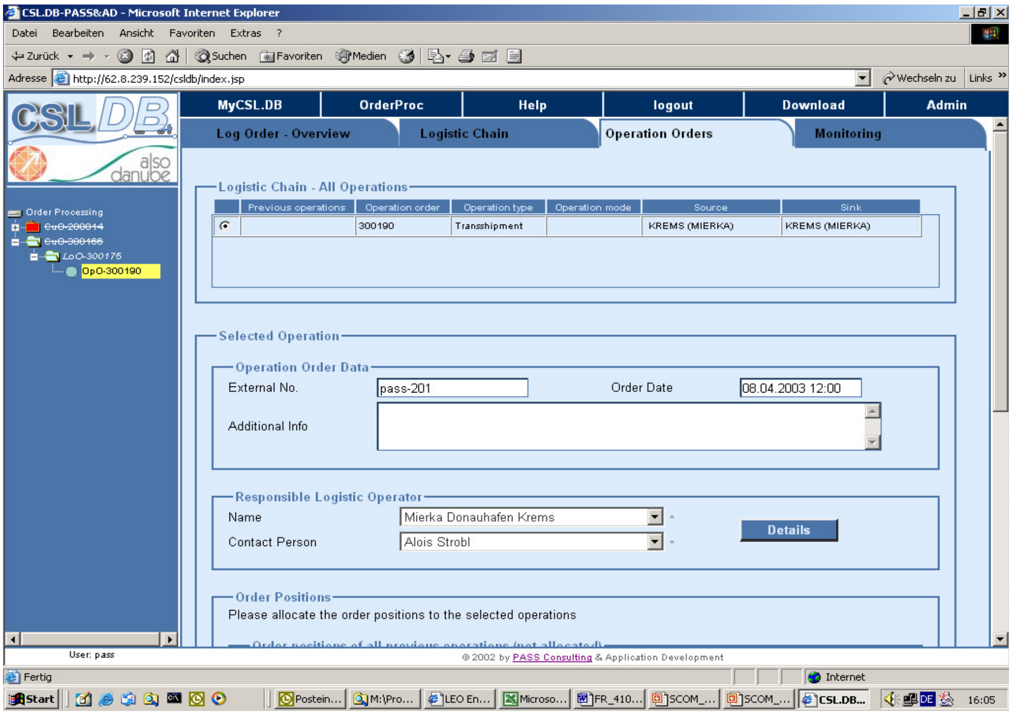

Figure 23: Sample screen of reference scenario (operations order)

The LSP (Logistics Service Provider) had to consider a stop for bunkering in Regensburg.

- Resource Allocation

All Logistic Operators received a message from the LSP and allocated certain resources to fulfil their instructions upon receipt.

- Process Management

Within the monitoring website, the Logistic Service Provider defined certain monitoring rules which were executed at defined monitoring points or times.

4.3.3.2 Conclusion

The prototype of the CSL.DB is able to adapt to logistics chains of any kind with unlimited number of actors. It is also able to provide the required information to all actors in the logistics chain based upon defined access rights. Due to the flexible concept of the CSL.DB in terms of interconnection to the actors in the logistics chain (web clients for users with hardly any IT, automatic interfaces for users with highly developed IT infrastructure) this tool is especially appropriate for the very traditional transport sector. The concept could improve traditional information processes of the inland navigation sector and actors in the Accession Countries to the European Union.

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4.3.4 DCS – Demonstration Scenario (Danube Combined Services)

DCS started operation in May 2001 and ran a weekly container liner service from Deggendorf (Germany) via Enns (Austria) to Budapest (Hungary) and vice versa for a period of 9 months till January 2002.

4.3.4.1 Objectives of the demonstration scenario

This demonstration scenario focused on the following objectives:

- to provide intermodal logistics services focussing on the economic areas in Germany, Austria and Hungary with possible extension to Eastern Europe with high reliability, guaranteed service quality and competitive terms
- to operate frequent intermodal transport services with a frequent inland waterway container liner services on the Danube as backbone and introduce it to the logistics market
- to demonstrate and evaluate the IT-solutions developed based on the system concept of ALSO DANUBE
- to use intermodal transport equipment, comparable to road transport, allocation of adjusted resource capacities targeted to the specific customer requirements

4.3.4.2 Cost Calculation and Container Management Application

During ALSO DANUBE, a cost calculation and container management application for the container liner services was developed to fulfil the defined objectives for the demonstration scenario.

It was determined during ALSO DANUBE that most container liner services used their own individually tailored IT systems. For this reason two applications have been developed with the aim of supporting their business processes:

- Cost calculation application
- Container management application

Cost Calculation Application

Cost calculation and pricing for integrated door-to-door services was implemented as part of the ALSO DANUBE demonstration scenarios as a prototype in order to specify this specific functional need. The prototype was implemented in MS-EXCEL and represented a prototype for the future integrated offer management system.

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The application aimed at supporting the following functions:

- Efficient and flexible pricing via adjusted logistic chains, reproducible prices for customer / service combinations
- Adjustable price reduction or extra charge e.g. for specific customer groups, quantities or services
- Each price or cost component tariff- and cost-components assigned to all nodes and arcs of the logistic chain

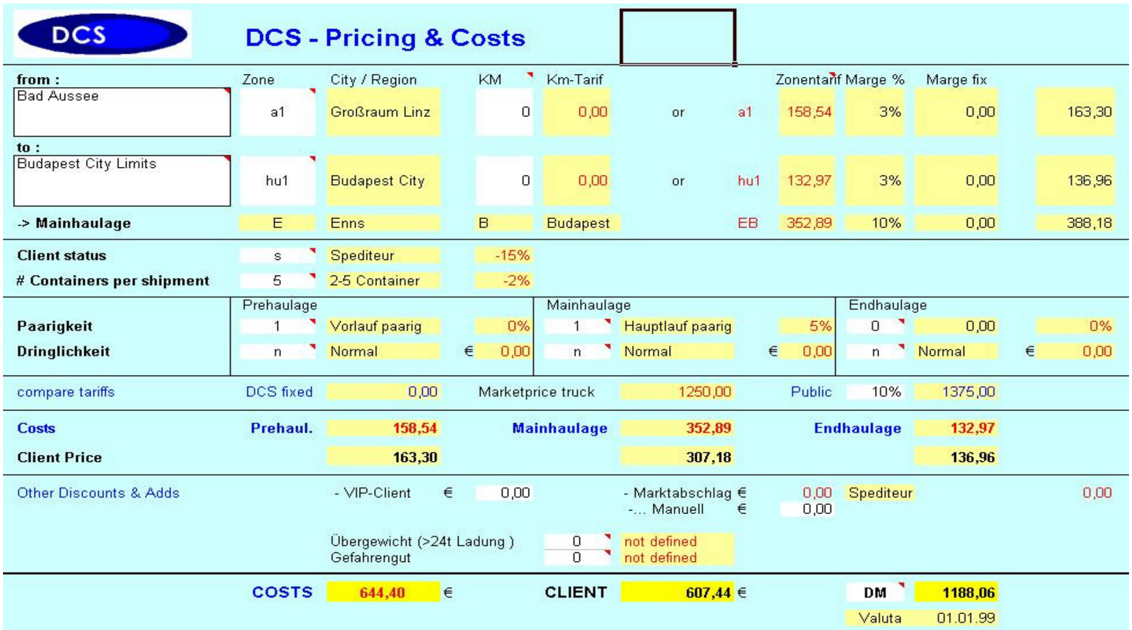

Figure 24: Sample screen of Cost Calculation Application

Container Management Application

The Container Management Application supports the dispatchers in their planning with information on the location of the containers (on stock at Budapest/Enns/Deggendorf, on transport vessel/truck). Technically, the application was based upon an Oracle database and client server applications for dispatchers.

4.3.4.3 Achievements of the Demonstration

The demonstration proved that container liner services were technically and operationally possible and experiencing the nautical bottlenecks in the upper Danube and that there was a high demand in high quality logistics services towards South-Eastern Europe.

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Figure 25: Overview DCS demonstration scenario

The full scale service provided from a single source for the co-ordination of the intermodal logistic chain and integrated at the same time the advantage of the know-how of its strategic partners.

The main innovations within the demonstration scenario are:

- For the first time, newly developed 45 ft. containers were used for continental traffic in Europe. The containers have a capacity of 33 euro-palettes and offered 82 m3 loading volume. They were available either as a box or as a curtain side container. The newly introduced transport equipment (45' open side and box containers) were accepted by the customers and the efficiency of this equipment was demonstrated.
- The IT solutions for offer processing, container management, logistics chain management, status and deviation management were installed and showed that they served the needs of an operator.

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4.3.5 CCS – Demonstration Scenario (Combined Container Services)

With 260,000 TEU transported yearly, Combined Container Services (CCS) belongs to the leading inland shipping companies in Europe and performed one important demonstration within the ALSO Danube project.

4.3.5.1 Objectives of the CCS Demonstration Scenario

In the frame of ALSO DANUBE, the CCS demonstration scenario was developed as a Rhine-Westfalen-Shuttle (RWS), comprising of a container service line on the Rhine-Herne-Kanal. This line was used by Combined Container Service GmbH & Co. KG (CCS), in co-operation with the Duisburger Container-Terminalgesellschaft mbH (DeCeTe). Two of the three weekly departures from Dortmund to Rotterdam were handled by the DeCeTe, the third one was handled at the Krefelder Intermodal Terminal (KIT).

The Rhein-Westfalen-Shuttle (RWS) was not only a sustainable means of transport but it also played an important economic role for the CCS logistic chains. By using this inland waterway with its connection to rail networks, forwarders were able to minimise costs by avoiding the planned toll road and the constant road congestion in the Ruhr region.

The main demonstration effort was devoted to the optimisation of route and resource planning by means of the ALSO-IRIS application.

4.3.5.2 Resource Planning Application

CCS created a network of different modes of transports in a hub & spoke scheme. To optimise all operations in a network with this complexity, it was necessary to use an automated, computer-based planning, routing and scheduling. To improve the tactical route and resource planning of CCS regarding multi-modal transport chains, ALSO-IRIS, which was the specific application for the CCS demonstration, was developed within the project.

The planning application within the CCS system included the integration of logistic orders, the planning of optimal routes based on actual shipping schedules, the booking of resources and the generation of transport orders.

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ALSO-IRIS (ALSO Inter-modal Routing and Information System) included the following functionality:

- Planning of optimal multi-modal route
- Booking of resources based on the CCS owned data
- Generation of transport orders
- Visualisation of delays and blockings

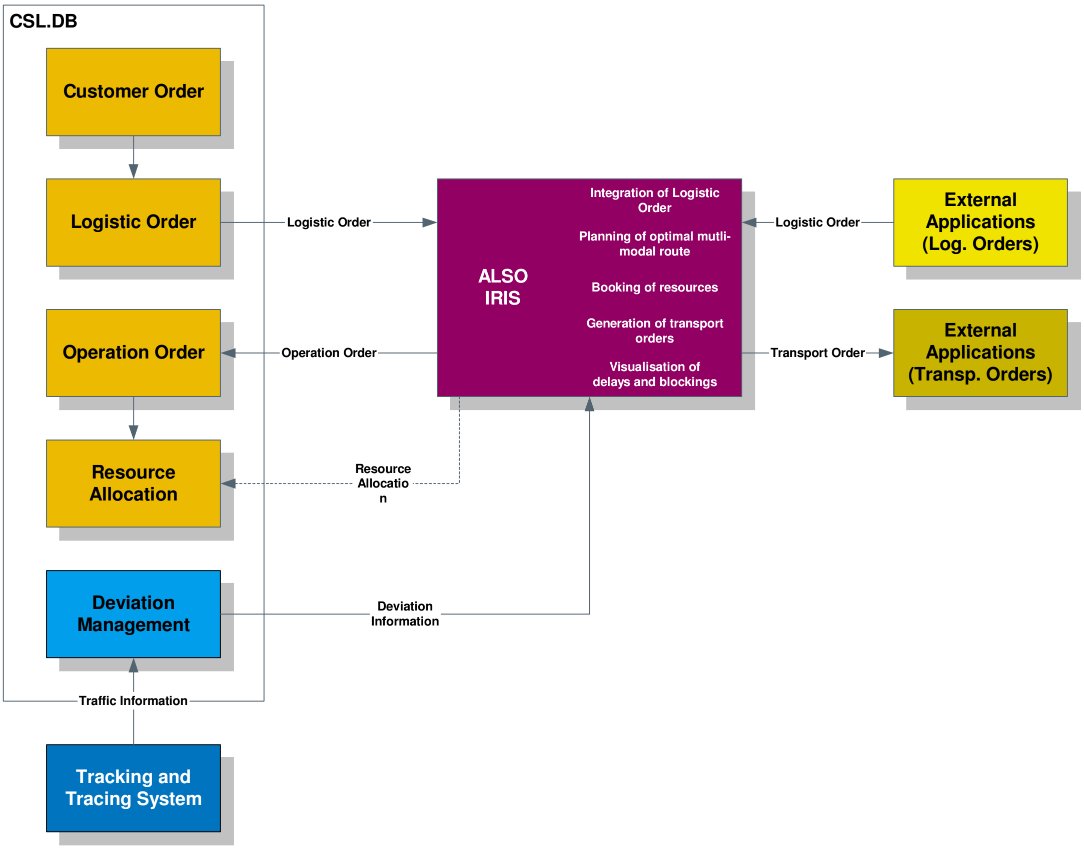

Figure 26: Overview of the involved IT-systems (Gateway, BBX, and interface to the CSL.DB)

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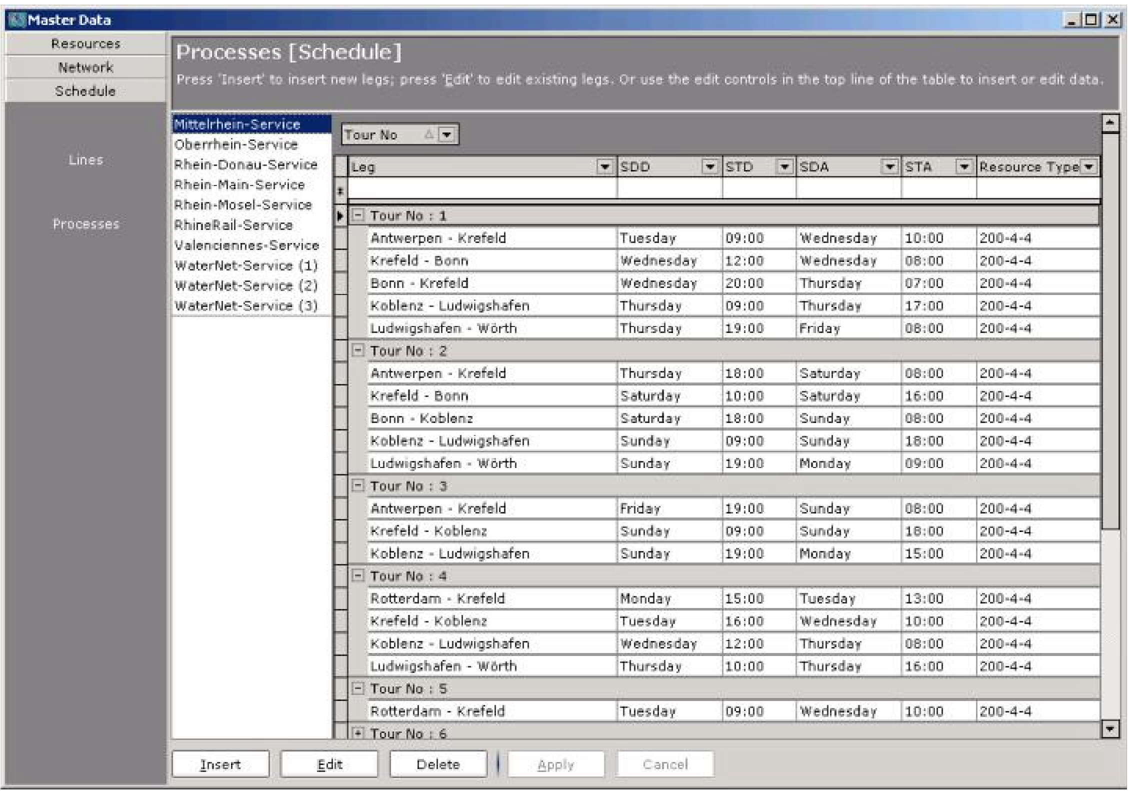

Figure 27: Sample screen of ALSO-IRIS

4.3.5.3 Achievements of the Demonstration

The implementation of the ALSO-IRIS application was a considerable support for the modernisation and increasing of flexibility of this Door-Sea Port Logistic Chain. Thanks to the automatic and immediate generation of operation orders, the application allowed a continuous information flow between the actors in the CCS demonstration scenario. All actors were informed at an early planning stage and received the necessary information in case of delay of inland vessels between Antwerp – Rotterdam, Dortmund and Kassel. Furthermore, the visualisation of delays or blockings served the decision support for re-planning of the transport chains. This pro-active re-planning was continuously possible and guaranteed an improved fulfilment of the logistic orders. The main innovations of the demonstration scenario were:

- Increased flexibility through visualisation of delays or blockings
- Reduction of transport costs due to sophisticated routing algorithms based on time/location-based networking for resource and route planning instead of the traditional “rules of thumb”.

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4.3.6 DDSG Cargo Line – Demonstration Scenario

DDSG Cargo is the largest west European fleet operator on the Danube, operating more than 180 units (motor vessels, push-boats and barges). The deadweight capacity is more than 220,000 tons.

4.3.6.1 Objectives of the Demonstration

Within ALSO DANUBE, this demonstration aimed at the modernisation of its fleet management by the introduction of advanced IT solutions (Transport Online Logbook, Fleet Monitoring System and CSL.DB for deviation monitoring and communication with ports). It also aimed at improving the utilisation of its fleet and better integration with key partners in the logistics chain and thus to make inland navigation a more competitive mode of transport.

4.3.6.2 Transport Online Logbook and Fleet Management System Application

Within the general objectives of ALSO DANUBE, fleet operators were forced to improve the information processing and their IT-systems. DDSG Cargo therefore implemented new information systems within ALSO DANUBE. The information systems comprised two interlinked systems:

- *Fleet Management System* – a system for tracking and tracing of the vessels and monitoring the vessel's operational parameters (oil pressure, etc.)
- *Transport Online Logbook* – a system for administration and management of forwarding and transport activities

Within ALSO DANUBE, DDSG Cargo implemented the new electronically based administration system for forwarding and transport activities. TGTOF (Transport, Güterverfolgung und Online Fahrtenbuch) deals with order management, fleet management and the on-line logging of the voyages within the fleet operator.

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Key-Functionalities of the TGTOF-System:

The four key-functionalities of TGTOF are Order Administration, Transport Administration, Commercial Evaluation and the Ships Movement Tool

Order Administration

As soon as an order is placed the master data of an order are typed into the TGTOF-system. Master data are order-number, customer (client), traffic-line, relation and account-data. An order can be in one of four possible states (planned, pending, completed or billed).

Transport Administration

The transport administration tool administrates data of the transportation processes of a certain transport order. Detailed data about transports are: loading and discharging of ships, type of commodities transported, draught, etc…

Commercial Evaluation

Up to now the commercial analyses of a completely executed order have been performed without the support of electronically processed data.

The TGTOF system enables DDSG Cargo to generate ratios of each order instantly after an order has been fulfilled in terms of costs, margin contribution, and turnover.

Ships Movements

The TGTOF-system is also linked to the fleet management system of DDSG Cargo and can thus automatically obtain traffic information from the vessels of DDSG Cargo.

4.3.6.3 Achievements of the Demonstration

In the past, the logging of the vessel movements, pre-announcing vessels to the ports and communication with the customers was conducted by phone, non-standardised fax or email. Moreover, files concerning customer orders were administrated separately by the control centre and the forwarding department inside DDSG Cargo.

The effort to coordinate the administration of the transportation orders was very cost intensive and a high amount of data was processed redundantly. Moreover, both divisions within the fleet operator involved communicated directly with the customer. Due to non-standardised procedures, the customers received the same information from both divisions involved.

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Within the demonstration scenarios, the benefits of the usage of IT systems (company internal in combination with CSL.DB) were determined. The interconnected systems allowed faster information exchange and more efficient execution of the individual process steps required for monitoring the vessel transport and communicating with actors in the logistics chains. This way, DDSG Cargo conformed with requirements of modern transport economy, asking for higher reliability, adherence to delivery dates and information about the status of a transport at any time. The main innovations of this demonstration scenario were:

- Utilisation of advanced IT systems for tracking and tracing of the vessel transport and for communication with actors in the logistics chains
- Identification of cost saving potentials for company internal processes and improved customer relationship due to better – automated – information exchange (better resource utilisation, better internal processes, etc.).
- Efficient integration of inland navigation into intermodal logistics chains by means of sophisticated ICT solutions
- Modernisation of logistic processes by integration of information technology leading to more attractive transport services with inland navigation in the main haulage

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4.3.7 Industrie Logistik Linz – ILL – Demonstration Scenarios

Industry Logistic Linz (ILL) is the logistics service provider for the consignor VOEST ALPINE Stahl GmbH, which is the most important steel production plant in Austria.

Within ALSO DANUBE two demonstration scenarios were executed

- Demonstration scenario door-to-door on *short distances* from Linz-Krems
- Demonstration scenario door-to-seaport for intermodal services from Linz to Antwerp *(long distance)*

4.3.7.1 Linz–Krems – Demonstration Scenario

Pre-haulage was performed by rail transport from the production and storage facilities of the steel plant to the multimodal terminal in the port of Linz where the direct transhipment was executed. In the main haulage the steel goods were transported by means of inland navigation from the port of Linz to the port of Krems over a short distance of approximately 130 km.

The end haulage (the transport between the port of Krems and the consignee) was operated by the consignee VOEST ALPINE Krems GmbH, where the cargo was used for the production of high quality steel products.

Objectives of the Demonstration Scenario Linz – Krems

During ALSO DANUBE it was found out that complex multimodal logistics chains like the ones in this demonstration scenario, with three different transport operators and two transhipment operators, were very sensitive to disturbances. Therefore in conventional operations extended safety buffers (time, material, and resources) needed to be considered in the planning process. This especially related to inland navigation. Long waiting times for the vessels as well as for loaded and unloaded rail wagons were characteristic for this situation. This increased the costs of multimodal transportation.

Achievements of the Linz – Krems Demonstration

Planning and managing the logistics chain by integration of modern information and communication technologies enabled the actors to overcome the shortcomings of inefficient waiting times. The logistics chain became better manageable and therefore more efficient when information about the overall status of logistics processes was available. An exact time schedule could be derived, from product retrieval from storage in Linz, to the exact departure schedule and arrival time in Krems, for the preparation of

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the coils in production in Krems. However, the exact production program in Krems was also necessary for efficient resource management.

In the demonstration scenario, the Common Source Logistic Database (CSL.DB) was the interlinking element between the IT systems of the actors:

- Interlinking of the systems of ILL, Port of Krems and the fleet operator by means of the CSL.DB
- Usage of Tracking and Tracing on the vessel for making the inland waterway transport transparent and sending traffic information to the port of destination
- Linking the systems of ILL and the railway operator

The transparent chain made the sending of information and coordination efforts via telephone between partners unnecessary. In addition to the resulting cost savings (relieves personnel), this also enabled automatic, central, and system wide optimal resource allocation. At a single centralised location, the information pool, all information was collected, all processes were planned, and results were made available to all system participants. Within the project ALSO DANUBE, this was executed fully automatically. Only one person was required for intervention in the event of unforeseen disturbances.

By setting up appropriate information systems for the integration of all information systems and managing of the logistics chains, the cost of the multimodal transport operation could be reduced by 36%. This makes multimodal transportation with inland navigation in the mail haulage competitive to rail and road transportation in terms of costs and reliability, even on short distances.

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4.3.7.2 ILL Linz–Antwerp – Demonstration Scenario

While the demonstration scenario Linz-Krems focused on intermodal transportation on short distances, the scenario Linz-Antwerp set measures towards optimisation of long distance intermodal door-seaport transport of steel plates and coils twice per week.

Objectives of the Demonstration Scenario Linz – Antwerp

The pre-haulage and transhipment in the port of Linz was organized in the same way as in the previous scenario with Krems. For the main haulage individual skippers were contracted for transporting the steel goods from the port of Linz to Antwerp over a distance of about 1350 km. Within the seaport of Antwerp, the cargo was examined by customs and transhipped to sea vessels to the US.

Achievements of the ILL Linz – Antwerp Demonstrator

In conventional operations long haulages on inland vessels are hardly controllable. For this reason modern tracking and tracing technology was applied in the main haulage. During the demonstration scenario deviation recognition was demonstrated. For this reason, a GSM/GPS box was placed upon the inland vessel temporarily during the specific voyages. This enabled ILL to “follow” the transport progress close to real time automatically without interacting with the captain of the vessel.

Moreover, traffic information of the vessel was compared to the time schedule which was automatically calculated before the execution of the transport. By comparison of the planned and actual data and considering a pre-defined threshold supported by CSL.DB, deviation information was sent to ILL in case of a deviation.

The ILL Linz-Antwerp demonstration case is certainly to be viewed as a benchmark in the view of modern transport management for door to seaport transport over long distances. Continuous location monitoring is important for accomplishing time- and cost efficient transports. This is primarily important on long distance transports because of possible delays due to the varying water levels on the Main-Danube canal.

It was demonstrated that tracking and tracing of inland navigation is feasible. Even the fleet operator does not provide traffic information automatically. Moreover, the technology enables the logistics service provider to be independent from captains for providing information on position.

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4.3.7.3 ILL - Logistics Cockpit ILLONET

During ALSO DANUBE, parts of a logistics cockpit (ILLONET) were developed with the following functions:

- Order and status management for the internal railway operator
- Order and status management - transhipment operators belonging to ILL
- Link to the CSL.DB

While the ILLONET system mostly focused on order management for transport and transhipment orders, which were executed by either the ILL staff or associated companies, the Common Source Logistics Database was used for the link to the inland waterway transport operators, which had no powerful IT infrastructure in place for order management. Moreover, the CSL.DB was used for monitoring waterborne transport processes and sending messages for enhanced planning at the port of unloading. The following functions were developed:

- Module to determine on basis of the transport order, which wagons are required for what transport relation and time. Since it can obtain the entire status information, the wagon type can be obtained as well.
- Automatic ordering of rail wagons from considering cargo, characteristics, transport relation, specified time.
- Status monitoring of the transport service, whether it has been completed or not. Moreover, all transport orders which are executed can be checked online.
- Automatic reimbursement of the transport services.

Order and status management - transhipment operators belonging to ILL

Within ALSO DANUBE, ILL extended their logistics cockpit with order and status management of ILL operated warehouses and transhipment facilities. With these functions, it was possible to plan and monitor transhipment processes on the following levels:

- Planning of transhipment operations on the basis of the transport order by the customer in terms of transhipment resources as well as staff executing the transhipment processes. Generation of ILL internal transhipment orders indicating which cargo has to be transhipped between warehouse and transport means.

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- After the transhipment, typically all cargo is scanned, which changes the status of the ILL warehousing system (retrieval from stock).
- Furthermore, this enables the creation of a detailed, automated cargo documentation for
  - putting onto the means of transports (e.g. the wagons)
  - handing over to the operator of the means of transport (e.g. bill of lading)
- In some cases, it is required not only to identify the cargo, but also to determine the position. This is done by means of handheld barcode scanners (Symbol 6840 which allows entering a coil position; the barcode scanner is connected to the access point by means of wireless LAN).
- After the execution, the person in charge of the monitoring can enter the actual data of the transhipment process into the system for further processing (such as billing, process cost calculation, etc.)

Integration of the CSL.DB and ILLONET

During ALSO DANUBE, the logistics control system ILLONET and the CSL.DB were linked at the level of customer and logistics orders. The customer order comprised data, which were originally sent from the consignee to the consignor and then forwarded to ILL. Furthermore, a logistics order comprising the order of the logistics chain from the consignor was sent to ILL.

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4.4 Socio-Economic Impact Assessment of ALSO DANUBE

Whereas the specific demonstrations within ALSO DANUBE were analysed at the micro level in a dedicated work package, the objective of the socio economic assessment was the in-depth analysis of the consequences associated to the ALSO DANUBE project on a macro-economic level.

4.4.1 Approach

The scope and contents of this widely-set objective are defined by several sub-tasks dedicated to specialised concepts. The position of the sub-tasks and the work flow is demonstrated below:

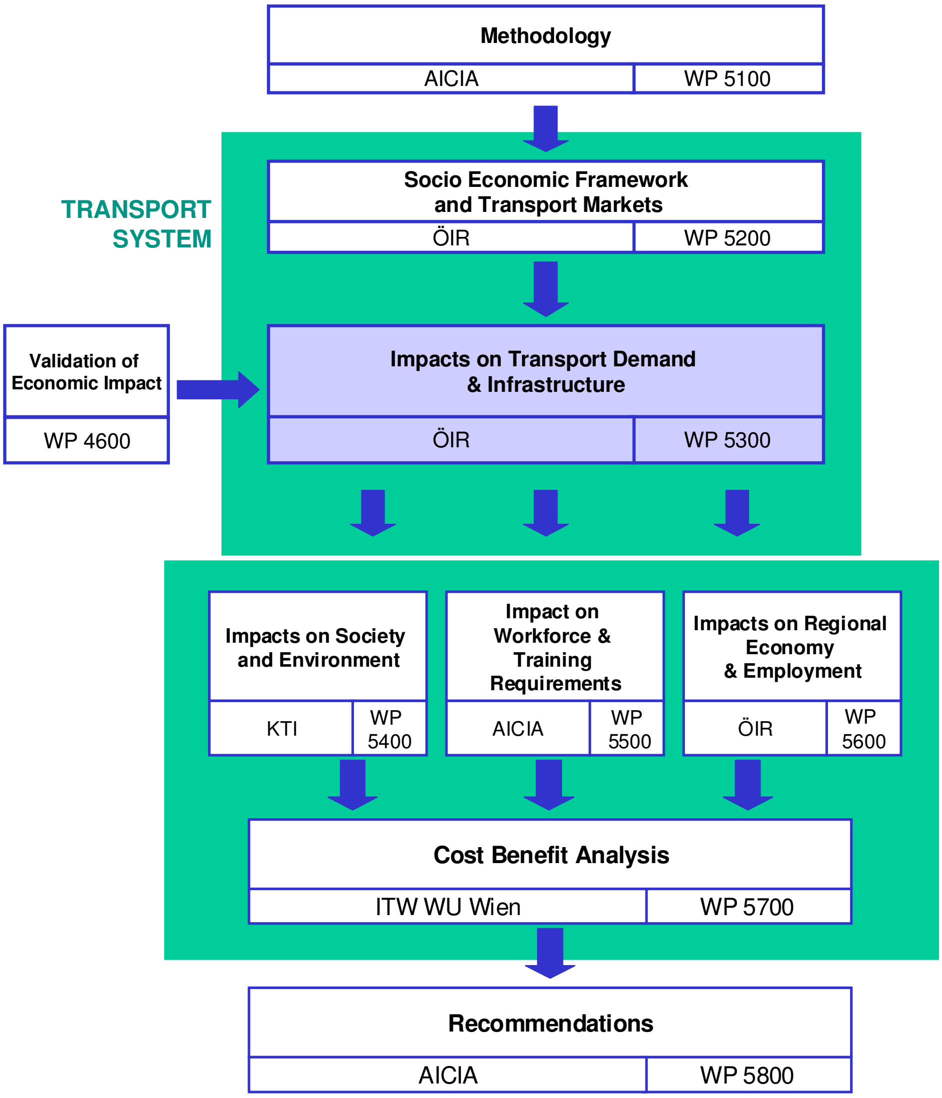

Figure 28: Work approach for the Socio Economic Impact Assessment

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Methodology

The methodology provided tools and concepts to measure socio–economic impacts resulting from Advanced Logistic Solutions on the river Danube.

Socio-economic Framework

It analysed the situation of the project by an analytical description of the framework of ALSO DANUBE measures. By analysing data and relevant information it arrived at the specific socio-economic aspects of the area necessary to develop the impact analysis, which is described in the next chapter.

Impacts on Transport Demand and Infrastructure

The core of the Socio-Economic Assessment was the identification of impacts and their precise definition. Complex and sophisticated measures taking into account the systemic interrelation between the components of the Freight Transport System allowed the evaluation and assessment of relevant socio-economic issues. The simulation of multimodal freight transport by a trade and a transport model allowed assessing impacts by providing precise data of transport flows and assigning the flows to the transport network. "Impacts on Transport Demand and Infrastructure" provided the main tool to evaluate the follow-up impacts within the subsequent sub-tasks.

Impacts on Society and Environment

This task focused on the social benefits and environmental impacts of the improvement of the quality of inland waterway freight transport mode in comparison to less environmentally friendly transport modes, mainly road transport. The cumulative effects and chains of impacts were studied. Identifying improved accessibility of the freight transport network in terms of better connectivity and reduced general costs allowed a qualitative evaluation of social benefits. The expected modal shifts of cargo were the basis for the environmental impact evaluation.

Impacts on Workforce and Training Requirements

The objective was the assessment of the impact of Advanced Logistic Solutions on human potential resources, identifying the profiles of professionals involved in current transport operations and the need for additional knowledge and skills. The characterisation of the new demand for knowledge in the profiles associated to advanced logistic solutions was obtained from the characterisation of the logistic information systems.

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Impacts on Regional Economy and Employment

The objective was to identify effects at a macro-economical level in the Danube Region. A variety of effects were analysed comprising direct effects originating within inland navigation as well as indirect effects taking into account the effects on other modes (shifts) and general effects on regional economy.

Cost Benefit Analysis

A multi criteria approach was chosen to integrate the impacts identified in the previous work-packages elaborated. Indicators were defined at macro-economic, social and environmental levels and subsequently weighted. The results showed the relative change of the benefits attributed to ALSO DANUBE measures.

4.4.2 Conclusions of the Socio Economic Impact Assessment

The positive effects of the implementation of ALSO solutions are summarised in the following. Conclusions have been drawn with respect to the transport market, transport demand and the utilisation of the infrastructure, on society and environment, on workforce and training requirements and from the impact analysis on regional economy and employment.

The objectives as well as the effects deriving from the implementation of ALSO measures were in accordance with European strategic policy goals – the development of the transport system towards an efficient, environmentally friendly and safe transport. To assess the effects of ALSO solutions two scenarios were identified (detailed information is given in the Final Report “Socio Economic Impact Assessment”).

In Scenario 1 - “Moderate implementation” the implementation of RIS on River Main, Main-Danube-Channel, Danube downstream to Budapest and the use of CSL.IP and TM-IP were assumed.

Scenario 2 – “Comprehensive implementation” additionally included the creation of a new Container Line Services ARA-Ports Austria – Hungary with an additional rail bridge Rhine – Danube.

The socio-economic assessment clearly shows that the integration of ALSO DANUBE solutions on the 7,800 km European waterway network lead to positive impacts on the competitiveness of inland navigation in general. With regard to the transport market, transport demand and the utilisation of the infrastructure, ALSO measures

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- an increase of the share of intermodal transport
- a shift of transport from road to inland navigation
- enhanced use of the existing infrastructure

The analysis on society and environment shows that ALSO solutions

- reduce emissions and noise in congested areas
- increase the safety on inland waterways and on roads
- enable inland navigation to better cope with adverse fairway conditions

ALSO measures contribute to improve of working conditions and education levels for the workforce in inland navigation (crew, operators in follow-up services as well as designers and suppliers of system components).

The analysis on the regional economy and employment leads to the conclusion that ALSO solutions

- strengthen the position of industry
- strengthen the position of ports
- contribute to the integration of Europe by connecting the emerging markets with the European core regions
- thus enable the Danube Region to cope with the challenges of the future

Detailed information about the Socio Economic Impact Assessment is given in the Final Report "Socio Economic Impact Assessment", which is available on request from the ALSO DANUBE project coordinator.

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4.4.3 Recommendations from the Socio Economic Impact Assessment

The recommendations are addressed to various actors in the system of inland navigation:

- Administration: all transport-related organisational units of the European Union, the national governments, the regional and state governments, the municipalities and the national development agencies for inland navigation
- Private Operators: ship owners, shipping companies, transport companies, logistic and software providers etc.
- Ports
- Industry as client of inland navigation services

4.4.3.1 Improvement of Administrative Processes

The national administration should use information technology to simplify and improve administrative processes (customs and persons control, statistics, information on hazardous goods).

With the implementation of RIS, transparent and secured information processes, including customs data, can be generated, executed and checked between all relevant parties. The use of information technology will improve customs and persons control, regarding the fact that, with Slovakia and Hungary becoming EU members in 2004, custom controls will disappear at those borders. Passenger controls will remain as long as the new EU members do not take part in the Schengen regime.

The use of information technology allows time savings by shortening border crossing procedures, if custom authorities are informed about approaching cargo in advance. Time savings also result from shorter stops at the locks, if the lock administration is informed about the approaching vessels.

A Common Source Information Provider (CSL.IP) was set up within ALSO Danube. Since the basic functions of the CSL.IP in the logistics network are data collection, data clearing and data presentation, existing statistic surveys could be improved sufficiently. On-line data processing would result in more up-to-date databases.

The integration of the vessel in the traffic management allows better information in case of ship accidents. This applies especially in case of hazardous goods transports. Quick information regarding the classification of dangerous goods enables rescue forces (fire

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brigade, police) to take the necessary actions earlier and more precisely. As a consequence, ecological damage can be limited considerably.

4.4.3.2 Realisation of River Information Services (RIS)

National administrations are requested to realise River Information Service (RIS) in accordance with the Rotterdam Declaration along River Danube., It was one of the main objectives of the Declaration adopted by the Pan-European Conference on Inland Waterway Transport in Rotterdam in September 2001, to establish a Pan-European River Information Service by 2005, based on standards to be drawn up in the framework of the European Union, UN-ECE and the two River Commissions.

The High Level Group for the revision of the TEN-T guidelines recommends adding the Pan-European implementation of RIS to the list of priority subjects.

4.4.3.3 Supporting the Implementation of RIS

The European Union should continue to assist the governments of Central and South Eastern European countries in the implementation of RIS. The co-ordination of RIS implementation with the Danube countries and West European partners takes place within the scope of the EU technology project COMPRIS (Consortium for the Development of an Operational Management Platform for River Information Services). In Austria the project has been co-ordinated by via donau. COMPRIS provides organisational support to other Danube States.

Austria plays a leading role in River Information Services in Europe as the operator of the DoRIS (Donau River Information Services) Test Centre and through its work in the development and implementation of the system. To support the countries alongside inland waterways in the implementation of RIS, the know-how gained in this project has to be made available to the relevant authorities. A network of national development agencies in the Danube countries could help to promote transport on the Danube waterway. In addition to Austria, a national development agency has been established in Serbia and will soon be opened in Croatia.

The administration is required to secure funding of supporting technology programmes. The administration should lay the foundations for an efficient and profitable use of new technologies. Financial and organisational incentives should stimulate the actors involved in inland navigation to use new IT solutions more intensively. This could be

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done in the form of fiscal incentives, premium payments or financial support for the implementation.

Existing public assistance programmes should be opened to support the inland waterway sector. In Austria there are a couple of programmes which are designed to support inland navigation such as the "Pilot programme for the development of intermodal transports on the Danube waterway".

4.4.3.4 Harmonised Regulations within EU, CCNR and DC

Another main objective of the Rotterdam declaration is to invite the European Commission, the UN-ECE and the two River Commissions to intensify their co-operation on Pan-European harmonisation of technical, safety and manning requirements, to encourage them to co-operate on the improvement of professional education and training and to facilitate the exchange of qualified personnel between European countries, as a means to overcome the imbalances in the employment markets. Training requirements cause comparatively modest costs. The system of inland navigation and ports should also be more strongly positioned in the educational system. This would help to improve knowledge about the advantages of inland navigation as a transport mode and would reduce today's access barriers. In this context, European harmonisation plays a major role.

4.4.3.5 Synergy Effects with Waterway Upgrading

The administration should contribute to create synergy effects between information technology and the upgrading of the waterways. The use of information technologies e.g. River Information Services can be regarded as an accompanying measure to the upgrading of the waterways, but upgrading cannot be replaced by the introduction of RIS. River Information Services may improve reliability, but they cannot eliminate under-utilisation in case of low water periods. Therefore, in spite of the positive effects of the implementation of RIS, upgrading of the Danube has to be implemented.

4.4.3.6 Raising Public Awareness

The administration is required to improve information and communication on inland navigation. The transport-related organisational units of the Federal Government, the States and the Municipalities should assign higher importance to inland navigation in their public relations work. This could contribute to raising the general awareness among the population to the advantages of this mode of transport.

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4.4.3.7 Improvement of Traffic Management

Private operators and ports should use information technologies to improve traffic management and strengthen logistic processes. At present the port does not receive detailed information on the loaded goods until the ship has reached the port. To make intermodal transport more reliable, the planning process needs a high degree of accuracy with respect to the timing of incoming and outgoing freight. The information exchange at ports on loaded and unloaded goods should be optimised and provided before the transhipping process starts.

The potential users for the ALSO DANUBE solutions should be open to consider the benefits of information technologies and calculate the costs of their logistic processes. In a second step they should take into consideration the availability of financial support from public assistance programmes (initiating pilot projects etc.). Special interest should be addressed to the question as to which extent existing in-house solutions can be replaced by new technologies or used in combination with the new technologies.

4.4.3.8 Creation of New Intermodal Services

Ports are predestined to manage and co-ordinate logistic chains and should have substantial interest in implementing IT solutions because intermodal transport is closely connected to the use of the waterway. By integrating the waterway in intermodal transport, a significant increase of turnover in ports could be expected.

In order to realise the opportunities for intermodal transport and to use business solutions for new services in inland navigation, businesses should be encouraged to further integrate water transport into supply chains. The aim is to create regular and reliable intermodal inland navigation services such as container liner services, swap bodies, RoRo services (Roll-on, Roll-off) and a Rhine-Danube rail-bridge (barge train concept) in order to bridge the existing bottlenecks on the Main and Straubing – Vilshofen.

4.4.3.9 Investment in Port Infrastructure

In order to make optimal use of the new IT solutions, generally only little effort is needed in Germany and Austria. Modern equipment for transhipment is available. In the Central and South Eastern European countries a certain necessity to upgrade or substitute equipment may be observed. Given the moderate investment e.g. in cranes and the multipurpose use of equipment, this should not be seen as a restricting factor.

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To further develop the ports into successful intermodal logistics centres, they have to be upgraded into intermodal transportation hubs. The creation of a tri-modal infrastructure, compatible information systems and logistics services are important basic requirements to strengthen the role of the European waterways.

In order to realise services that comprise various modes of transport, the infrastructure and organisational links between inland navigation and railway transport have to be promoted. Ports should enforce their co-operation with railway transport to develop common IT solutions.

4.4.3.10 Location of Industry on the Waterway

Spatial planning and economic policy at federal, state and local levels should take into account the advantages of concentrating industries in the immediate vicinity of the Danube waterway (e.g. ports) when planning the location of new industrial sites. On the one hand enterprises could be situated in the vicinity of existing ports, or they could settle down near the waterway and construct their own port. In these cases the production process is linked directly to the waterway. This recommendation addresses especially the industry of the Vienna Region, where, with a few exceptions, no industrial enterprise is situated close to the Danube waterway.

The main actors concerned will be those industry branches in the Danube Corridor that already use inland navigation to meet their transport demand (steel, oil, chemical, agriculture) and, additionally, those industries that could profit from inland navigation transports because of reduced prices and improved services. This would apply to industries located within the feeder regions of the Danube ports which will reduce the high costs for pre-haul and end-haul transport. Examples are the Austrian paper, chemical and automotive industries.

4.4.3.11 Summary

The following table summarises the activities that should be taken to implement and operate ALSO Logistic solutions and to generally strengthen the role of Danube waterway as well. Recommendations address

- Administration: all transport-related organisational units of the European Union, the national governments, the regional and state governments, the municipalities and the national development agencies for inland navigation

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- Private Operators: shipping companies, forwarding companies, logistic and software providers etc.
- Ports administration, stevedoring activities, industries in ports

	Administr-ation	Private Operators	Ports
to use information technology to simplify and improve administrative processes (customs and persons control, statistics, information on hazardous goods)	●	•	•
to realise RIS in accordance with the Rotterdam Declaration along River Danube	●		
to support the Danube countries in the implementation	●		
to lay the foundations for an efficient and profitable use of new technologies	●	•	•
to secure funding of supporting technology programmes	●		
to create harmonised regulations on the implementation within the EU, CCNR and DC	●		
to create synergy effects between information technology and the upgrading of the waterways	●	•	•
to improve information and communication on inland navigation	●	•	•
to use information technology to improve traffic management and to strengthen logistic processes		●	●
to use the chances for intermodal transport		●	●
to optimise intermodal information exchange at ports		●	●
to create new intermodal services in inland navigation	•	●	●
to invest in port infrastructure	•	•	●
to use the IT solutions to develop into intermodal logistics centres		•	●
to improve the interfaces to the railways		•	●
to use the advantages of the waterway and locate industrial plants at the vicinity of the waterway	•		●[x]

[x] .... ports as well as industry as client of inland navigation services

Figure 29: Conclusions of ALSO DANUBE, by main actors (socio economic aspects)

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4.5 Extensive Dissemination/Exploitation Activities

The goal of the Dissemination and Exploitation activities within the ALSO DANUBE project was to spread the ideas and results of ALSO DANUBE all over Europe and to prepare platforms for further exploitation activities after the end of the project.

The following main tasks according to their stated objectives were performed during the running time of ALSO DANUBE:

4.5.1 Dissemination and Exploitation Strategy and Technology Implementation Plan

The objective of the task "Dissemination and Exploitation (D&E) Strategy and Technology Implementation Plan" was the definition of a dissemination and exploitation strategy, the set-up of a "Technological Implementation Plan" and the provision of guidelines for the D&E activities thus forming the basis of all performed D&E activities.

The following three subtasks were performed:

- development of dissemination & exploitation policies and strategies
- identification and planning of dissemination & exploitation measures and activities
- development of a Technological Implementation Plan (TIP) describing the intentions of the project partners how to use the know-how and products produced by ALSO DANUBE

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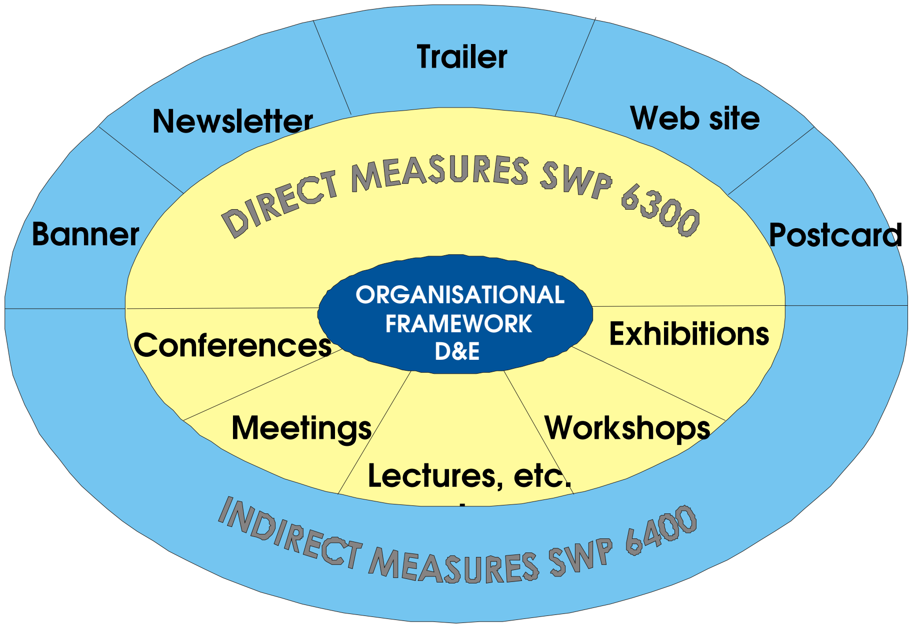

Figure 30: D&E strategy including organisational framework, direct and indirect measures

The illustration above shows the integration of all the necessary measures into the D&E strategy.

4.5.2 Organisational Framework

All topics regarding the establishment of an organisational D&E framework for ALSO DANUBE were performed within this task. Objectives of the task "Organisational Framework" were the identification and set-up of an efficient organisational framework for D&E-measures.

To this end, the following subtasks were performed:

- set up of an operational organisation for dissemination & exploitation
- set up of a communication platform and a project info database
- establishment of a D&E-network (target groups were identified and addressed)
- provision of information and dissemination & exploitation support services.

An internal organisation was established to organise the execution of tasks like administration, quality management, planning and co-ordination, budgeting and controlling, special task forces and liaisons management in the framework of dissemination and exploitation (D&E).

In order to implement objectives, the following D&E institutions were established:

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- Dissemination and Exploitation Committee (DECOM)
- Dissemination and Exploitation Network Group (D&E Network Group)
- Exploitation & IPR Manager (SWP 7600 - Leader).

A communication platform and project info database was set up in order to guarantee an optimal dissemination of R&D results.

The main communication platforms were the Dissemination and Exploitation Committee (DECOM) mentioned above and the ALSO DANUBE homepage created as a project web-page where current and comprehensive information about the project course was published. Participation in "Thematic Networks" projects of the European Commission also represented communication platforms.

4.5.3 Direct Dissemination & Exploitation Measures

Dissemination itself is a complex process, which goes beyond the mere distribution of information or products. Keeping in mind the nature of ALSO DANUBE as a research and demonstration project, dissemination became an integral part of the entire project's planning and implementation. Research utilisation starts when research and development starts, and is not a sequential step only following research and development. There are five major elements which need to be considered when starting the dissemination process of a research project:

- the user, or intended user, of the information or the product disseminated,
- the dissemination source, that is, the agency, organisation, or individual responsible for creating the new knowledge or product, and/or for conducting dissemination activities,
- the content or message that is disseminated, that is, the new knowledge or product itself, as well as any supporting information or materials,
- the context in which the knowledge or product is developed and disseminated, including contextual factors related to the source, the use, the content and the dissemination medium,
- the dissemination medium, that is, the ways in which the knowledge or the products are described, packaged and transmitted.

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All the above mentioned elements can be found in the ALSO DANUBE D&E Strategy pursuing one aim, which is to address potential users in the most efficient way possible. Keeping that in mind, the dissemination medium is a key factor. ALSO DANUBE used the approach of two main categories of dissemination approaches: Direct Dissemination and Indirect Dissemination.

The direct D&E activities mainly comprised measures which were performed in a more personal way (e.g. by members of the project consortium), including the following activities:

- Kick-off and launch press announcement
- Press releases
- Organisation of round tables, workshops
- Participation in fairs and exhibitions
- Organisation of international demonstration events
- Integration and feasibility of IT integration of additional potential users of the CSL.DB

One of the major goals of the ALSO DANUBE D&E activities was to communicate the ALSO DANUBE concepts all over Europe and thus to strengthen inland navigation in the countries with navigable inland waterways. The most suitable instrument in this case was the presentation of ALSO DANUBE and RIS (River Information Services) at different conferences and workshops by the ALSO Danube consortium. These activities were carried out during the project runtime and continue to be carried out now that the project has ended. ALSO DANUBE presentations were carried out in the following countries (number of conferences/workshops is indicated in parentheses):

Austria (18), Germany (11), the Netherlands; Belgium (4), France (1),

Slovak Republic (1), Hungary (5), Croatia (2), Bosnia Herzegovina (1),

Serbia Montenegro (2), Romania (2), Bulgaria (3), Ukraine (1)

Due to the fact that there are navigable waterways all over the world which need sustainable development to cope with the future growth of goods transport, the project consortium decided to present the ALSO DANUBE concepts at special locations outside Europe. The table below gives an overview of the worldwide conferences/workshops, where ALSO DANUBE was presented to the audience.

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Year	Conference/Exhibition	Location	State	Date
2001	TRANSGLOBAL 2001	Vienna	Austria	07. to 08.03.
	80th TRB Washington	Washington	USA	07. to 11.01.
	FIST (Financing Sustainable Transport Infrastructure and Technology focusing on CEEC and NIS	Vienna	Austria	25. to 26.01.
	International Canals & Waterways Organisation (ICWO)	Vienna	Austria	26. to 28.04.
	Vienna – Preparing for Enlargement	Brussels	Belgium	22.05.
	Marind'2001 – 3rd International Conference on Marine Industry	Varna	Bulgaria	4. to 8.06.
	DVWG – German Transport Research Association	Magdeburg	Germany	07. to 08.06.
	EIWN – European Inland Waterway Navigation Conference	Budapest	Hungary	13. to 15.06.
	SECI – Southeast European Cooperative Initiative	Sarajevo	Bosnia Herzegowina	25.05.
	SECI – Southeast European Cooperative Initiative	Belgrade	Serbia Montenegro	11. to 12.07.
	RIS workshop	Belgrade	Serbia Montenegro	11. to 12.07.
	RIS workshop	Sofia	Bulgaria	25.07.
	ITSC 2001 – IEEE Intelligent Transportation Systems Conference	Oakland, California	USA	25. to 29.08.
	9th WCTR Conference – World Conference on Transport Research	Seoul	Korea	end of July
	LOG-NET – International Conference on Integrated Logistics and Transport	Vienna	Austria	12. to 14.09.
	8th ITS World Congress	Sydney	Australia	29. 9 to 5.10.
	Annual Meeting - German society for locating and navigation	Wolfsburg	Germany	23. to 25.10.
	Chinese Delegation	Bremen	Germany	09.11.
	Inland Waterway Consultation	Caracas	Venezuela	17.11.
	Netzwerke Transportsysteme	Wien	Austria	20. to 21.11.
	RIS Workshop	Zagreb	Croatia	27.11.
2002	81st TRB	Washington	USA	13. to 17.1.
	RIS Workshop	Bratislava	Slovakia	06.03.
	RIS Workshop Hungary	Budapest	Hungary	28.03.
	Visit of Vice Minister of Republic of Croatia	Vienna	Austria	09.04.
	TLC Konferenz	Vienna	Austria	11.04.
	EuroChina 2002	Beijing	China	15. to 20.4.
	Peace Workshop	Beijing	China	16. to 20.4.
	Transport-Logistik-Internet 2002	Bremen	Germany	05.03.
	E-Commerce for Freight Transportation	Amsterdam	Netherlands	18.03.
	Port Logistics Conference	Amsterdam	Netherlands	19.03.
	Workshop organised by Danube Meadows National Park Authority and Word Wildlife Fund	Vienna	Austria	19.04.
	Danube Regions Conference	Mohács	Hungary	16. to 17.05.
	Science Week	Vienna	Austria	11. to 13.06.
	Corridor VII Meeting	Odessa	Ukraine	13. to 14.06.
	International Summer Academy	Sorpon	Hungary	20.06.
	TRB 27th Annual Summer Conference	Pittsburgh	USA	25.06.
	Danube Summit	Constantza	Romania	26. to 27.06.
	RIS Week	Vienna	Austria	18. to 20.09.
	FOVUS - Networks of Mobility	Stuttgart	Germany	18. to 20.09.
	PIANC Congress	Sydney	Australia	26.09.
	18th BVL - Logistikdialog	Vienna	Austria	26. to 27.09.
	General Managers Conference	Sibenik	Croatia	04.10.
	MARIND 2003	Varna	Bulgaria	06. to 10.10.
	9th World Congress ITS	Chicago	USA	14.10.
	RIS - Forum	Regensburg	Germany	24.10.
	Business Meeting	Krems	Austria	09.07.
	Business Meeting	Linz	Austria	13.11.
	5th EUTP Clustering Meeting	Rotterdam	Netherlands	10.12.
2003	82nd Transportation Research Board	Washington	USA	11. to 18.01.
	5th Workshop Transport Logistik Internet	Bremen	Germany	05.03.
	EPIC Conference	Berlin	Germany	13. to 14.03.
	CETMEF Technical Meeting	Paris	France	25. to 26.03.
	DGON Transponder 2003	Hannover	Germany	01. to 03.04.
	GNSS 2003	Graz	Austria	22. to 25.04.
	ALSO DANUBE ILL - Demonstrator	Linz	Austria	27.05.
	DRBC 2003	Bucharest	Romania	04. to 06.06.
	EIWN 2003	Györ	Hungary	11. to 13.06.

Figure 31: ALSO Danube presentations 2001-2003

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Taking into account that the Rhine, the Danube and the Main are the most important waterways in Europe, ALSO DANUBE concepts and results were spread all over the countries alongside these seminal routes of transport:

<u>North-Western Europe:</u>

The Netherlands, Belgium, Germany

<u>Middle Europe:</u>

Austria, Slovak Republic, Hungary

<u>South-Eastern Europe</u>

Croatia, Serbia Montenegro, Romania, Bulgaria, Ukraine

Figure 32: Area coverage of European ALSO Danube dissemination activities

It is clearly visible how much effort was put into the dissemination of the ALSO DANUBE concept and the promotion of inland navigation in the most relevant countries alongside the Danube axis (see figure above for European area coverage of ALSO Dissemination activities).

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4.5.4 Indirect Dissemination & Exploitation Activities

Indirect D&E activities used different information carriers than the direct D&E activities. New media like CD-ROMs and Internet appearances belong to such indirect activities. The indirect channel strategy focused on the following aspects:

- Project CD-ROM
- Project web pages
- Information brochures and leaflets
- Newsletters (altogether 5 issues)
- and activities addressing public authorities and RTD organisations, national and international federations and associations, as well as ”key players“ interested in a strategic partnership

4.5.5 Preparation of Exploitation of Project Results

In the last phase of the ALSO DANUBE project the exploitation preparation activities were focused on one of the developed applications, namely the Common Source Logistics Database (CSL.DB). A major success for the further validation of the project results was achieved in Finland with the Saimaa Intermodal Portal.

The basic functions of Saimaa Intermodal Portal are Forecast & Lead Time Control, Cargo Plan and Damage Reporting. The application is based on the Common Source Logistics Database (CSL.DB) and data input to the database is either a manual function via an Internet browser or an EDI message transfer.

The Forecast & Lead Time Control function is used by the partners in the transport chain to plan, forecast and control the functions, i.e. estimated and actual sailing and arrival times of vessels, cargo amounts, requested loading and discharging resources, and numbers of requested barges and wagons.

The developed application will be used for consignments from the Lake Saimaa area in Eastern Finland to Central Europe.

The consigners are Stora Enso paper mills and sawmills in the Lake Saimaa area. The other partners in the transport chain are the port operators at the ports of loading in Lake Saimaa area and at the ports of discharge, the shipping line agents (Intercarriers, Saimaa Terminals), and the barge operator at the port of discharge.

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4.5.6 Conclusion

The high number of dissemination activities assured a good visibility of the ALSO Danube project and its results all over Europe.

A TIP showed that the exploitation of the main project results is guaranteed and the partners committed themselves to further develop and use the results obtained in the project.

The assessment of D&E measures showed that the ways chosen in ALSO Danube are well appropriate to satisfy the strategies agreed upon at the beginning of the project.

By transferring the project results to other geographical areas (like the Saimaa area in Finland) it was demonstrated that the developments are suitable for other areas of inland waterway transport as well.

5 LIST OF DELIVERABLES

The following table gives an overview of the project deliverables, which were delivered to the European Commission. Project deliverables comprise the whole documentation as well as, for example, software code and developed prototypes of applications developed in the scope of ALSO DANUBE. Deliverables are either available for the public or confidential to the project consortium and the European Commission. Further information about the content of the deliverables can be obtained from the project coordinator.

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Formal deliverables:

Deliverable No.	Output from WP No.	Status	Nature of Deliverable and brief description, comments
D 1	1000	Confidential	Strategic Concept (Report): this report describes the concept ALSO DANUBE including a requirement analysis and the strategic implementation concept
D 2	1000/ 2000	Confidential	Mid-term assessment Report
D 3	3000, 5100, 5200	Confidential	ALSO Danube Demonstration Applications (System description; Software Code; Prototype); Socio-economic Assessment Report – Part 1, please confer comment on IR3 and IR5 for explanation
D 4	4100- 4600 5300	Confidential	Summary Report of Demonstrations Summary Report of full scale demonstration programme; Evaluation of economical effects and impacts (Report) Socio-economic Assessment Report (Part II), please confer comment on IR4 and IR5 for explanation
D5	1000 - 7000	Publishable	Final Project Report
IR1	1000	Confidential	Internal report of WP 1000
IR2	2000	Confidential	Internal report of WP 2000 This report covers the "System Specification" of the ALSO DANUBE describing the CSL.DB and all related IT-solutions
IR3	3000	Confidential	Internal report of WP 3000 This report includes the implementation of the ALSO components defined in WP2000 (IR2)
IR4	4100- 4500	Confidential	Internal report of WP 4000 This report gives a full description of the executed demonstrations of the four demonstration channels, as well as the validation of economic impacts and effects.
IR5	5100- 5700	Confidential	Internal report of WP 5000 This Report describes the executed socio-economic assessment of the ALSO DANUBE system including recommendations
IR6	6000 & 5800	Confidential	Internal report of WP 6000 In this report the complete field of dissemination and exploitation activities is covered including an assessment of these actions.
MR .1-MR 5	7000	Confidential	Management Report (confidential and public part), All Management Reports have been delivered so far

Figure 33: List of formal deliverables

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Work Package Reports:

The work package reports contained a detailed description and documentation of the results which were achieved in the work packages and sub work packages.

Work Package.	Final Report	Name of Work Package
WP1000	WP1000	System concept
	SWP1100	Requirement Analysis
	SWP1200	European Concept
	SWP1300	System Concept
	SWP1400	Strategic Implementation Concept
WP2000	WP2000	System specification
	SWP2100	Functional Specification
	SWP2200	System Architecture
	SWP2300	Operational Organisation
	SWP2400	System Implementation Plan
WP3000	WP3000	System Implementation
	SWP3100	Common Source Logistics Database
	SWP3200	Client Application to CSL.DB
	SWP3300	Interconnectivity management
	SWP3400	Traffic Management
	SWP3500	Generic Logistics Management Application
	SWP3600	System Integration
WP4000	WP4000	Demonstration and Validation
	SWP4100	Demonstration of Common Source Information Provider
	SWP4200	Logistics Channel CCS
	SWP4300	Logistics Channel DCS
	SWP4400	Logistics Channel DDSG
	SWP4500	Logistics Channel ILL
	SWP4600	Validation of Economic Impacts and Effects
WP5000	WP5000	Socio Economic Assessment
	SWP5100	Methodology
	SWP5200	Socio-economic Framework and Transport Markets
	SWP5300	Impacts on Transport demand and Infrastructure
	SWP5400	Impacts on Society and Environment
	SWP5500	Impacts on Workforce and Training Requirements
	SWP5600	Impacts on Regional Economy and Environment
	SWP5700	Cost Benefit Analysis
	SWP5800	Recommendations
WP6000	WP6000	Dissemination and Exploitation
	SWP6100	D & E Strategy and technological Implementation Plan
	SWP6200	Organisational Framework
	SWP6300	Direct D & E Measures
	SWP6400	Indirect D & E Measures
	SWP6500	Assessment of D & E Measures

Figure 34: List of work package reports

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6 Management and Co-ordination Aspects

The tasks of the project management of ALSO DANUBE can be described as follows:

1. Project start
2. Project organisation
3. Project controlling
4. Management of discontinuities
5. Project finalisation

6.1 Project Start

Via donau organised the kick-off meeting of ALSO DANUBE which was held from 22 – 23/05/2000 in Vienna. The aim of this meeting was to make the project partners familiar with the project rules (reporting, organisational framework, consortium agreement, intellectual property rights,…) and to give a rough overview about the project and the content of the different WPs. Due to complex negotiations, the project started later than expected, thus it was another target to keep the project running and to motivate the partners. About 80 participants joined this kick-off meeting.

6.2 Project Organisation

The figure on the next page shows the project structure of ALSO DANUBE. The design follows a process-orientated structure beginning with WP1000 (on the left). The project consists of seven work packages (WP1000 – WP7000) which are divided into sub-work packages. Each work package / sub-work package has a work package or sub-work package leader, who is responsible for fulfilling the tasks according to the Technical Annex.

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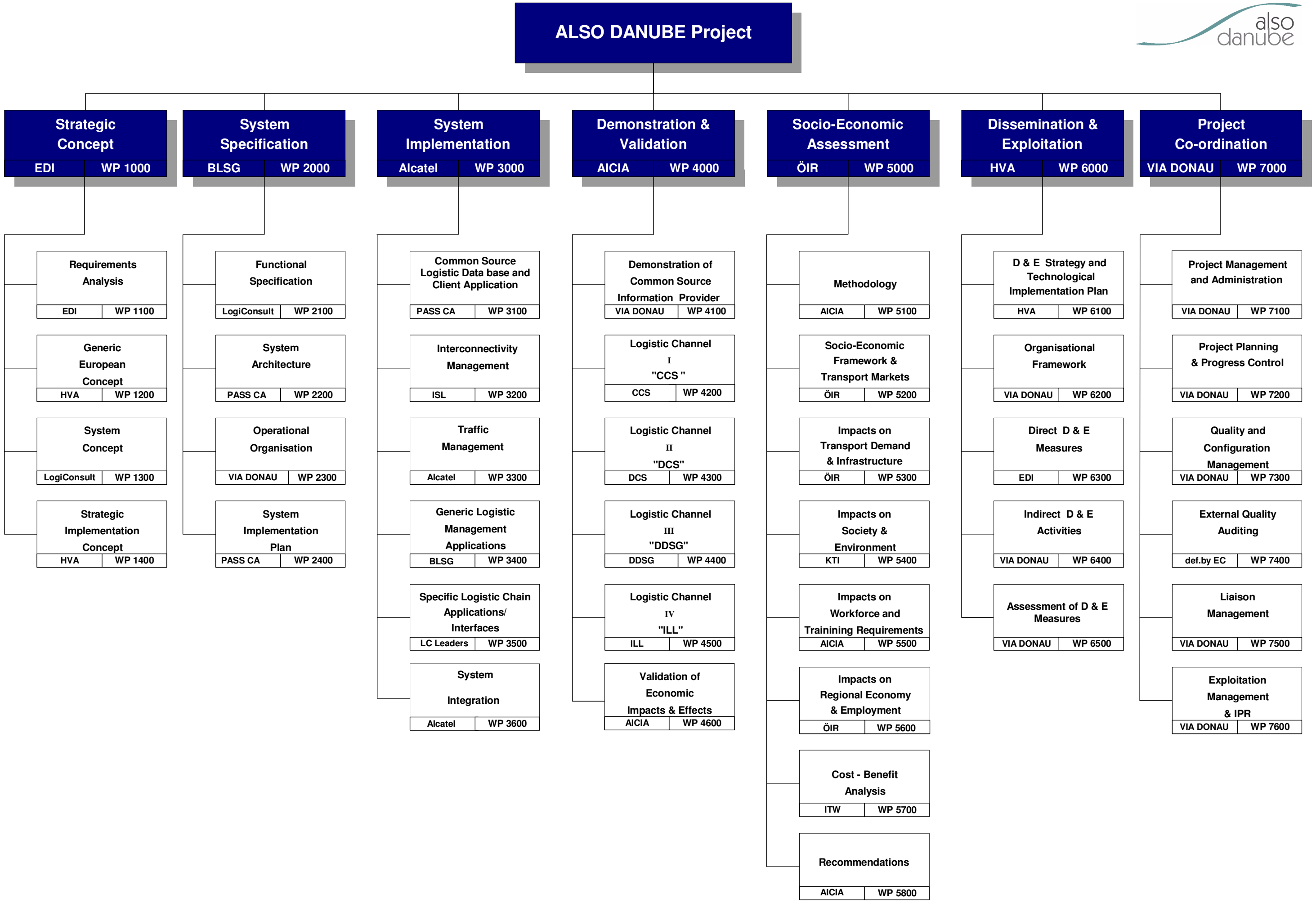

Figure 35: Project structure ALSO DANUBE

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The figure below illustrates the project organisation of ALSO DANUBE. For project communication and decision making processes the Steering Committee (SCOM) was established. Since dissemination and exploitation was considered an important task, an institution similar to SCOM, the Dissemination and Exploitation Committee (DECOM), was established. The SCOM consisted of one representative per partner and meetings were to take place at least twice a year.

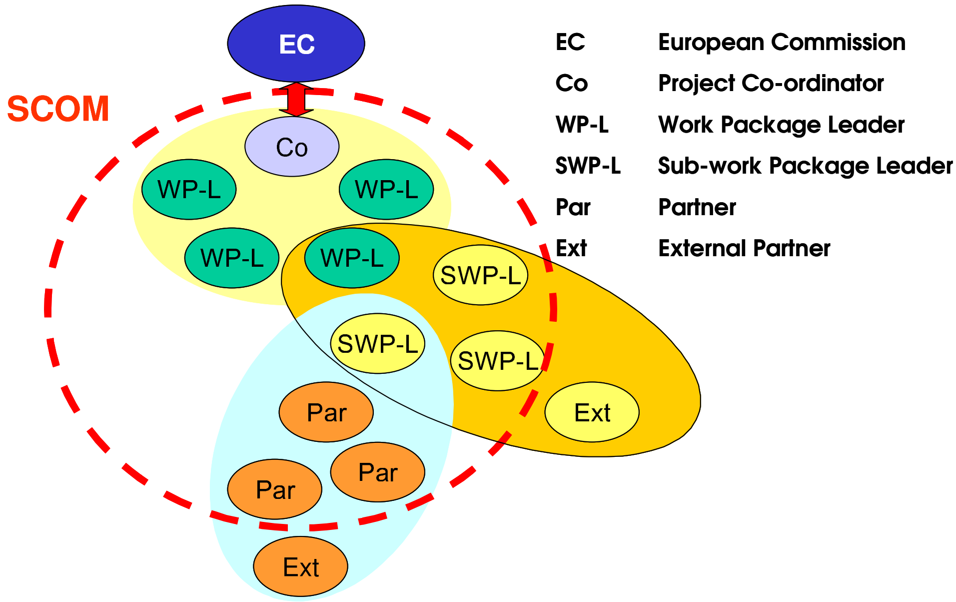

Figure 36: Project Organisation ALSO DANUBE

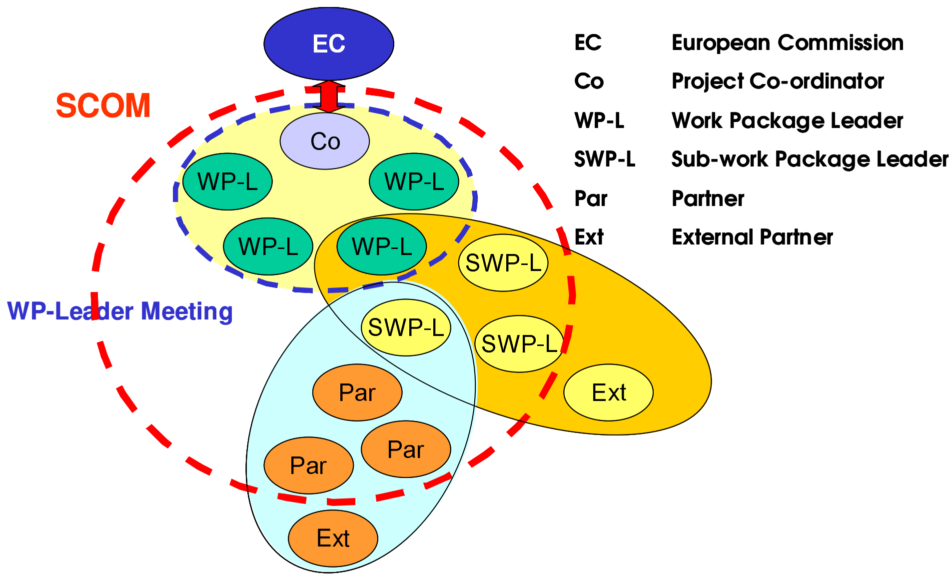

Figure 37: Adapted Project Organisation ALSO DANUBE

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Experience showed that SCOM meetings were too big for efficient discussion and decision making as the organisation of meetings was time- and cost intensive (as mentioned above it consisted of 26 members from 8 countries). The consortium agreed to establish the so called "work package leader meeting" which consisted of the WP-leaders only and which was easier to handle (please see Figure 37: Adapted Project Organisation ALSO DANUBE). The working level in this meeting was closer to the problems which occurred in the project and it was easier to render decisions in this committee.

In order not to change the consortium agreement, this institution made formal suggestions to the SCOM which were agreed on by e-mail with the consortium. All meetings were organised by the project co-ordinator in cooperation with a hosting partner pf the country where the meeting was held.

The following SCOM / DECOM meetings were held.

- Kick-off Meeting, Vienna (Austria), 22-23/05/2000
- 1st SCOM, Vienna (Austria), 05/07/2000
- 2nd SCOM, 1st DECOM, Vienna (Austria), 20/10/2000
- 3rd SCOM, 2nd DECOM, Lappeenranta (Finland), 05-06/04/2001
- 4th SCOM, 3rd DECOM, Lake Balaton (Hungary), 20-21/09/2001
- 5th SCOM, 4th DECOM, Bratislava (Slovakian Republic), 17-18/06/2002
- 6th SCOM, 5th DECOM, Würzburg (Germany), 10–11/04/2003
- 7th SCOM, 6th´DECOM, Linz (Austria), 26-27/05/2003 with Demonstration Event

The following WP-Leader meetings were organised:

- 1st WP-Leader, 15/03/2001, Vienna (Austria)
- 2nd WP-Leader, 26/07/2001, Vienna (Austria)
- 3rd WP-Leader, 13/02/2002, Vienna (Austria)
- 4th WP-Leader, 15/10/2002, Vienna (Austria)

As suggested in the guidelines for GROWTH project co-ordinators by the EC, a consortium agreement was signed by the project partners. This agreement covered

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liabilities, reporting, costs / payment, confidentiality, protection and access of knowledge, standards and settlement of disputes.

Additionally the consortium agreed on an ALSO DANUBE project handbook, the so called "ALSO DANUBE Manual" which, apart from the Consortium Agreement, includes the following:

- Documentation Index
- Project Plan
- Project Management Plan
- Configuration Management
- Organisational Structure
- Quality Management Plan
- Project Schedule Plan
- Intellectual Property Rights
- Payment Plan

6.3 Establishment of the ALSO DANUBE Project Server

Another important topic for ALSO DANUBE was the document handling. The project co-ordinator via donau operated a dedicated project file-server. The agreed security concept consisted of access by an IP-address, username and password. The passwords were changed periodically by the co-ordinator. Especially the need of the IP-address was under discussion because it allowed the partners to work from a defined computer/location only and there where companies working with temporary IP-addresses which meant extra adaptation to that concept (please see Figure 38: Access concept ALSO DANUBE Project Server)

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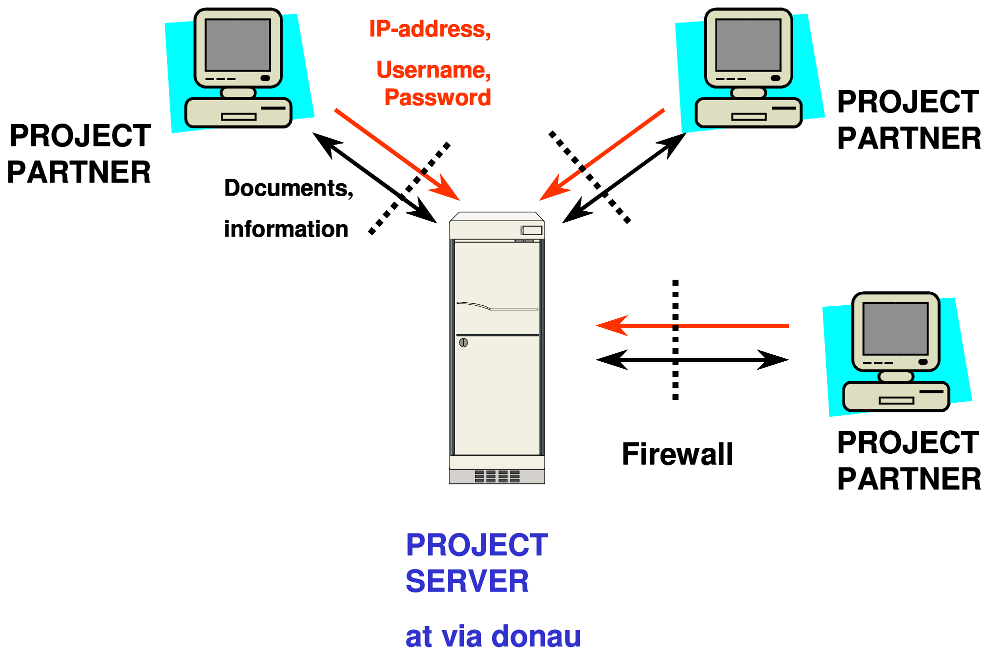

Figure 38: Access concept ALSO DANUBE Project Server

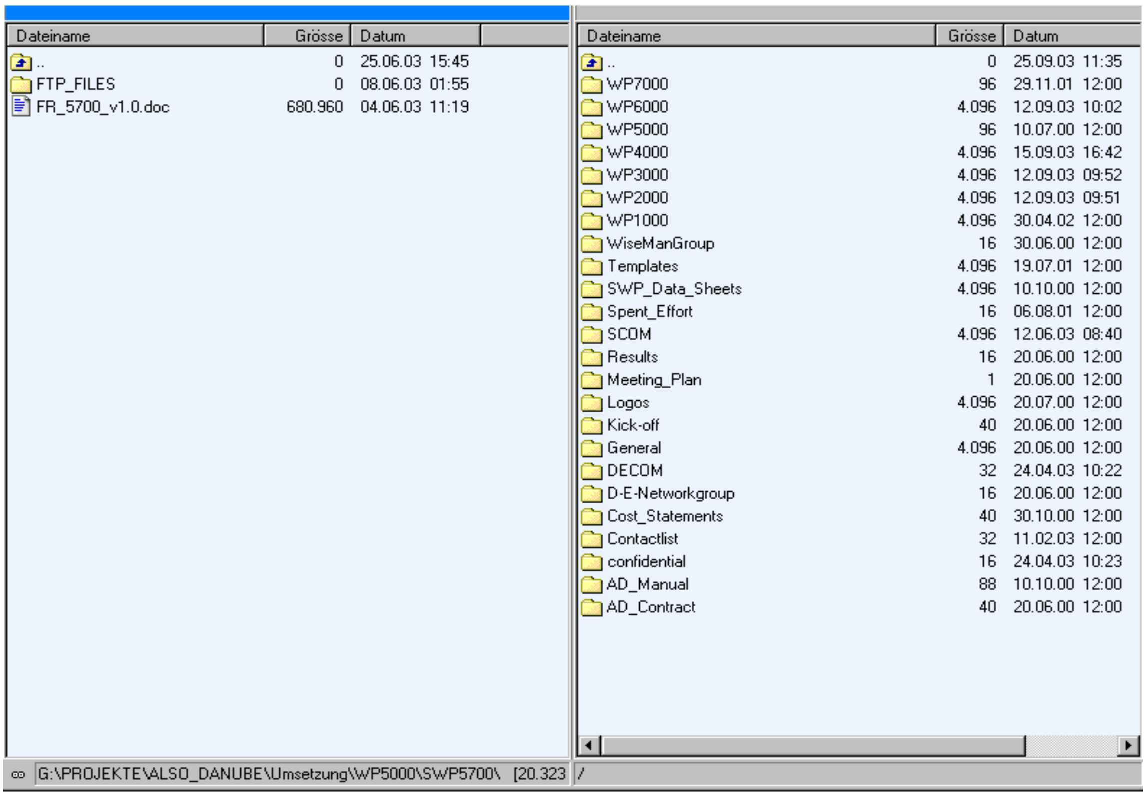

Figure 39: Screenshot ALSO DANUBE Server Structure

The figure above shows the structure of the ALSO DANUBE project server. Each project partner was able to upload the latest version of a report or to access a variety of information concerning the latest status of the project.

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Different access rights allowed work package leaders to have full access to their work packages, sub-work package leaders had only the right to write in their own sub work packages. For all other files on the project server only reading rights were assigned.

Due to the frequent use of the server by all the project partners it was possible to establish a very well working communication platform and to have the latest project status permanently available.

6.4 Project Controlling

The project controlling within ALSO DANUBE focused on the following:

- Controlling of project progress
- Handling of Cost Statements
- Reporting to the EC
- Handling of Intellectual property rights (IPR)

As mentioned above, the procedure for controlling the project progress was covered by the consortium agreement and the project manual. The partners had to make monthly reports on spent person hours (effort report), the sub-work package leaders monthly progress reports and the work package leaders bi-monthly progress reports. The progress reports had to be filed on the ALSO DANUBE project server. This procedure allowed the project co-ordinator to gain an overview of the work progress and to recognise deviations in an early stage.

The effort reports also worked as a basis for the Cost Statements which had to be sent to the EC every six months. The project co-ordinator had to collect and to check the cost statements and related documents (subcontracts, invoices, justifications) and to transfer the money to the partners. In some cases it was also necessary to send comments to the EC as the sent tables included some errors.

Every six months the project co-ordinator had to issue a Management Report and a Progress Report to the EC apart from Cost Statements. These reports typically consisted of about 40 pages and included a high number of tables, like budget follow-up and manpower follow-up, and included additional figures and tables apart from EC requirements.

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6.5 Handling of the Intellectual Property Rights

Another important task of the project co-ordinator was the handling of intellectual property rights (IPR). Please see Figure 40 for details on the declarations.

Organisation	Item	Conditions of use
BLSG	RECON-Tool	Unlimited user rights for carrying out the project work of ALSO Danube to the project partners are granted by BLSG to the partners.
PASS LOGICONSULT	PROXCIS	Free usage for involved project partners during the project time of the ALSO Danube project.
ISL	CoDaBa MeGa ApVis CoDaBa EDIFACT IFTMBF Interface to CSL.DB Viewer for transport orders	"Communication Database" declared as pre-existing know-how "Message Gateway" declared as pre-existing know-how "Graphical User Interface" declared as pre-existing know-how Declared as pre-existing know-how Free usage for ALSO Danube partners during demonstration scenarios Free usage for ALSO Danube partners during demonstration scenarios Free usage for ALSO Danube partners during demonstration scenarios
KIOS	ETNA Application	Copyright remains in KIOS for unlimited period of time KIOS agrees on manipulation of ETNA application if: manipulation has non-commercial character manipulation does not lead to commercial use KIOS is willing to participate in future modification processes of the ETNA application. Any commercial use of the ETNA application must be agreed in advance based on a written contract between the involved companies. KIOS is willing to participate in any follow-up development of the ETNA application for a commercial use.
PASS-CA	CSL.DB: Physical database Data model Documentation CSL.DB web application including: Object model Source files Documentation	Free usage for involved project partners during the project time for the ALSO Danube project.
Gesellschaft für logistische Systeme	OSIS	Licensed user rights within the project ALSO Danube
CCS Combined Container Services GmbH & Co KG	CCS - IRIS	unrestricted intellectual rights on the product IRIS, which was developed within the project ALSO Danube

Figure 40: Intellectual Property Rights

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7 RESULTS AND CONCLUSIONS

The ALSO DANUBE approach consisted of five major steps to fulfil the ambitious objectives of the project towards strengthening the European inland navigation transport mode.

Starting point was the development of concepts to ease the integration of inland navigation into intermodal logistics chains like the "Requirement Analysis for Waterborne Transport", the "Set-up of interlinked Traffic and Transport Management Systems" and the "Concept for European Wide Interlinked Traffic and Transport Management Systems". The next project step led directly to the identification and development of IT solutions enabling interlinked traffic and transport management.

The Common Source Logistics Database (CSL.DB), an application for transport management, was developed within ALSO DANUBE. It represented the core IT-solution within the project. It was interconnected with the IT-systems of the demonstration partners, the generic logistics management application (ETNA) and the Application Interconnectivity Manager (AIM). For obtaining traffic information automatically, a tracking and tracing solution was connected to CSL.DB. The interface to the Austrian Inland Waterway Traffic Management System was conceptually designed and specified, so that traffic information could be obtained for transport management.

Within the framework of traffic management, a pilot system for lock management (LOMAX) on the Austrian Danube was developed according to the user requirements of the authorities and inland skippers.

For the integration of the developed IT-solutions it was also necessary to develop an operational concept for the CSL.DB, thus enabling the CSL.DB to be installed and operated in different business environments.

Using the concepts and the IT-solutions as a foundation, consequently the next step of the ALSO DANUBE project was the demonstration of the developed solutions. Five demonstration scenarios with different characteristics were chosen for the integration of the ALSO DANUBE achievements. Transport Management on Inland Waterways, Danube Combined Services – DCS, Combined Container Services – CCS, DDSG Cargo and ILL – Industrielogistik Linz showed in their daily business activities that inland navigation is a competitive mode of transport under the pre-condition that it is

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integrated into managed intermodal logistics chains and new services are developed. Within these scenarios, it was demonstrated how logistics chains with inland navigation in the main haulage meet the requirements of industrial supply chains.

Whereas the specific demonstrations within ALSO DANUBE were analysed at the micro level in a dedicated work package, the objective of the SOCIO ECONOMIC ASSESSMENT was the in-depth analysis of the consequences associated with the ALSO DANUBE project on a macro-economic level.

In summary, the implementation of ALSO DANUBE solutions on the 7,800 km of European waterway network will improve the competitiveness of inland navigation on the whole. Concerning the transport market, transport demand and the utilisation of the infrastructure, ALSO DANUBE measures

- increase the share of intermodal transport,
- enable a shift of transport from road to inland navigation,
- thus make a better use of existing infrastructure.

The analysis on society and environment showed that ALSO DANUBE solutions

- reduce emissions and noise in congested areas,
- increase the safety on inland waterways and on roads,
- enable inland navigation to cope better with adverse fairway conditions.

ALSO DANUBE measured the contribution to the improved working conditions and education levels for the workforce in inland navigation (crew, operators in follow-up services as well as designers and suppliers of system components).

The analysis of the regional economy and employment leads to the conclusion that ALSO solutions

- strengthen the position of industry,
- strengthen the position of ports,
- contribute to the integration of Europe by connecting the emerging markets with the European core regions,
- thus enable the Danube Region to cope with the challenges of the future.

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The conclusions were drawn from the analysis of the findings of the System Implementation phase, the Demonstration and Validation phase and the relevant sub-tasks of the Socio Economic Impact Assessment of ALSO DANUBE.

The high number of dissemination activities assured a good visibility of the ALSO Danube project not only in an academic environment, but also at the policy level and in the European inland navigation sector. The results were disseminated at a large number of events especially in the ARA – black sea axis.

Furthermore, a clear Technological Implementation Plan (TIP) proved that the exploitation of the main project results is guaranteed and the partners committed themselves to further develop and use the results obtained in the project.

The assessment of D&E measures (direct and indirect measures) showed that the ways chosen in ALSO DANUBE are well appropriate to satisfy the strategies agreed upon in the beginning of the project.

ALSO DANUBE demonstrated the possibility to transfer the project results to other geographical areas and industries, such as the Stora-Enso exploitation case in the Saimaa area, Finland. Summing up, Inland Navigation is attractive also for short distances. Its operation can be made transparent to the other actors in the logistics chain. Inland navigation can serve as backbone of modern container liner services and is competitive if integrated into managed logistics chains.

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8 ACKNOWLEDGEMENTS

via donau, the project co-ordinator of ALSO DANUBE would like to thank Jean Trestour, head of the Maritime Policy and Technology Unit at the European Commission's transport department DG TREN and Astrid Schlewing, scientific officer at DG TREN/E-3 Waterborne Sector for Research and Development, who supported the project patiently during the overall lifetime.

During its running time of 37 months the project experienced “ups and downs”, but owing to the excellent team and the special working atmosphere the consortium was able to finalise the project successfully due to the engaged contribution of all consortium partners within ALSO DANUBE.

Special thanks go to the organisations PASS CA, DCS, CCS, ILL and DDSG, which were responsible for the demonstration scenarios. The companies MDK, PASS, PASS CA and DDSG entered ALSO DANUBE in the latter half of the project and took over extended responsibility to finalise the work program successfully.

Last but not least we thank the company ILL, which supported the great closing event in Linz (July 2003), where representatives of the European commission, politicians, industry representatives, Austrian shippers and the ALSO DANUBE consortium took part.

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9 ABBREVIATIONS

Abbr.	Full Designation
PL	party logistics
AG	Aktien Gesellschaft (stock corporation)
AIM	Application Interconnectivity Manager
AIS	Automatic Identification System
ALSO	Advanced Logistic Solution
ALSO-IRIS	ALSO- Integrated Risk Information System
Appl.	Application
ApVis	Graphical User Interface
ARA	Amsterdam, Rotterdam and Antwerp
ASCII	American Standard Code for Information Interchange
BBX	IT-System (Babcock Borsig)
CCNR	Central Commission for Navigation on the Rhine
CCS	Combined Container Services
CEEC	Central and Eastern European Countries
CL	Cargo Lifter
CoDaBa	Communication Data Base
COMPRIS	Consortium Operational Management Platform River Information Services
CSL - IP	Common Source Logistics Information Provider
CSL.DB	Common Source Logistics Data Base
CSL.IP	Common Source Logistic Information Provider
D&E	dissemination and exploitation
D1-5	Deliverables (1-5)
DB	Data Base
DBMS	Data Base Management Systems
DC	Danube Commission
DCS	Danube Combined Services Gesellschaft m. b. H.
DDSG	DDSG Cargo
DECOM	Dissemination and Exploitation Committee
DG TREN	Maritime Policy and Technology Unit at the EC's transport department
DG TREN/E-3	Waterborne Sector for Research and Development
dGPS	Differential Global Positioning System
DoRIS	Donau River Information Service
EC	European Commission
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange For Administration, Commerce and Transport
EDP	Electronic Document Processing
ENC	Electronic Navigable Chart
ETA	Estimated Time of Arrival
ETNA	European Network Application
FP4	Framework Program 4
G.m.b.H.	Gesellschaft mit beschränkter Haftung (public limited company)
GIS	Geographical Information System
GPS	Global Positioning System
GROWTH	projects funded under FP5 by the Growth Programme
GSM	Global System for Mobile telecommunication
ICT	Information and Communication Technology
IEEE	Institute of Electrical and Electronics Engineers
IFTMBF	Firm booking message
ILL	Industrie Logistic Linz
ILLONET	ILL - Logistics cockpit

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Abbr.	Full Designation
IP	Information Provider
IPR	Intellectual Property Rights
IR1-6	Internal Report (1-6)
ISD	Information System Donau
ISIS	Internationales Schifffahrtsinformationssystem (Int. Shipping Information System)
IT	Information Technology
ITW WU	Institut für Transportwirtschaft und Logistik
IWT	Inland Waterway Transport
IWW	Inland Waterways
JIT	Just in Time
LAN	Local Area Network
LCM	Logistics Chain Management
LOMAX	lock management system for the Austrian Danube
LSP	logistics services providers
MeGa	Message Gateway
MR1-5	Management Report (1-5)
MTO	Modal Transport Operators
OSB	Oberste Schifffahrtsbehörde (Supreme Shipping Agency)
OSIS	Open System Interconnection Software
Par	Partner
PIANC	International Navigation Association
PPS	Product Planning System
R&D	Research and Development
RECON	relational database developed by company BLSG
RIS	River Information Services
RLC	Regional Logistics Cluster
RoRo	Roll-on roll-off
RTD	Research and Technical development
SCOM	Steering Committee
SME	Small and Medium Enterprises
SMS	Short message service
SQL	Structured Query Language
SWP	Sub-Work Package
SWP-L	Sub-Workpackage leader
TEN-T	Trans European Networks - Transportation
TGTOF	Transport management application of DDSG cargo
TINA	Transport Infrastructure Needs Assessment
TIP	Technological implementation plan
TM	Traffic Management
TM - IP	Traffic Management Information Provider
TRB	Transportation Research Board
TTI	Tactical traffic image
UN-ECE	United Nations Economic Commission for Europe
VA	VOEST ALPINE
VHF	Very high frequency
VIM	Very Important Multipliers
WCTR	World Conference Transport Research
WHL	Wiener Hafen
WP	Work Package
WP-L	Workpackage leader
XML	Extended Markup language

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10 LIST OF FIGURES

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