

WEB-BASED AND MOBILE SOLUTIONS FOR COLLABORATIVE WORK ENVIRONMENT WITH LOGISTICS AND MARITIME APPLICATIONS

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ABSTRACT

Maritime transport is a rather fragmented sector with a quite significant number of different players involved. During recent years, substantial efforts have been made to overcome this fragmented structure and to build an integrated maritime research community. Large and mid-sized logistics and transport organisations often consist of many decentralised business units. The challenge is to balance the benefits of decentralisation with group optimisation and volume advantages. The Web, WML/WAP and GPRS solutions are becoming a corporate communication infrastructure for setting up integrated information services and mobile collaborative processes in logistics and transport with maritime applications. In 2004, the EU-funded project has been started, which is called eLOGMAR-M.

INTRODUCTION

The major goal of the eLOGMAR-M project is to create a dynamic, collaborative work environment (virtual pool), which incorporates different partners operating along the selected maritime freight route by the way of uniting their information management systems, databases, Internet Web-sites and portals and to provide services and new work methods for the mobile actors (traders, shippers, brokers, consignees, forwarders, railways etc.).

Although some of the companies operating along the selected freight route are competitors, the advantage that co-operation could bring real benefits for different target groups, should be realised: Major target group – forwarding companies, which represent owners of goods (manufacturers or buyers). They can calculate a start-to-finish transportation rate and “optimise” the logistics supply chain by using information systems and databases; Shipping lines (deep sea and feeder lines) – bringing additional cargoes flows, promotion of their services and increasing quality of services (the delivery of goods at the correct time); Terminal operators – planning of cargo transportation and decreasing of storage and processing time; Freight brokers – increasing the profit of their business by involving a wider range of user groups dealing with freight transportation.

Collaborative working and information openness can create a positive image of international transport routes and the participating partners. The united information space produces a certain model allowing to control as well as forecast the whole transportation process. The meaning of “dynamic collaboration” is considered in the sense that other organisations can join in a virtual collaboration space at any time and that information resources are regularly updated.

THE MARITIME FREIGHT ROUTE

The maritime freight route "Baltic Sea feeder ports - Western Europe hub port (Hamburg) - Mediterranean port (Thessaloniki) - Chinese ports" is selected as the subject of investigation and demonstration.

The rapidly developing trade between Europe and Asia, the polarisation of producers in Asia and of consumers in Europe needs the improvement of supporting services along this transportation routes. Containerships present one half of the turnover measured in gross tonnage along the route “East Asia ↔ North-

Western Europe”, with China being the largest producer of container traffic originating in Asian countries. Multilevel support of logistics and transport business process by Web-based and mobile solutions will be analysed at three levels (Figure 1):

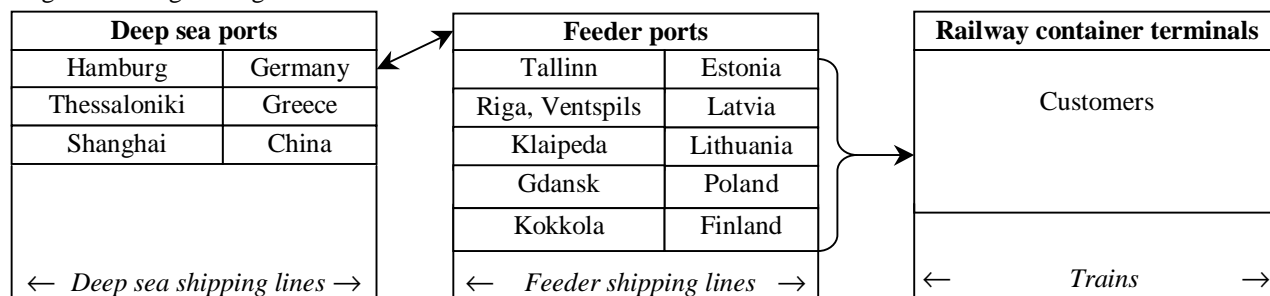


Figure 1. Multilevel logistics and transport business process.

- First level – containers delivery from one deep sea port (hub) to another by deep sea shipping lines,
- Second level – containers delivery from hub port to smaller feeder ports by feeder shipping lines,
- Third level – containers delivery from feeder ports to customers by trains.

Harvest Development Ltd. and Beijing HOPE Software (China).

The combination of expertise of IT companies and transport and logistics enterprises enables solving problems related to the proposed area.

The Baltic Sea Region is selected as the sample of feeder shipping and Port of Hamburg as container hub for this region. IT- and Communication support of intermodal transportation is illustrated by logistics supply chain “Baltic feeder ports ↔ trains ↔ Customers”.

All partners operating along any transport supply chain have their own information systems (IS), databases (DB) and Internet Web-sites or portals. The concept of an international transport corridor entails systems of means of transport communication associated with the various modes of transport, which facilitate the international carriage of freight on routes of maximum concentration (Gambardella 2000).

Special attention will be also devoted to the study of maritime and logistics processes in the Baltic Sea Region as they form an integral part of the above mentioned freight route. This region has specific requirements: after the candidate countries (Lithuania, Latvia and Estonia) joined both the EU and NATO, they play the role of a new border between EU and CIS.

Creating a dynamic collaborative virtual society, which incorporates different partners operating along the selected maritime freight route empowers all of these partners:

CONSORTIUM AND APPROACH

17 partners from 9 countries are presented in the project's consortium: Fraunhofer Institute for Factory Operation and Automation (FhG/IFF), Port of Hamburg Marketing and Transportation Freight Broker Company RTSB (Germany); Port of Kokkola (Finland); Maritime & Supply Chain Solutions Ltd. (U.K.); Thessaloniki Port Authority and TRD International (Greece); Logitrans Consult and Interbalt Maritime Agency (Estonia); IDC Information Technologies, Riga Technical University and Latvian Intelligent Systems (Latvia); Klaipeda State Seaport Authority and Sonex Computers (Lithuania); Warsaw University of Technology (Poland); China

- To provide access for mobile users by using GPRS (traders, shippers, brokers, forwarders, terminals etc.),
- To reduce costs and optimise collaborative procurement and logistics,
- To increase customer service through collaborative sales and co-ordinated order fulfilment,
- To reduce lead time through supply chain visibility and integration,
- To centralise cash flow processes,
- To integrate different Enterprise Resource Planning systems and databases.

We consider the following scheme to reach the major objectives of the eLOGMAR-M project (Figure 2):

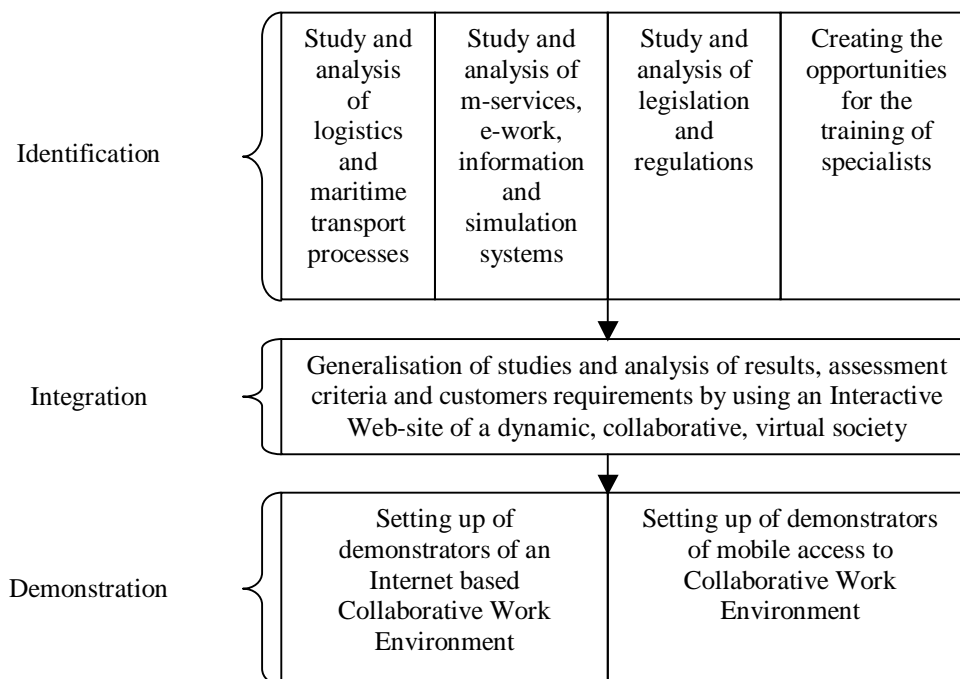


Figure 2. General scheme.

Identification and integration phases serve as a technical and organisational platform to create a dynamic, collaborative, virtual pool of the partners, operating along the selected maritime freight route. However, the phase of demonstration illustrates the applications of this platform in the sections of the selected maritime freight route “Europe – China”.

The overall methodologies and technologies used to achieve the objectives consist of:

- Mobile Internet Solutions;
- Web-based technologies to combine different ISs, DBs and simulation models located in different ports, terminals, shipping companies, forwarding companies and logistics centres along the selected freight transport routes in the Internet based Collaborative Work Environment;
- Formal models to specify and re-engineer logistics business processes;
- Multi-level methodology to analyse and simulate logistics and maritime processes;
- Virtual Reality;
- Computer-Based Training.

DEMONSTRATORS OF WEB-BASED AND MOBILE SOLUTIONS

Frames of Demonstration

Frames of demonstration are defined by the following factors:

- 1) Two environment friendly transport modes will be considered:

- maritime transport (deep sea and short sea shipping and transshipment),
- rail transport of freight;

- 2) Transportation of cargo in containers will be considered (the global container market is a very dynamic one);

- 3) Several sections of the whole maritime freight transport route “China – Mediterranean – Western Europe hub port (Hamburg) – Baltic Sea region feeder ports” are selected for demonstration:

- Hamburg - Riga;
- Hamburg – Tallinn;
- Gdansk – Klaipeda;
- Riga - Thessaloniki;
- Klaipeda – Thessaloniki – Shanghai (Hong Kong).

Technological Solutions

Objectives:

- 1) To demonstrate technological solutions to create a networked, collaborative structure of the partners along the selected freight route by integrating their information resources. The following heterogeneous information resources are considered:
 - Databases;
 - Information & simulation systems;
 - Internet Web-sites and portals.
- 2) To provide access for mobile users (shippers, forwarders, consignees, insurers etc.) to Web-based Collaborative Work Environment. The general scheme, which presented in Figure 3, will be demonstrated.

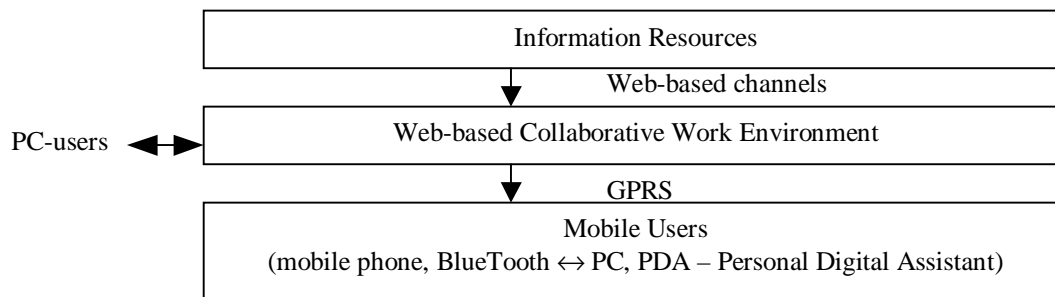


Figure 3. Demonstration of Web-based and Communication Solutions.

The following approaches will be investigated and demonstrated:

- 1) Web-service - is based on common, Web-related technologies: TCP/IP, HTTP, SMTP, and XML. Together with three new specifications (Simple Object Access Protocol, Web Services Description Language, Universal Description Discovery and Integration) they present a set of technologies that define Web Services. Web Services provides interoperability between port terminal simulation model, railway simulation model and information management systems (Raumbaugh 1991).
- 2) Several typical schemes with different hardware sets for Internet will be tested (Ginters 2002):

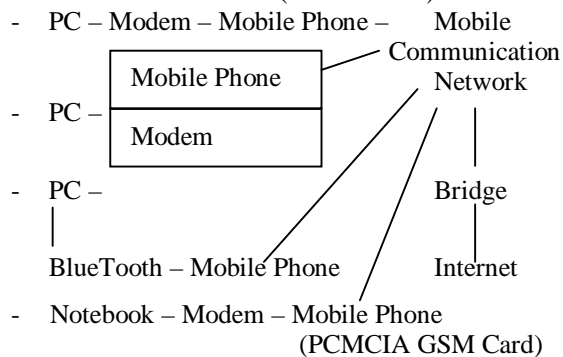


Figure 4. Typical schemes of mobile solutions.

A set of demonstrators will illustrate the use of mobile solutions and different hardware sets to support logistics and transport processes such as booking of transport means, billing and payment services, tracking of deliveries, exchange of typical sets of information between actors (shippers, ports etc.) for choosing a port for call etc.

EXPLOITATION AND DISSEMINATION OF RESULTS

The exploitation of results is very important for projects funded by the European Commission. For this reason, the consortium core partner group created the Baltic Sub-Regional Competence Centre (BSRCC) in Riga within the frameworks of the BALTPORTS-IT project.

BSRCC is the instrument to create and support a networked, collaborative virtual, organisation aimed at bringing together industrial users, universities and research institutions around the common topic of, e.g. "Logistics, IT-solutions and Simulation with Maritime Applications".

Besides the further development and maintenance of the central office in Riga, branch office in Tallinn will be established under the eLOGMAR-M project.

The main tasks of BSRCC are:

- To create a network of excellence and a training network aimed at bringing together industrial users, universities and research institutions around a common theme "IT-solutions and e-logistics for maritime applications". Such a network would be used in future as a kernel for the next RTD projects, including EC activities;
- To improve the systematic exchange of information between different organisations that are interested in virtual collaboration;
- To provide the possibilities of regional specialists training by using Web-based open-distance courses;
- To support the organisation of Internet conferences;
- To introduce partners, operating in Freeport areas of the Baltic States, to the Western and Chinese experience and to the methodologies of privatisation and ports re-engineering processes based on modelling;
- To provide distant access to simulation models, training materials and knowledge located in specialised servers.

The considerable experience of the co-ordinating organisation Fraunhofer FhG/IFF in creating different regional centres and branch offices will be used.

Special sessions will be organised by the consortium partners within the frameworks of:

- European Simulation Multi-Conference (Riga, 2005);
- International Conference "Logistics and IT-Solutions in International Trade" (Tallinn, 2005);

- International Workshop HMS "Harbour, Maritime & Multimodal Logistics Modelling and Simulation" (2005).

CONCLUSIONS

eLOGMAR-M project is Accompanying Measure aimed at supporting logistics and maritime operations by Web-based and Mobile Solutions. Project objectives, consortium structure and general scheme of workplan are presented in the article. Results of demonstration of technological solutions will be presented during the next HMS events.

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