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SERVICE LEVEL MANAGEMENT OF THE GERMAN AIR TRAFFIC CONTROL AN INTEGRAL PART OF THE ITIL PROCESS LANDSCAPE

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Standard-based approaches to managing the complex IT environment have been rapidly embraced by the IT community. The most popular framework being adopted is the IT Infrastructure Library (ITIL).

Originally developed by the British government in the late 1980s, ITIL is comprised of a growing series of publications that outline a process-based set of best practices for IT service and systems management.

ITIL promotes a quality approach to achieving business efficiency and effectiveness in the use of information systems. ITIL best practices are applicable to all IT organizations, no matter what their size or what technology they use. Today, ITIL is the world's most widely accepted approach to IT service management.

The distinction between business process and IT process needs to be well defined and communicated.

The Service Level Management (SLM) is one of the important and integral parts of the ITIL Standard. The goal of the SLM is to create IT-service modules from the customer point of view. The problem of System Management is that operations are only described from the technical or system point of view. Often the customer view is lost. This problem becomes obvious when dealing with such specific systems as Air Traffic Control (ATC) services. One of the decision-making approaches is discussed in this paper as a case study for DFS Deutsche Flugsicherung GmbH, which is the legal private company for the German ATC and navigation services.

The progressive introduction of the IT-Infrastructure Library (ITIL) process for the IT-System Management, has been planned since 2001.

For the DFS it was important to describe end-to-end services. As example the service chain "Representation of Radar Information". A major point is not only to create the complete chain, but also to define the right criteria and measurement methods. The SLM is responsible for the standardization and controlling of IT-Services. The services have to plan and to fix in a special IT-contract. One-success criteria for Service Provider and Customer are a long-term win-win connection. The SLM has to be arranging the permanent monitoring and reporting for the agreed Service Level.

The tasks and goals are as follows:

- Management of Customer Requirements for IT-Services;
- To create, plan and optimise customer oriented IT-Services;
- To maintain Service Modules and Service Catalogues;
- Standardization of Service Level and Services;
- Contract-Management, monitoring and reporting of Service Level Agreements.

A successful SLM has to equally focus on economical, technical and organizational Customer Requirements. The most important success criterion of SLM is standardization.

Keywords: IT Infrastructure Library – ITIL, Service Management, Service Level Agreements

THE ACTUAL SITUATION OF IT

Often IT and its organization is technical oriented or is focused only on the system point of view. Especially IT-organizations are often structured in such a way that they reflect technical purposes and products.

Due to the fact that Companies today depend on the availability of their IT-Systems, IT has to support all business processes. This means that IT is a critical factor of the company success and its role on the market. IT became a completely new mission for high tech companies and the requirements regarding IT have to be changed.

Business IT has to be more flexible and customer oriented. IT has to move from a technical point of view into a services and customer oriented service organization. This is a complete change of business culture. The customer today is not interested in an IT product. The customer requires an overall measurable IT service, maybe a complete end-to-end service.

SHORT INTRODUCTION INTO THE IT-INFRASTRUCTURE LIBRARY (ITIL)

ITIL is a quasi standard for IT-System Management Processes. The Central Computer and Telecommunications Agency (CCTA) set up ITIL. The British Government set the task to create a new standard for public IT-departments. ITIL is a protected label of the office of Government Commerce (OGC).

What is important is that ITIL is the Best Practice Standard, reflecting the experiences of IT System Management Processes. ITIL is to be understood as an open guideline and a resource to arrange IT service processes, which are tailored for IT Service Management Processes. ITIL is independent of Supplier or other industrial companies. ITIL describes a common frame for all activities of an IT-organization. These activities will be bundled into different processes. Every process is responsible for a special task of the IT-organization. This method for IT-management is independent from the structure of the IT-organization. The main goal of ITL is to describe the IT-Service Processes and to set a standard in a systematic way.

The goals of ITIL are as follows:

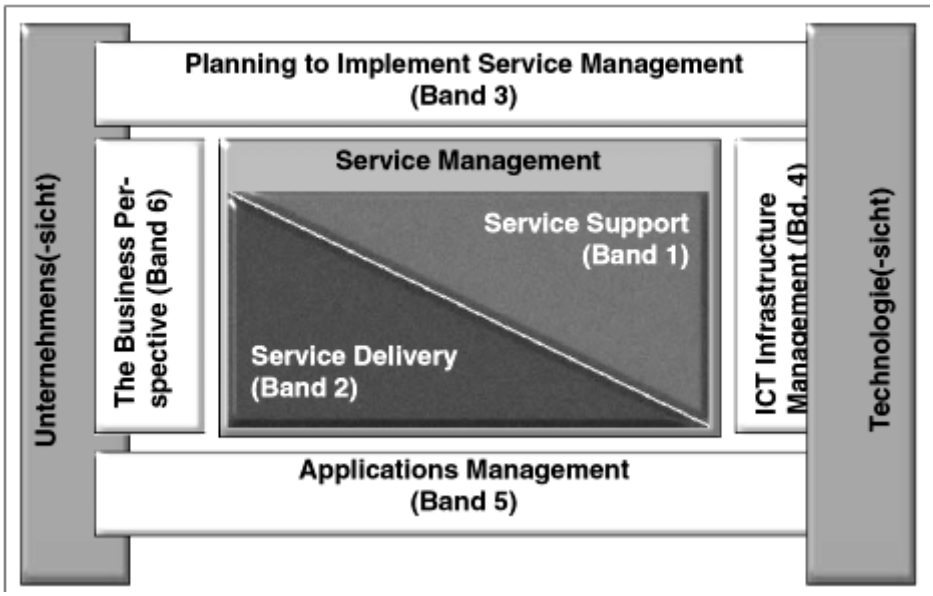
- Provision of a framework of best practices for the management of IT-services.
- Implementation of methods for improvement of quality, performance and economy of IT-organizations.
- To provide a higher degree of professionalism for employee and organization.

The use of the ITIL standard provides the IT-organization with the possibilities of automation and more flexible and customer oriented Services Processes. ITIL is the basis for optimum and cost-efficiency.

"ITIL has the goal to deliver IT-Services in a high quality"[1].

Most IT-organization different ITIL processes can be found. One goal of ITIL is to build a complete and integrated model of IT-processes, which are optimised and perfectly coordinated with each other. All ITIL processes are in line.

The ITIL frame structure is shown in the following picture[2]:



[1] It SMF page 37.
[2] It SMF IT Service Management.

The ITIL Service Management Processes are divided into two core areas:

- Service Support;
- Service Delivery.

The Service Support processes concentrate on the support and realization of system management processes. On this operational level, all processes for system operations are summarized. The term Service Support describes the key practices of system management, like Service Desk, or Incident Management.

On the tactical level the Service Delivery processes describe the long-range planning and improvement processes of IT-Service performance. They ensure that customer oriented service processes are fulfilled in detail and are executed in a structured way.

Service Support	Service Delivery
Service Desk[3]	
Incident Management	Service Level Management
Problem Management	Finance Management
Configuration Management	Capacity Management
Change Management	Continuity Management
Release Management	Availability Management

SERVICE LEVEL MANAGEMENT AS A PART OF SERVICE DELIVERY

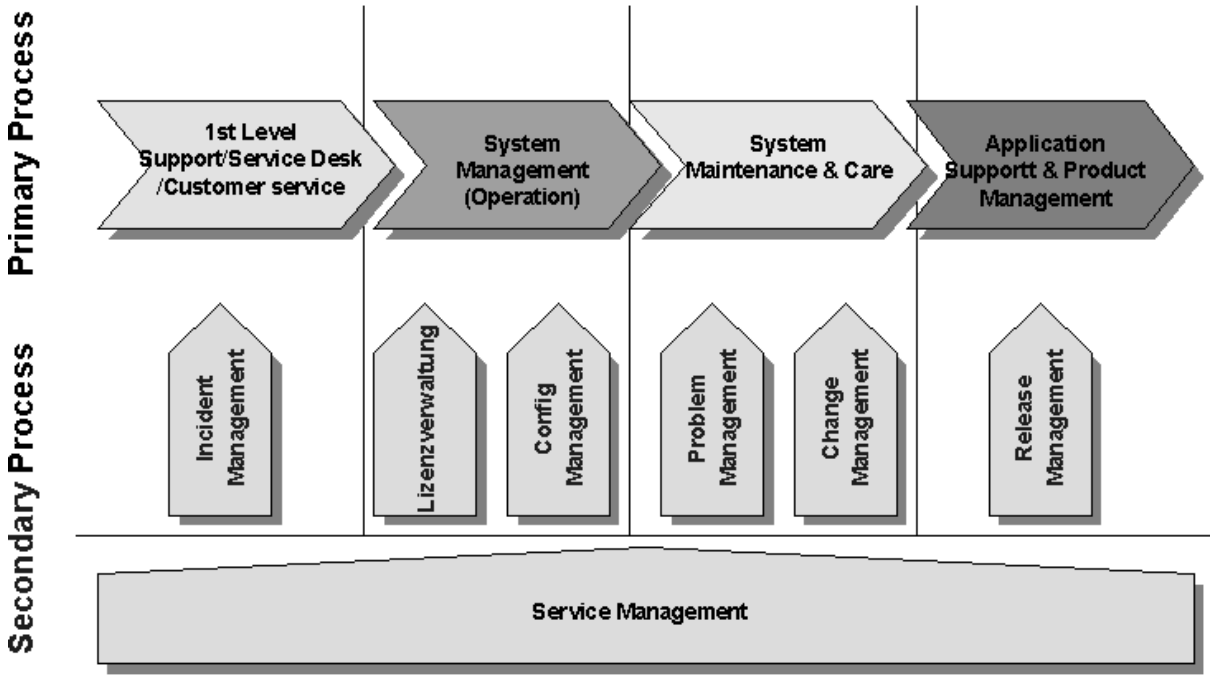
The main goal of Service Level Management (SLM) is to make IT performance measurable. Today it is important that the customer is able to measure the achieved Service Level and to assess the service quality in relation to the customer requirements. Basically the SLM and the customer use agreed metrics for this task. Due to the fact that the IT services have a direct impact on the success of business processes, the IT services have carefully to create, to plan, to operate and to monitor. In this way the SLM is a central and strategic task of IT Management. The SLM as a part of Service Management is the central interface between the customer requirements and the IT Service Operation.

The benefits of Service Level Management are the following:

- The Service Level Management will increase the service quality and economy of service support.
- The services shall fulfil in the customer requirements in a better way and so increase customer satisfaction.
- The Service Level Agreements contain clear requirements from a quantity and quality point of view. Thus there will be a common understanding of the tasks, competence and responsibilities of the customer and the IT-service organization.
- With the help of a permanent service monitor it is possible to react in a timely and cost effective manner to service quality violations.

[3] Service Desk is not a process, but is a special function.

The following picture shows the specific DFS Service Management Processes:



Definition of fundamental basics:

Service Request (SR):

A Service Request contains all customer requirements / wishes. These requirements / wishes shall be described in detail. This is the responsibility of the customer. The task of the IT-organization is to define the resulting technical and financial consequences, so that the Service Request brings all customer requirements into a technical form, which is measurable and necessary for implementation. The Service Request also contains all information about required operational agreements and / or underpinning contracts for the fulfilment of SLAs.

Service Catalogue (SC):

The Service Catalogue is part of a highly sophisticated Service Level Management, because in the Service Catalogue the IT-organization describes the complete service performance, which is normally divided into different service modules. The Service Catalogue contains detailed information on the service modules. The customer can find out which services are standard services and options of the IT-organization and which are only available by special order.

Service Level Agreement (SLA):

The SLA is the formal contract for IT-Services and their quality between the customer and the service provider. The SLA has to be described for the required IT-services in such a manner that not only technical personnel can understand the SLA. The SLA can be structured in a service-oriented or customer-oriented way or as corporate SLAs for a standard service for a lot of different customers.

Operational Level Agreement (OLA):

The OLA is an internal agreement between different internal IT-divisions, for example between the IT-Service provider and the networking provider. The OLA serves to support the IT-organization, which is responsible for the complete service or end-to-end service. Because the OLA is an internal document the OLA is only an agreement, not a contract.

Underpinning Contracts (UC):

The UC is like the same as an OLA. The UC will be closed, if it is necessary to use an external partner for the support of the end-to-end service. The UC has the status of contract.

The following table gives an overview of the Service Level Management activities:

Goal	Confiscation of the agreed and provided IT-service in quantity and quality		
Input	- Costumer requirements - Information about Customer satisfaction - Reports about provided Services - Cost overview - emergency plan	**Source**	- Customer - Service Management Process - Financial Management - Continuity Management
Task	- to take the customer requirements into the Service Request - to ensure the service provided via Operational Level Request or / and Underpinning contract - to work out the service quality - to work out and to maintain the Service Catalogue	**Activity**	- to generate reports - to measure the fulfilment of required services - to plan and to realize the service improvement
Output	- Service Catalogue - SLA, OLA, UP - Service Level Reports - requirements of performance and availability - Service Improvement Programme	**Receiver**	- Customer, IT-organization - internal / external Service provider - Management
Metrics	**Customer advantage**	Fulfilment of Agreements and contracts Economy of services Service satisfaction	
	Quality	Level of covering SLA / OLA / UC Service availability per anno in % Performance parameter / time of processing Reaction time / restoration time Number and time of service interruption	
	Cost	Price / Cost development and trend	
Role	Key Account Manager Service Level Manager		

STRUCTURE OF SERVICE LEVEL AGREEMENTS (SLA)

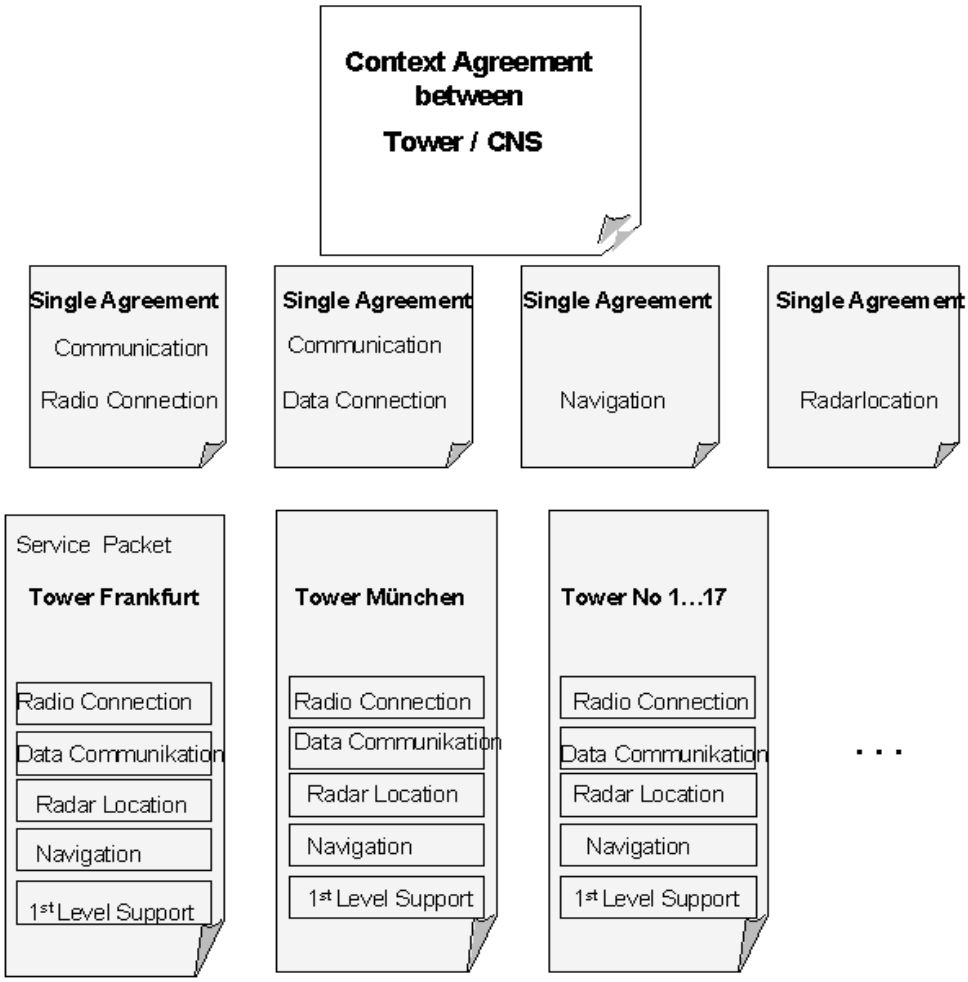
SLAs can be structured by different features. For the formal point of view, SLAs can be divided into the elements Context Agreement / Single Agreement / Performance and service certificate.

The Context Agreement describes the fundamental agreements and regulations, which is important for partnership co-operation between the customer and service provider.

The Single Agreement contains all relevant topics and regulations, which are specific for a defined service or an agreed performance or a specific customer. The Single Agreement can be tailored in such a way that all specific topics can be clarified in the Context Agreement.

Service and Performance Certificates describe all the metrics for the service quality and quantity. This description can be related to a general service or to a service that depends on the location.

The following figure shows the SLA structure between the business units *Tower* and *CNS*:



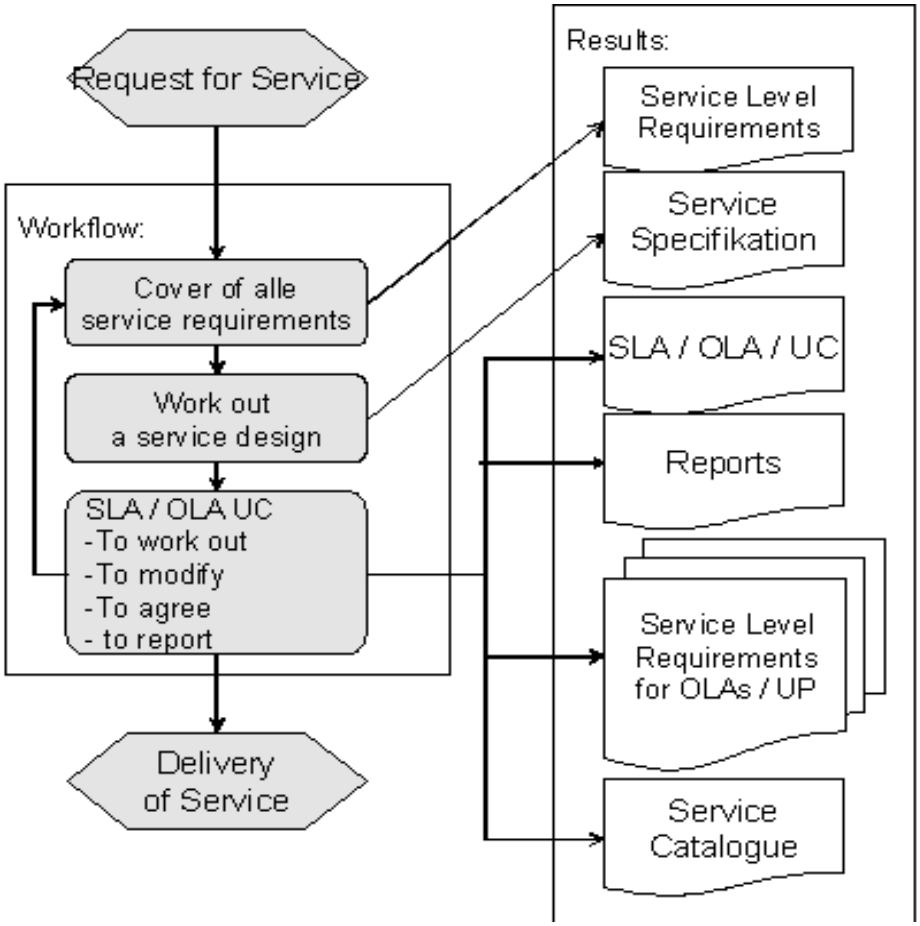
The Service and Performance Certificate shall contain the following aspects:
- Simple description of services and performance criteria;
- The agreed service time period;
- Reaction time period;
- Criteria for availability, Security / Safety and continuity aspects for the Services;
- The tasks of Customer and service provider;
- Critical aspects and exceptions.

The workflow of SLA management has to be included in the referenced documents:
- general description to establish out the process;
- process description;
- Context Agreement;
- appendix to the structure;
- appendix to the organisation and co-operation;
- Single Agreement;
- Service and Performance Certificate;
- Service specification;
- Service Catalogue;
- Lessons Learned.

In DFS the ATC Operation Business Units have established SLAs with the ATC technical Business Units (Service Provider). The DFS technical Business Unit is the central partner for all internal and external technical services. It is the "one face to the customer" and has the complete responsibility for the fulfilment of technical services. Also, all costs for service provision shall be accounted via the internal service calculation.

The steps for establishing SLAs are as follows:
- to record all requirements of the customer;
- to work out the service design;
- to identify the external and internal OLAs / UC;
- to agree all documents for service provision;
- to perform a periodical review and reporting.

The following picture describes the DFS workflow to establish Service Level Agreements:



CREATION OF SERVICE MODULES /CATALOGUE

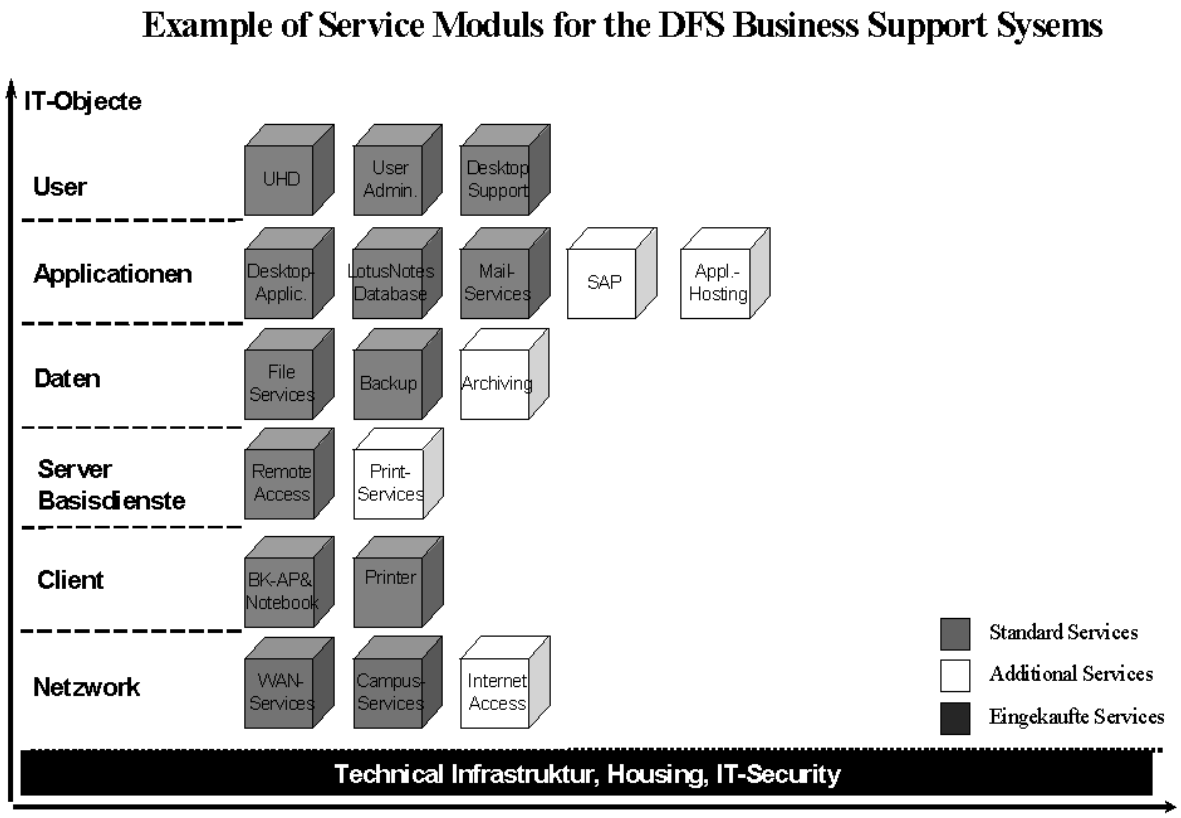
The creation of service modules is one of the important activities to reorganize the IT into a service-oriented organization. It is fundamental, because the definition of service modules required different aspects:
- To work out the services and performance;
- To bundle the services based on different requirements;
- To describe the defined service module in detail;
- To define the interfaces and dependencies between modules;
- To calculate the cost for each service module;
- To decide standards as a basis for the creation of the Service Catalogue.

The service catalogue presents a detailed overview of all services, and describes standard services and options. With the help of the service catalogue the IT-organization can be represented as a service organization with transparent costs or prices.

A service module can be described in the following way.

Service Module:	User Help Desk (Service Desk)
Contents of Service:	The User Help Desk records all hardware and software incidents.
Detail description:	Acceptance and analysis of incidents and calls via telephone and remote administration. Qualification, classification and documentation of all call in the central call management database. Solution and consulting of call for standard services / products. Escalation of call or incidents, which cannot be solved directly to the 2nd level support. Call management for calls escalated to third parties. Customer information management (Call number, status, information about problem solving). In case of systematic or vast number of incidents the UHD has to perform crisis management for the customer.
Hand-over:	Communication between customer and User Help Desk via telephone, number 4500
Service Level:	Service period: Monday-Friday 7:00 am -7:00 pm
Metrics:	80% of calls to be answered within into 30 sec. 95% of calls to be answered within into 45 sec 80% of calls to be solve within 15 min after the first call
Cost:	Price for recording of call: xx € Price for call with direct solution: yy € Price for call with escalation and local support: zz €
Reporting:	Monthly and following metrics: – number of calls by month / day / hour – number of calls solved based on different categories – diagram of accessibility – number of calls taken directly – number of calls not taken – rate of direct solution
Assumption:	Customers are qualified. The Call database is central database for automatic escalation and information. UHD support only for the service modules of the service catalogue.
Running time and dismissal	Duration is 1 year and can be dismissed 3 months before end of duration.

The following picture gives an overview of the service modules for the DFS Business Support Systems:



END-TO-END SERVICES

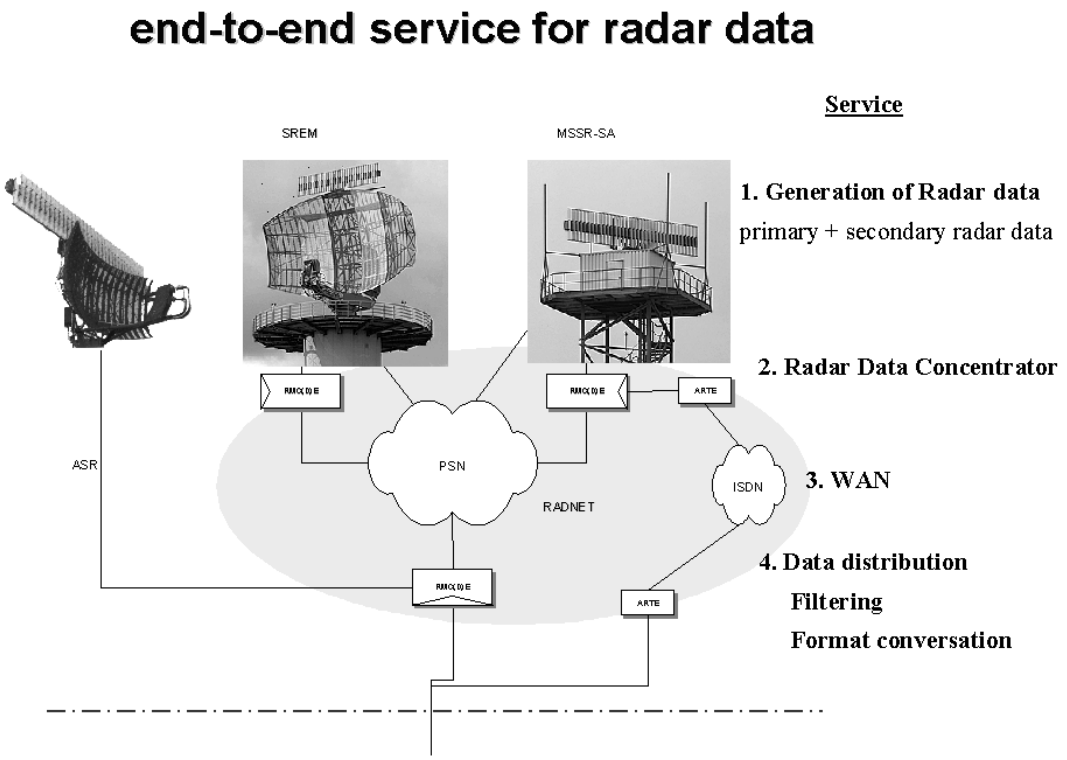
Today in the German ATC we have different service providers, which are responsible for different services. There are a certain of number of SLAs, OLAs and also UC with different external service providers. Additionally, every business unit or division has their own structure and quality of SLAs, with different metrics to measure and to interpret the service quality. They have their own tools and methods.

This cannot be in the interest of the customer and the customer requests an end-to-end service, because the customer requires a certain performance for the complete service chain, and is not interested in managing different services with different units. The requirement is: “One face to the customer”. In this way, only an end-to-end service can satisfy the customer completely.

The different services and systems have their own history. Therefore it is not easy to define and to describe the complete end-to-end service. It is necessary that all service providers establish a working partnership and define a central service provider who is responsible for the end-to-end service.

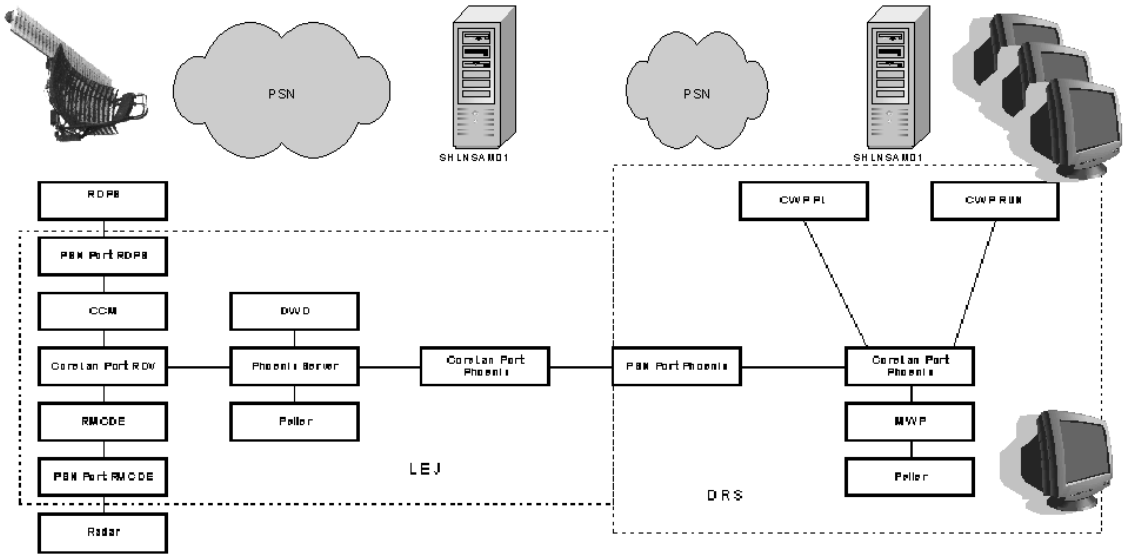
At first DFS has to define which end-to-end services exist, to describe these and to realize the prototyping for these services. Based on this prototyping the end-to-end service becomes transparent and it becomes possible to monitor and to manage. This service responsibility of the service provider including all interfaces shall be clearly defined. Important is that the complete end-to-end service is in one hand and in one place. Incidents and failure must be reported automatically and under real time conditions. For that a sophisticated system management and SLA tool with a uniform database is absolutely necessary.

The following pictures describe the end-to-end services for the radar data distribution Dresden Tower.



The business unit CNS is responsible for the SLA / OLA Radar Data generation. CNS also uses an external service provider like German Telecom for weight area network. The point of hand-over is the input port of the radar data and flight plan processing system.

Radar - Concentrator - WAN- Processing system - LAN - representation system - CWP



This picture shows the complete service chain for the distribution of radar data. Main metrics for this service are:

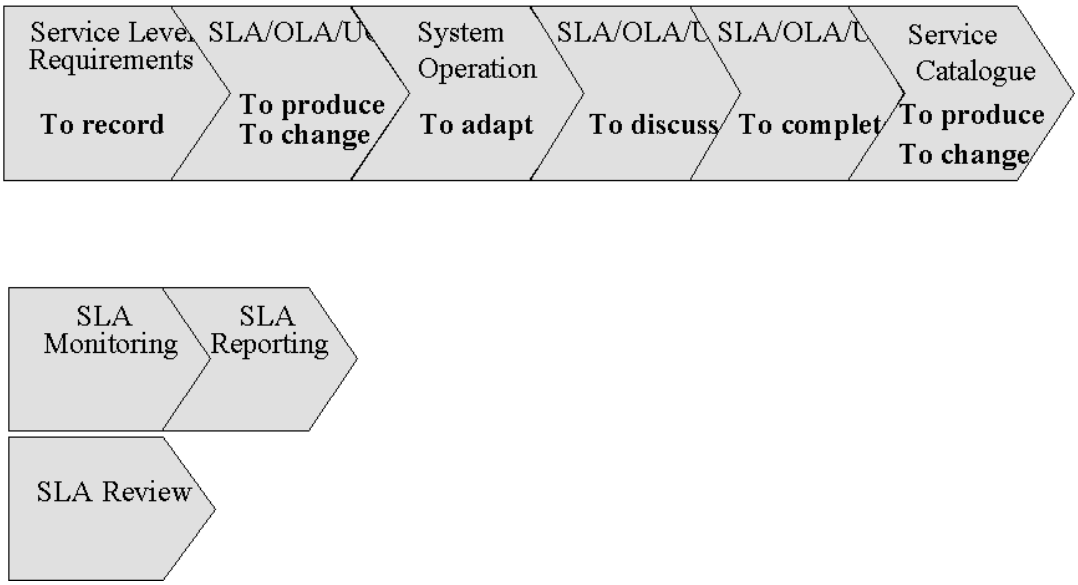
- Servic availability 99,98% p.a.
- Processing time from radar source to reprensentation <2000 msec.

TOOL SUPPORT

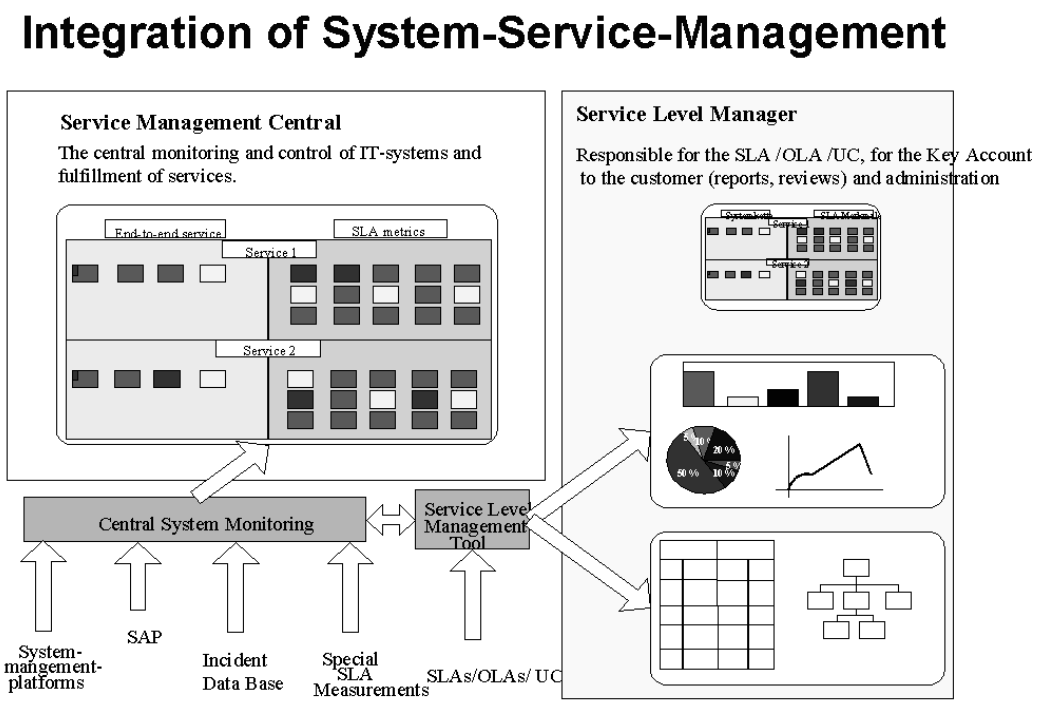
To establish service management processes based on the ITIL standard it is necessary to have tool support. The DFS divides the tool platform in two different kinds of tools. From the technical point of view it is necessary for automation to use a system management tool to report and monitor failures and to perform switch over between cluster systems. The tool resource is for the employee of the system operation (Service Level 1) and System Management (System Level 2). The DFS uses the tool "BMC Partol" for the Business Support System.

The different services and systems have their own system management and monitoring tools and different databases. Therefore it is important to define and to realize special adapters between the system management tool and the service level management tool. The tool platform describes and supports the complete service process. It is necessary that all service providers establish the data and information and define the rules and logic for calculation of the service level metrics. In that way it is possible to integrate the SLA directly in the SLA tool, to combine the different SLA to an end-to-end service. It is necessary to investigate a lot of time and resources to integrate the SLA in the tool and additionally to define the calculation rules, metrics and rules for reporting and alarms. Based on these standards it is simpler to integrate a high number of SLAs in the tool. The SLM tool has to support the following elements.

Tool Support for the complete SLM process



A second important aspect is that the SLM tool and the system management tool have to work together. The databases from the system management tools are the central input for technical information of SLM tool. Based on the integrated Service Level Agreements and calculation rules the SLM tool reports on different levels. Recommend reporting for the High Level Management (Managing Director) via dashboard, for the Service Level Manager and customer via metric reports and for the system operation via detailed technical metric and alarm reports.



CONCLUSION

Today the most critical factor for IT-organization or service provider is the "full-life-support" of the business processes. The ITIL standard is best practice method for reorganization into a customer oriented service provider. It is recommend realizing the ITIL processes via organization project. There for it is necessary to work out a detail project plan. The implementation time for the ITIL processes dependents on the complexity of IT-organization and on the ITIL process it self. The experience for complex companies shows the following time periods.

Incident Management	6-18 months,
Configuration Management	3-9 months,
Problem Management	5-8 months,
Change Management	3-4 months,
Release Management	2-3 months,
Availability Management	4-8 months,
Financial Management	6-12 months,
Service Level Management	6-9 months.

After the implementation of ITIL it is necessary to define the services and service modules of the IT-organization; to describe them in detail and to calculate the costs and prices for every service as well as to provide the service via Service Level Agreements.

The DFS is now gaining its first experience with the definition of service chains and service management and monitoring of end-to-end services. The first prototype will be completed by end of this year. However, it has become apparent that a complete service orientation and customer satisfaction can only be achieved through end-to-end management of services and via complete transparency of cost and service quality. A high level of automation is required based on standard system management and SLM tools. From an organizational point of view it is very important to provide visible results for the management (dash board) and practical acceptance from the system management organization.

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INFLUENCE OF LOGISTICAL FACTORS TO THE TRANSPORT FLOWS DISTRIBUTION

CASE SURVEY IN LITHUANIA

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Many authors have analysed distribution of transport connections and transportation flows by internal characters of transport system, but very important are the external relations of transport system. The aim of this article is to find an answer - who really decides transport network structure, routes and warehouses positions, the volumes and directions of goods flows, and the selection of transport mode, etc.? Of course there are hypothetical answers - politicians, environment and transport engineers, transport companies, forwarders, and customers of transport and logistics services. Author has analysed many scientific and practical researches, but there are very different points of view.

Article author made survey in the following period – December 2003-January 2004 in 56 trading companies and 29 transport companies of Lithuania. The companies were selected casually from one of the biggest business catalogue "*Musų Lietuva-2003*" (Our Lithuania-2003).

All questions were divided according logical groups as 1) basic factors determining warehouses positions, 2) basic factors determining selection of routes, 3) parameters of time of delivery, 4) estimation of delivery quality characters, 5) structure of logistical channel, 6) type of contracts.

The basic conclusions of this survey are presented in the article. This survey could be very important for transport network development strategy of Lithuania and entire Baltic region as well.

Keywords: flows of goods, routes, warehouse positions, logistics channels, transport companies

1. INTRODUCTION

The analysis of scientific works shows a dual point of view of transport links distribution. The first theory shows that transport links are distributed by decision of transport and logistics service providers and their engineering results. The criteria like route characteristics, kind of transport, optimal warehouse positions, and shortest path according this theory are decided by technological point of view [1-3]. In other case this theory does not enough integrate external influence.

The estimating of marketing factors influence to transport links gives another approach of scientific problem. Conception of logistic as marketing element faces on all transport links as subsystem of material supply system [4-6]. In conformity of marketing theory researches solving following tasks in logistic: 1) add of value; 2) logistics costs minimization; 3) customer service. But technological approach of transportation links distribution is totally missing in these tasks.

The origin of different approaches is dual interpretation of transport service: 1) as physical material supply and 2) as marketing element.

The transportation science faces the problem – what is primary: transport links or trade relation and which influence factors have logistical requirements of trade to transport links. The aim of article is to determinate logistics influence to transportation links in Lithuanian case. Seeking the aim author has made a case survey in Lithuanian transport service providers and consumers market. The basic results of survey are presented in chapter two of the article.

2. RESULTS OF THE CASE SURVEY IN LITHUANIA

There was made 13 specific questions to trading companies – customers and 12 specific questions to transport companies – providers. All questions were divided according six logical groups which results are presented as follows:

2.1. The Basic Factors Determining Warehouses Positions

Fig.1 shows hierarchy of parameters estimating importance of warehouse position. 10 – high importance, 1 – low importance.

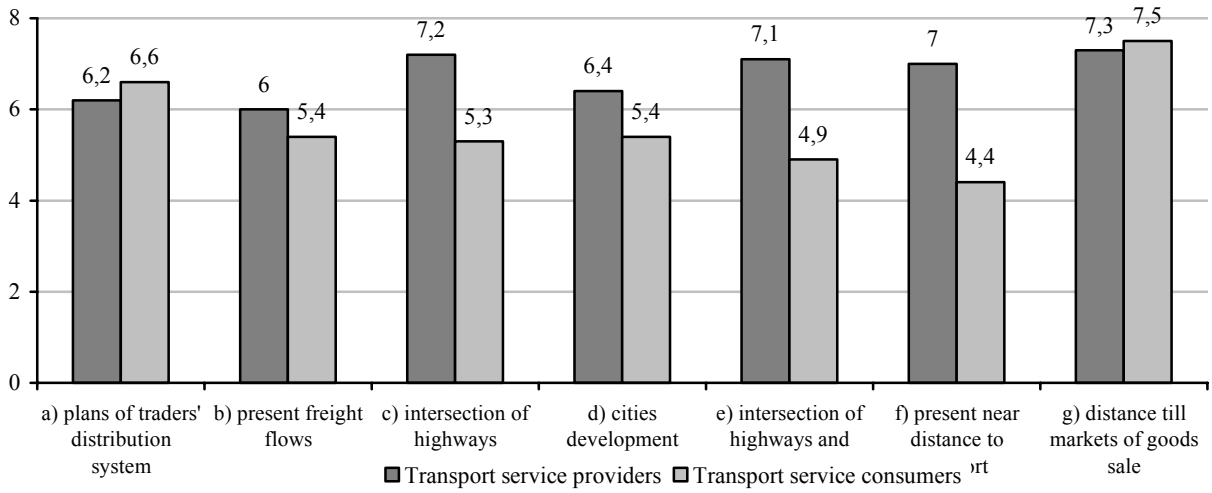

Figure 1. *Hierarchy of parameters determine of warehouse position*

Transport companies select more important technological (positions a), b), d), g) in Fig.1) parameters and trading companies – supply management parameters (positions c), e), f) in Fig.1). Medium technological characteristic according transport service providers is 7.3 and consumers – 4.7, in other case medium supply management characteristics according transport service providers 6.5 and consumers – 6.1. Survey show dual approach to transport links distribution as well as theoretical analysis.

2.2. The Basic Factors Determine Selection of Routes

The survey shows the following:

- 41.1 % transport service providers are under route selection influence of consumers.
- 75.0 % transport service consumers know exactly transit routes of their goods, for 51.8 % their goods carrying is important, 32.1 % make influence to route selection.

Fig.2 shows hierarchy of parameters estimating importance of route selection according transport service providers answers, 10 – high importance, 1 – low importance.

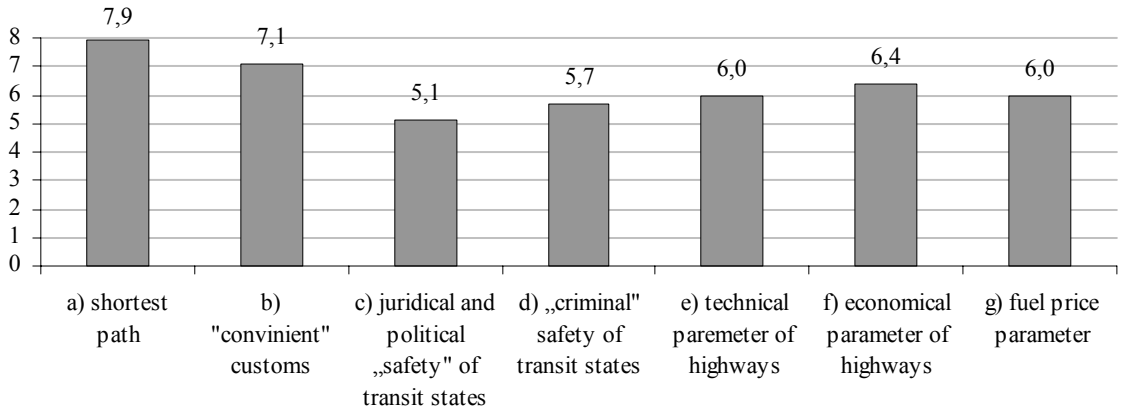

Figure 2. *Hierarchy of parameters determine of route selection*

2.3. The Estimation Parameters of Time of Delivery

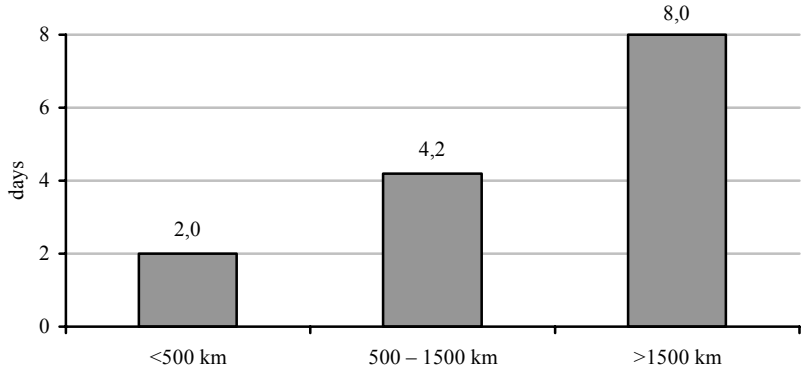

Figure 3. *Time of delivery*

The transportation distance determines time of delivery. According survey, from 500 km average time of delivery by truck is 2 days, from 500 to 1500 km – 4.2 days, 1500 km and more – 8.0 days. The reason of this result is grouping of goods. Grouping of goods provide possibility minimize cost per cargo unit but for routing of grouping goods more time is necessary. 44.6 % goods by truck are carried as grouping goods. This shows necessity of creating grouped goods channels.

2.4. The Estimation of Delivery Quality Characters

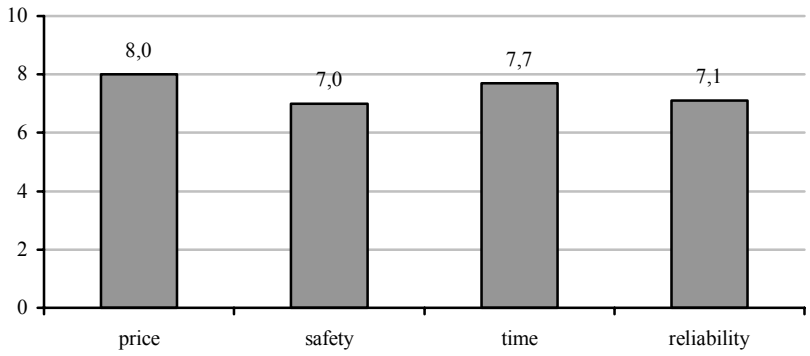

Figure 4. *The most important transportation factors*

As we could see in Fig.4 there are price and time the basic factors determine selection of carrier. Safety and reliability are not so important for customers.

2.5. The Structure of Logistical Channel

According survey 62.2 % goods supply orders are direct from manufacturer and 37.8 % from distribution warehouse. This result shows low level of distribution platform development in "new Europe". Fig.4 shows depending logistical channel type from traders business size.

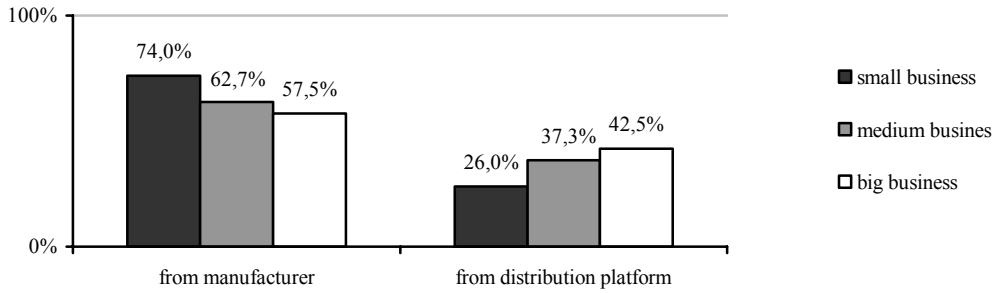

Figure 5. *The most important transportation factors*

In the big business import or export more goods direct from manufacturer. Small – more from distribution platform. So logistics channels type depends from business size and of course supplies orders size.

2.6. The Type of Business Contracts

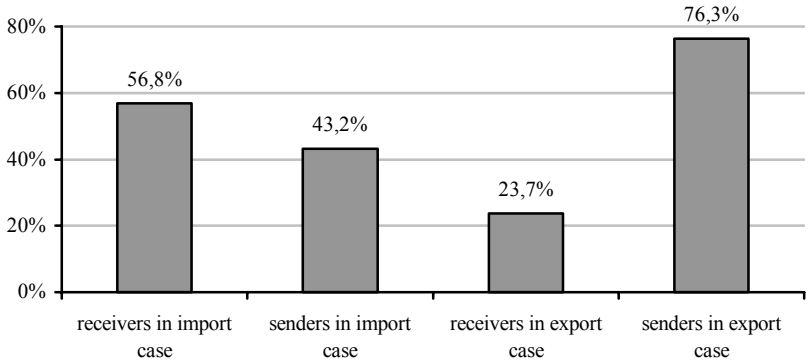

Figure 6. *The contractor's authorities in export and import case*

Fig.6 shows very interesting tendency of contractors' authorities. In export and important case contract customers of carries in more part of orders are Lithuanian companies. National factor is more important for transport company selection. According survey 72.9 % contracts are long-time contracts and 27.1 % - casual.

3. CONCLUSIONS

1. Survey shows dual approach to transport links distribution as well as theoretical analysis. Transport links are distributed according marketing logistics strategy of transport service consumers and technological solutions and implementations of providers as well. Survey shows that transport companies are not only "sellers" or "providers" of transport services. They are logistics partners of transport service consumers. The strategic partnership of trading and transport companies determine in many cases transport links formation.
2. The basic logistical factors determining transport links distribution according authors survey in Lithuania are as follows: geography of consumers markets, geography of basic transport nodes, structures of logistical channels, perspective of cities development, shortest paths, political and crime safety of transit, grouping of goods, national factor.

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GENERAL DESCRIPTION OF EUROPEAN RAILWAY TRAFFIC MANAGEMENT SYSTEM (ERTMS) AND STRATEGY OF ERTMS IMPLEMENTATION IN VARIOUS RAILWAY MANAGEMENTS

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The paper presents the general overview of European railway traffic management system (ERTMS). Subsystems are described ETML, GSM-R with particular attention to ETCS.

The technological progress of application of national railway traffic control equipment, in the case of international trains, has enforced development of a unified ERTMS system. This paper describes the issue of ERTMS system implementation in various railway managements.

Keywords: ERTMS, railway traffic control, railway managements

1. INTRODUCTION

European Railway Traffic Management System (ERTMS) in accordance with the Decision of European Committee 2001/260/EC should ensure railway interoperability.

Railway interoperability means the broadly understood compatibility of infrastructure, power supply, maintenance, control, and rolling stock, traffic. Railway interoperability applies both to existing and newly constructed lines, the existing signalling systems and ERTMS.

Operational interoperability of control ensures international safe train; travel within various European networks and in particular:

1. The train passage through the border without necessity to stop the train;
2. Without change of locomotives;
3. Without change of driver;
4. Using exclusively standard tasks compliant with ERTMS.

Technical interoperability is a component of operational interoperability.

Together with the economical progress of European countries the development of national railway traffic control system took place that are not compatible with each other. As a result, trains passing the border are equipped with various national systems that are extremely costly and have to be installed among other onboard equipment. When passing the border, the train has to change its system in accordance with dictated by the cross border European country. This extends the time of travel and increases maintenance and operating costs.

2. GENERAL DESCRIPTION OF ERTMS SYSTEM

European railway traffic management system (ERTMS) consists of the following:

- European Train Control System (ETCS);
- Radio transmission system GSM-R;
- European Train Management Layer ETML.

General assumptions of ETCS. ETCS is bound to supplement and in the future even suppress the variety of AKJP systems (Automatic Train Travel Control) by one common system. Thus, it has to be fully accepted by all European, and in the future also non-European railway managements. This means that it has to fulfil all functions performed by the presently used system, while certain basic functions will be obligatory for all lines equipped with ETCS, and other will be used on an as needed basis.

At the same time for economical reasons this system will have to ensure a possibility of cooperation with various structures, both on the vehicle and on the infrastructure side. Moreover, the system has to enable management of traffic in accordance with requirements and provisions of all specific railway managements and ensure safety at the high level, but not lower than now.

It is necessary to make possible smooth transition of railway management borders without longer standstills for replacement of locomotive and reduction of investment and operational costs by expansion of market and implementation of market competition principles between control system manufacturers on the railways by making available full documentation of interfaces and functional and system requirements of each module to the potential manufactures.

Thus set, these objectives are reached through a far-reaching modularity of functions and structure of the system, open hardware and software architecture and mechanisms taking into account national and local traffic regulations.

ETCS based is on digital track-car transmission. This transmission may be made by balises, short, average or long loops, digital radio channel or specialized transmission modules. The data describing the track and data describing the vehicle serve the purpose of static and dynamic speed profile calculations. The calculated profile is continuously compared with the present speed in function of a location. Location function, necessary for this purpose is based upon uniquely identifiable (by an unique number) and precisely located devices for pinpoint transmissions (balises or loop end marks).

Functions of control and supervision always operate along the same principles, independently from the channel receiving the information from the track. The basic functions fulfilled by the vehicle and track devices are presented on Figure 1.

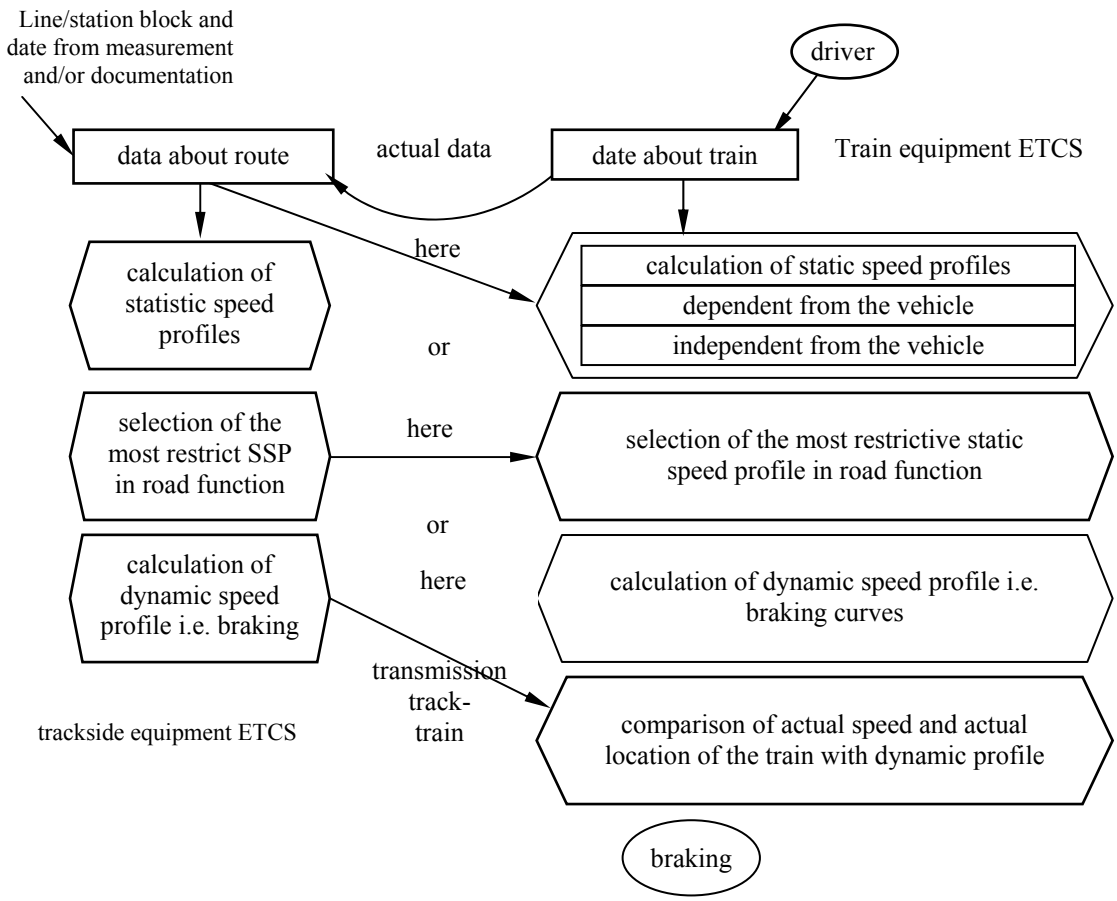

Figure 1. *Basic functions of vehicle and track devices ETCS*

This drawing shows clearly trackside equipment, transmission track-train and train devices. This division is always appearing in AKJP systems based on train-track transmission. We have to draw attention to the fact that in the case of ETCS both trackside and onboard train devices may realize system the majority of functions.

Each train provided with ETCS devices is able to realize all functions shown at the side of ETCS train on-board equipment as shown on Figure 1. Use or not of each function depends on information received from the track i.e. of level of ETCS application or configuration of trackside devices. This does not mean, however, that each vehicle equipped by ETCS is able to move on any line equipped with ETCS.

Trackside equipment, depending application level and configuration are ready to perform only a predetermined range of functions. This range is determined during designing of line equipping with ETCS taking into account, among others, needs of the line (expressed by, for example, required throughput of the line, speed of the line, required comfort of passengers) as well as cost of investment and operation.

GSM-R. GSM-R is a railway version of GSM (R – Railway) operating in the band of 900 MHz. GSM-R functionally corresponds to GSM 2+ making available to the users, besides talk channel, also a radio channel for data transmission, group calls, determination of call priorities, functional addressing (using for example train numbers) and other specialized functions designed for such services as railways or police. GSM-R constitutes then a transmission carrier whereby drive clearances are sent, issued by Radio Block Centre – RBC to specific trains located within one RBC area. Place of GSM in the ERTMS/ETCS system is shown on Figure 2.

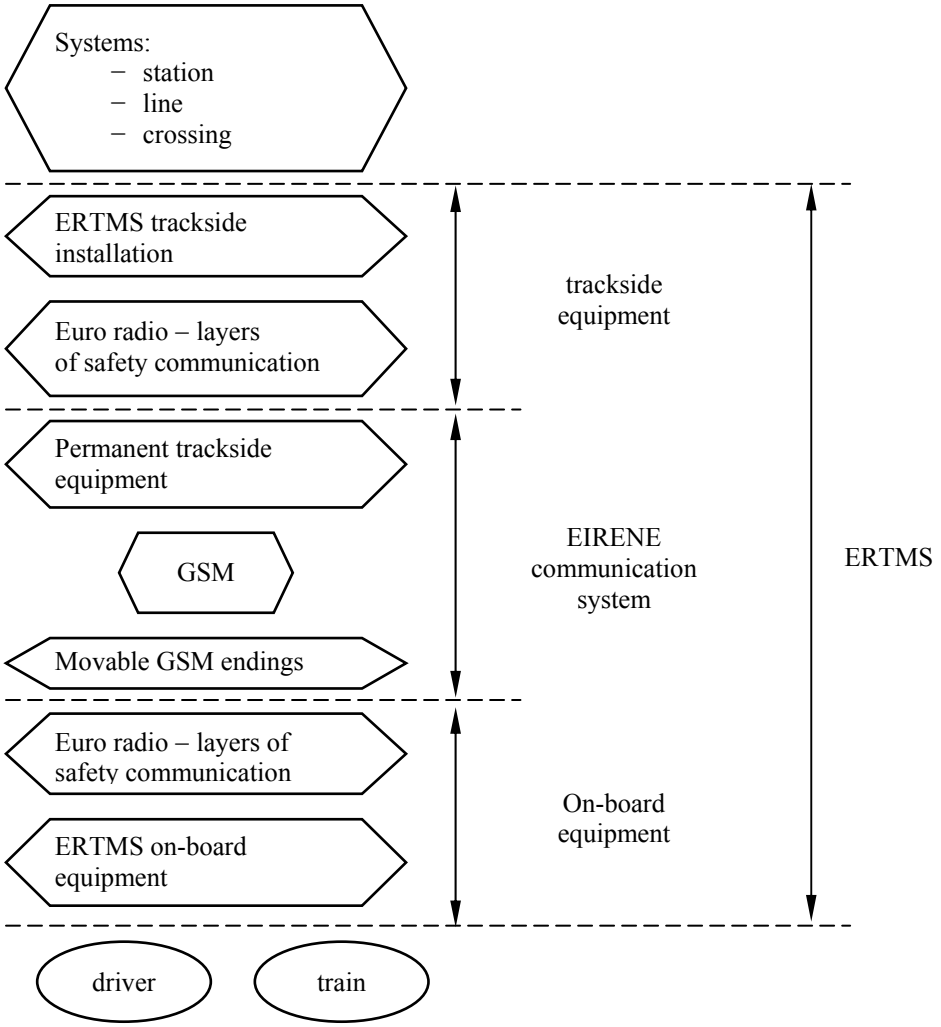

Figure 2. *Place of GSM in the ERTMS/ETCS system*

Architecture of GSM-R system is a typical GSM cellular network and consists of a main Network Switching Subsystem – NSS and Network Management Subsystem – NMS on the main level Base Station Subsystem – BSS consisting of peripheral groups of Base Station Controllers – BSC and peripheral groups of Base Transceiver Stations – BTS.

GSM-R constitutes the transmission medium not only for ETCS but also for train radio communication, as it makes available also talk channels. At the same time, spreading of GSM-R gives medium for all other applications, related with information transmission for the purposes of maintenance, statistics, travellers information etc.

Train management level – ETML. Even in 1998 it was expected that within the ERTMS system the railway management layer would be introduced. Railways however could not agree upon which functions should have been introduced to the management system and in the meantime the railway managements were creating their own systems. Telematic railway management systems in the specific railway managements developed to such degree that any standardization of the entire management system became impossible. For this reason, at the level of European Committee, a decision was taken that ERTMS should contain an interface enabling the national telematic railway management systems to exchange information using standard connections and standard messages.

The fact, that within the ERTMS only an interface between telematic railway management systems will be developed, means that specific railways need their own railway management systems and should not expect in this respect standardized European solutions.

3. OFFICIAL STATUS OF ETCS IMPLEMENTATION

The discussions held on governmental level and aimed at integration of structures of various countries into a single organism directed according to certain principles with maintained privatisation trends of other transport branches, forces the operators of railways to be more competitive than previously. Railways have to offer increased speeds and more comfort of travel not only in high-speed trains, but also in all trains travelling along trunk lines, Similar criteria have to apply also to the operation of cargo transport.

The governmental discussions concerning integration of specific countries within the European Union (EU) forced the specific national railway operators to begin discussions concerning meeting the challenge of competitiveness of railway transport. An outcome of these discussions was development of an ERTMS system covering the train control and supervision system (ETCS), system of digital transmission channel in the railway band (GSM-R) and traffic management system (ETML). Three basic levels with possible modifications have been proposed to the future users.

Operating possibilities and a possibility of cross-border travel on the lines of neighbour countries results in the fact that this system is provided as basic one (in accordance with EU directive) on the European railway networks (at the high speed tracks and main transport channels) where the trains have to travel in always safe conditions.

Implementation of ETCS in each country requires big initial effort in order to determine specific technical and legal circumstances of ETCS implementation. Definition is required also for conditions of contract and installation realization, conditions of system's implementation approval for regular operation. This process is advanced to a different degree in different countries. Generally, the phase of testing and certification approaches its end and ETCS enters the phase of real commercial application. Pilot applications for both Level 1 and Level 2 are already in day-to-day commercial operation for over a year. Several additional important projects will be implemented in the next two years.

The map below gives a general overview where and to what scale we may expect the ETCS until the end of 2008.

Especially with mentioning in the fact that till today instead the interoperability was the key driving factor for implementation of ETCS, but opening of new lines and improvement of safety. Till today, significantly more kilometres of conventional lines than those of high-speed lines have been assigned for provision with ETCS not later than 2008. Similarly, in relation to rolling stock, more than half of units provided with ETCS will have STM with return information which means that these vehicles will probably run on conventional lines. Of course, in next 2–3 years it is possible and more

than desirable than additional ETCS equipment is ordered for future conventional and high speed railway connections.

Plans of ERTMS/ETCS implementation in certain European countries are shown below.

Belgium. At the end of April 2001 the supervisory board of Belgium Railways made a decision about implementation of ETCS in the Belgium railways.

On the high-speed lines, the system TBL2 will not be developed anymore. For new lines Antwerp – border of Denmark and Liege – border of Germany the system 2 ETCS will be installed till the end of 2006.

For the remaining conventional networks till the end of 2006 the Level 1 ETCS will be installed till 2006 on the 50 % of networks. Priority will be lines and nodes on the international corridors and/or burdened with intense traffic. The main goal is elimination of railway accident risk.

On the lines with fewer burdens it is provided to use Level 1 ETCS with use of travel in the "limited supervision" mode, which is related with time and cost limitations.

The following options are provided for in the area of rolling stock:

- Units supplied in 1980 and later, without TBL2 will be provided with ETCS onboard equipment.
- Units with TBL2 will have reverse STM.
- Units supplied in 1980 but that will remain in use until 2010 (ca 31 % of rolling stock) will have the data transmission equipment (balises/loops) and simplified cabin equipment giving the same scope of functions as TBL1.
- Units with their lifetime expiring till 2010 or earlier will not be provided with ETCS.

France. French Railways are the founding member of ERTMS users. A test centre was established on a section of a high-speed line near Paris, a conventional line joined it. Here, the suppliers such as Alstom and Ansaldo/CSEE have a possibility to test and approve their ETCS products containing STM for Crocodile/KVB and TVM. These tests with combustion wagons as well as interoperability tests of a German train equipped by Siemens will be completed till the end of 2004. In particular in relation to the French STM certain inconsistencies have been discovered in the presently available specifications. Appropriate revision requests have been formulated (Cr).

The French government investigates technical and financial possibilities of realization of a first international commercial application of ETCS on a new high-speed line LGV East European. For this purpose, development of a so-called two-standard cabin device for TVM j and ETCS level 1 and 2 has been ordered at the supplier Ansaldo/CSEE. In this concept, the same central equipment may be used for either realization of an ETCS function for level 1 and 2, or TVM 430 function as a so-called internal or integrated STM – ECS/TVM 430, or as the so-called external STM for TVM. Each application is provided with an odometer. The visualization equipment for the driver (MMI) was designed in accordance with ETCS specifications. Combined equipment ETCS/TVM 430 will be used for the first time in 15 international trains that have been recently ordered. On the infrastructure side, the new high-speed line East will be provided with TVM 430 and in parallel with ETCS Level 2. If the financing decisions were to be taken, it would be purposeful to use both systems in parallel. Whereas the trains provided with TVM 430 will operate according to previous principles, and those provided with new MMI will operate in ETCS mode. This would require harmonization of procedures and regulations (watchdog, temporary speed limitations, drive on sight mode, manoeuvring mode etc).

On condition that all technical and operational issues will be possible to solve, all new TGV trains ordered since the mid-2005 will be marked with a new generation cabin profile ETCS/TVM 430.

For the existing high speed line Paris – Lyon a study is carried out aimed at showing how much the throughput will grow as a result of ETCS installation.

The planned future extension of French high-speed networks where ETCS could be applied, are shown on the drawing below.

For a conventional network studies are carried out concerning implementation of ETCS but no formal decisions have been taken yet.

Italy. Italian Railways are a founding member of ERTMS user group and since very beginning they actively participated in the ETCS development works.

The pilot installation was established between Florence and Arezzo, using 61 km section of a high-speed line Direttissima and a conventional branch connecting it with Arezzo station. Purpose of this pilot installation whose supplier was Alstom was to demonstrate the feasibility of ETCS Level 1 and 2 installations based on ERTMS specifications taking into account the specific interfaces to the Italian signalling and train borne equipment. Trial runs have been performed using specifically equipped train sets Pendolino. Commercial service using ETCS never was planned on this line.

As a next step, the consortium responsible for a new line Roma – Napoli lead by Ansaldo has installed a prototype track equipment designed to the latest specifications on an extension from Arezzo to Rigutino. In 2002 a full program verifying various functions including GSM-R was successfully carried out.

The first commercial application of ETCS will take place in a new line Roma – Napoli. In the developed track part of the system the following main partners are engaged RFI/Direzione Technica, Consortium Saturno, Alstom (RBC, track circuits), Ansaldo (protection equipment and balises) and Sirti (GSM-R radio equipment). ETCS Level 2 will be installed without track signals.

The following rolling stock is provided for this line:

- 60 multi-system trains ETR500 with cabin equipment (combination of ETCS and SCMT) supplied by Alstom.
- 15 multi-system trains ETR 480 with cabin equipment (combination of ETCS and SCMT). For these systems the supplier will be selected.
- 12 new multi-system trains ETR 480. For these systems the supplier will be selected. Beginning of commercial services is expected in 2004.

Luxembourg. At the end of 1999 the supervisory board of Luxembourg railways has taken a decision about implementation of ETCS Level 1 on the entire network (ca 250 km with 880 signals) and on the entire rolling stock (36 motor wagons, 20 electric locomotives, 40 combustion locomotives).

In the last two years a bidding procedure took place covering the transformation study. Till the end of 2002 the following contracts were signed:

- With Alcatel for delivery of track equipment. Several sets have been determined, the first one as a pilot application. The most optimistic scenario provides for the entire network to be equipped within 5 years.
- With Alstom for rolling stock equipment. In the first phase the electric locomotives will be equipped (type 3000, identical with type 13 in Belgian railways).

In reference to the transformation, the decision was to maintain in operation the system Memor II+ both in track and in train borne part.

Holland. Pro Rail is a member of ERTMS user group. For testing and validation of ETCS system the specific Dutch environment two independent test centers have been established, equipped by Alstom and Bombardier companies. Expansion of STM for ATB and ATB of new generation has been ordered.

On the Southern High Speed line from Hoofddorp to Rotterdam – West and from Rotterdam – South to the Belgian border, the ETCS Level 2 will be installed. The rolling stock to be used on this line both existing and new will need onboard equipment. The line will be connected to the existing conventional infrastructure near Amsterdam, Rotterdam and Breda. Till now no plans for installation of ETCS on sections of this line exist. Such plans may be developed in the future as a result of implemented national strategy. Project of preparation of such a strategy was recently initiated.

On the new cargo line, Betuwe, connecting several terminals in port of Rotterdam and the marshalling yard Kijfhoek with Zevenaar and Emmerich on the German border, ETCS Level 2 will be installed. Locomotives travelling along this line will need onboard equipment ETCS.

Line Amsterdam – Utrech is presently modernized and expanded from 2 to 4 tracks. The ETCS Level 2 and first generation national ATB system will be installed on this line, which will enable testing of transition from ATB to ETCS in the onboard equipment. The further transition to ETCS on the Dutch railway lines will depend, among others, on results of these tests. Installation of ETCS on the existing line between Utrecht, Arnhem and German border may be considered as a consequence of the above-mentioned migration. We have to note that in 2001 implementation of GSM-R system on the entire network of Dutch railways has been initiated, to be completed till 2005.

Lithuanian railways are also instead in equipping new lines with ERTMS system equipment.

4. CONCLUSIONS

1. The paper presented the general overview of ERTMS system. Subsystems were described: ETML, GSM-R with particular attention to ETCS.
2. Plans of ERTMS/ETCS implementation in certain European countries were shown.

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LOGISTICS CENTRES IN THE BALTIC SEA REGION

CASE STUDY IN LATVIA

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The paper includes summary of interviews of transport policy makers, logistics operators, spatial planners in Latvia about the spatial planning need of logistics centres and about the state of co-operation between logistics operators and spatial planners in this question.

The main goal of interviews – identification vision of different actors involved in the process of planning and development of LC on real state and possible decisions in this area.

Keywords: interview, logistics centres, spatial planners, transport policy

1. INTRODUCTION

The identification of the following is the main tasks of investigation:

- past and present operations and possible development plans,
- needs of logistics centres concerning land use,
- problems for development concerning legislation and regulations,
- problems in the spatial planning processes and co-operation between logistics operators, transport policymakers and planners,
- co-operation between logistics operators and authorities in charge of regional and traffic planning.

The main purpose of interview is collecting opinion on the logistics centres and concerning problems from the point of view of different actors (Fig.1).

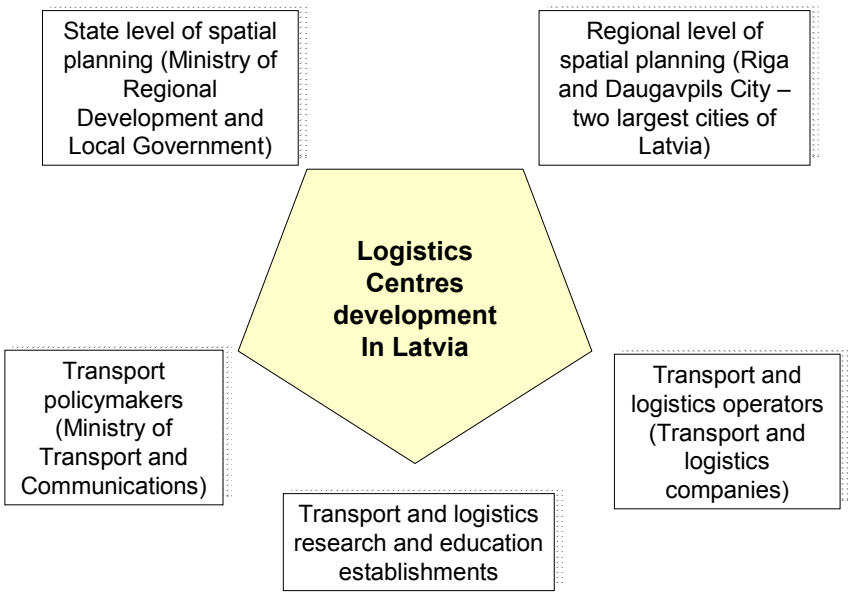

Figure 1. *Actors of interview*

2. CONCEPTS AND OBJECTIVES OF THE LATVIAN NATIONAL TRANSPORT POLICY

ROLE AND PLACE OF LOGISTICS CENTRES IN THE NATIONAL TRANSPORT POLICY

The long-term objective of the Latvian transport development policy is to create an effective, safe, competitive, environmentally friendly, balanced and multi-modal transport system, which is fully integrated in the European transport system, and satisfies economic and social needs of Latvia for passenger and cargo transportation in domestic and international traffic. The improvement of the quality of the transport system is one of the main pre-conditions for re-industrialisation and for the development of an innovative economy in Latvia, since it encourages regional development and improves the competitiveness of Latvian companies at the European and international market.

The main directions of Latvian transport policy development are identified in the National Programme for Transport Development 1996-2010. The National Transport Development Programme is a medium term strategic planning document in the transport sector. Its implementation is of vital importance and indispensable for the purpose of the balanced development of the society and the national economy of Latvia. For the full implementation of the National Transport Development Programme there are a range of tasks to be accomplished. Among these tasks are: maintenance and development of environmentally friendly transport infrastructure, increasing of traffic safety, promoting and ensuring an increasing performance efficiency of national and international passenger- and freight transport operations, developing transit operations and transit corridors as well as ensuring the integration and competitiveness of the transport system of Latvia in the European transport system.

The National Transport Development Programme (1996-2010) is a most general document of plan character, which constitutes the activities (actions, tasks) of economic, organizational, and institutional nature. It is worked out for a 15 years period.

Unfortunately transport research and business and transport policy do not have very close links in Latvia. Freight transit is the main part in Latvia's transport sector. There is a large internal competition between different transport enterprises (e.g., sea ports) and between different modes of transport (e.g., road and rail transport) in Latvia. The profit of transport companies, involved in this transit business, is mainly depending upon political decisions of neighbouring countries but not upon optimisation and logistics decisions. Due to this situation the investments in research as well as correlations between research results and 'real-life' business are very small.

The idea of logistics centre is at early stage of development in Latvia and now is not included in any official documents.

3. ANALYSIS OF THE QUESTIONNAIRE AND INTERVIEW

The development of freight terminals and warehouses should be promoted at crossings of transport corridors. In this process the development of logistics is of high importance. As a rule freight distribution centres are developing as joint ventures of private and respective municipal companies.

In the future it is planned to set up freight distribution centres in Riga, Ventspils, Liepaja, Rezekne, Daugavpils and at other principal transport junctions.

It is regarded that one of the most important issues for peripheral regions development is the development of logistics and distribution centres focused on attracting freight from Asia and the Far East. Latvia can serve as a distribution centre for cargo from Asian countries (e.g. China, Korea) not only in the Baltic States but also with equally successful results in Russia and the CIS countries. But today the idea of logistics centre is at early stage of development in Latvia.

The main sentences concerning logistics centres, legislation and regulation, land use needs, co-operation between spatial and transport planners and logistics actors are summarised in the next part of report.

3.1. General vision

1. State spatial planners have not vision on development of logistics centres.
2. Seaport city-regions are key nodes in the global logistics freight transportation network. The maritime activities exploited at the seaport location may promote the regional economic growth of

the surrounding because of the circular and cumulative causation a central place is capable to give origin to. The most appropriate regions for logistics centres development are ports of Riga, Ventspils and Liepaja.

3. Transport policymakers and logistics operators both stress the necessity to build up an efficient transportation system by promoting the inter-modality patterns through the establishment of distribution and inter-modal centres. The seaport city-region should promote the settlement of such public logistics terminals at the local level in order to promote the local entrepreneurship, as well as to reduce the environmental impact of the freight transport within the urban area. The building of the inland logistics terminal at the more far hinterland locations should increase in efficiency the whole transport system because of the promotion of the inter-modality.
4. The three main goals of co-operation between actors are supposed to achieve can be summarised as following: 1) to establish a more efficient logistics system; 2) to facilitate the implementation of advanced information systems; 3) to promote co-operative freight systems.
5. The LC has to be seen as a meeting point for both public and private logistics operators. The consolidation of the urban logistics activities can be realised at this freight transport node of the transportation network by the application of the most advanced information systems.
6. An efficient co-operative freight transportation system can be implemented at the LC location. This co-operative system enables a large number of shippers or freight carriers to share a jointly freight vehicles system, jointly terminals, as well as common information systems in order to exploit the synergy effects the spatial agglomeration of the logistics operations spread out.
7. The individual economic agent should be able to reduce the costs for collecting and delivering goods due to the exploitation of the economics of space at the LC. The spatial agglomeration enables the co-operative performance of the logistics operations jointly with other entrepreneurs, as well as the supply to the customer of a level of services of better quality.
8. Through the establishment of a spatial multi-function cluster the entrepreneurship in the logistics transport sector may be promoted, and at the same time the negative externalities generated by the road transport modality may be reduced.
9. The establishment of public logistics terminals in the area surrounding a seaport city can be helpful for promoting the co-operative freight transport systems.
10. The general vision of different actors at the problem of logistics centres development is shown in the Table 1.

Table 1. The general vision of different actors at the problem of logistics centres development

Actors of interview	Relation to idea of logistics centre development	General problems
State level of spatial planning (Ministry of Regional Development and Local Government)	Have not vision on development of logistics centres.	▪ No special legislation and regulations of LC. ▪ No special rules for land use needs. ▪ No principles of cooperation between stakeholders of LC. ▪ No methodological and practical approach for LC establishment. ▪ No cooperation between state level of transport policymakers and regional level of spatial planners.
Transport policymakers (Ministry of Transport and Communications)	There is a sensation of necessity of creation of the logistics centres, but there is no practical programme of their development.	
Regional level of spatial planning (Riga and Daugavpils City – two largest cities of Latvia)	There is a desire of creation of the logistics centres, but know-how of their design and the practical programme of their development are absent.	

Continuation of Table 1

Transport and logistics operators (Transport and logistics companies)	There is a need of creation of the logistics centres, but is absent know-how their creations. The mutual competition and mistrust of transport operators to each other essentially interferes with the decision of practical questions of LC creation.	▪ No practical experience in pilot project of design and development of LC. ▪ Transport transit much more outnumber of distribution at the state level.
Transport and logistics research and education establishments	There is a sensation of necessity of creation of the logistics centres; there is a general vision on development of logistics centres. There is no demand from the other actors.	

3.2. The Main Problems of the Optimal Geographical Location and the Optimal Spatial Physical Size of the Logistics Centres

The are two main problems in the development of LC:

- the optimal geographical location and
- the optimal spatial physical size of the LC.

The location choice among different potential sites has to evaluate the trade-off between transportation cost and facility cost. The facility cost is defined by the sum of the construction, maintenance, land and truck operation costs at the LC site.

The land price plays a major role when the potential nodal location is settled nearby the urban agglomeration. In this case, the lower transport costs the logistic operators had to bear for the pick-up/delivery activities between the LC and the urban centres might compensate in such a way the more expensive fixed investments necessary to bin the land, as well as for building the infrastructure.

The public planner should have the role to perform a macroeconomic decision about the more suitable geographical location and dimension of the LC. His aim is to minimise the total cost of the LC. It follows that the accessibility patterns are absolutely relevant (Table 5).

Among all the potential proper places, the location choice of the public planner should be addressed in favour of the geographical site closer to the major inter-modal transport links, which connect the urban agglomerations that had to be served by the new settled LC. If any congestion problem already exists, then an inappropriate location decision of the traffic policy planner might induce a worsening in the road traffic conditions within the region.

The improvement in the efficiency of the road network can significantly help to mitigate the negative economic impact the spatial traffic congestion induces, which is reflected by the increase in the transportation costs.

The public planner has no influence at the microeconomic level of decision, when the distribution and assignment of the freight traffic is considered.

At a micro level, where the individual transport operator decides to use his own freight vehicle, the choice of making a stopping call at a certain LC rather than another is supposed to be determined by the behaviour of the single transport operator or company. At this level of choice, the goal is to minimise the transport costs (Table 2).

Table 2. The public logistics terminals and the two levels of decision

Level of Decision	Kind of Decision	Goals
Macro level: Public planner	Location choice, and optimal size of the LC	Min the total cost = Min (transport cost + facility cost)
Micro level: Every entrepreneur, each company and freight vehicle	Choice of the LC and optimal routing	Min the transport cost

The structure of the transportation sector has not to be forgotten. The freight transport is generally undertaken by individual entrepreneurs and private companies, which operate within a competitive market framework. Hence, the control and regulation measures put in force by the regional public planner should not excessively interfere with the activity of the transport sector.

Besides the transport policy instrument of the LC several other city logistics initiatives have been proposed in order to overcome at the best all the negative externalities the urban freight transport generates.

The freight transport carriers fire expected to provide economically efficient just-in-time services. This means that the minimising of the transport and logistics services should be achieved. At the same time, some urgent problems had to be solved, such as the traffic congestion, the environmental impact of the transport activity, as well as the problem of the energy conservation.

The crucial role played by the public-private partnership is always stressed when speaking about the city logistics initiatives. Besides the LC the implementation and diffusion of progressive information systems in order to organise the routing and scheduling of the consignments in advance, the promotion of co-operative freight transport systems, the control of the load factor for the pick up/delivery activities, as well as the planning of the must innovative underground freight transport systems are all potential instruments of transport policy the regional public planner had to consider and properly evaluate.

3.3. Advanced Information Systems

The improvement of advanced information systems is one of the most relevant instruments in order to achieve the rationalisation in the logistics activity. Planning in advance the routing and scheduling of the consignments may effectively improve the efficiency in the transport system.

The advance information systems enable both the drivers of the trucks and the control centre to communicate to each other, to provide the information on the traffic conditions in real time, as well as to store detailed historical data about the pickup/delivery truck operations. In particular the last function plays an important role for rationalising the logistics operations.

The most important findings beyond the particular ease are as follows:

- Large customers (shippers) require logistics partners (forwarders) to either accept paper input (primarily fax) or to subscribe to customer's choice of technology. Such customers are unlikely to reimburse their partners for related effort, the implementation thus have to bear sufficient saving potential for the forwarder;
- EDI data transmission and the relating process automation provide the basis for improvements of transport planning and execution. This results not only in commercial benefits but may eventually lead to a reduction in unnecessary transport (e.g. empty legging) and a better utilisation of public and commercial infrastructure (e.g. roads, floor space and terminal equipment);
- Port community systems provide the technical, managerial and business background to implement EDI systems. While they are normally successful in linking the majority of directly port related companies they are traditionally weak when it comes to hinterland companies;

- Linking only one additional exporter or importer in the hinterland may have very significant multiplication effects. The company may communicate with additional partners in the same and in other ports. Likewise the resident logistics partner has been enabled to also communicate with other hinterland partners;
- A success factor is the usage of standardised communication and messages. In transport EDIFACT has the largest user base.

Computer based information systems in transportation chains have several advantages:

- Increased management options through tracking and tracing and improved quality control of own services and those of subcontractors;
- Outsourcing of transport services, but staying in control of logistics performance;
- Increased production-to-order orientation and better transparency of market demand and supply.

3.4. The Inter-regional Level

At the inter-regional level, the programme instrument should enable the integration between seaport regions by following the broader issues of network connectivity and logistics. The three fundamental network characteristics of (1) inter-modality, (2) interoperability and (3) interconnectivity should be achieved in order to add value to the seaport network.

A coherent collaboration programme between the seaport regions should particularly emphasise the benefits of its realisation, in order to attract as many potential private/public investors as possible. The regulatory and organisational framework represents a valid tool of transport policy, in particular when the negative externalities generated by the different transport modalities are not completely internalised into the market price of the transport service. The under-pricing in the transport sector occurs when a transport modality hides its full social cost. The structure of the transport sector is typically shaped as an imperfect competitive market system, which is assumed to allocate inefficiently the economic resources. Hence, the under-pricing in the transport service shows the lack in efficiency of the market instrument of allocation. The larger the share of the full social cost a transport mode is able to hide, the sharper the under-pricing it may form.

The new economic figure of the Multi-modal Transport Operator (MTO) is assumed to exploit the provision of the logistics services within a wholly integrated transport network. The Table 3 summarises the key issues and the critical patterns of success at the inter-regional level of decision.

Table 3. The inter-regional level of decision

Level of Decision	Key Issues	Critical Success Factors
Inter-regional Level: *Programme*	For each transport modality: • Inter-regional links • Inter-modality • Interconnectivity • Interoperability • Logistics and networking effects • Competitiveness • Environmental issuer • Information network • Economies of scale • Economies of time • Economies of scope • Economies of networking • Just-in-time requirements	• Functional collaboration and competition • Interchange of complementary functions • Co-ordination for developing the infrastructure transport network • Information and knowledge interchange • Inter-regional management • Multi-modal transport operator • Adding value to the interregional network and communications • Sustainable balanced growth between regions • Favourable conditions for promoting a new innovative space

3.5. The National Level

At the national level, the programme of LC creation is once again a powerful instrument of transport integration and co-ordination. Logistic effects and networking effects have to be considered in order to exploit a sustainable national transport policy. The freight transport by road seems to fit better the new logistics requirements due to the restructuring process in the supply chain of production. The environmental and social impacts of the transport negative externalities are not completely internalised into its market price.

The under-estimation as well as the under-pricing of the road transport modality has a remarkable impact on the modal choice of the economic agents, due to the apparently higher efficiency this environmental unfriendly transport modality shows with respect to the others. A careful estimation of the real impact of the negative externalities on the national economic growth should be estimated in monetary terms to calculate the "green" GDP.

There are three possible approaches in order to estimate and/or internalise of the negative transport externalities: the consumer-pays approach, the taxpayer-pays approach, and the cost-benefit analysis.

Furthermore, the logistics companies look for a central location as basis for their logistics activities directed to their international clients, as well as a departure site in order to enlarge their commercial relationships. A relevant role is played by the technological changing in the loading/discharge operations, as well as the increasing availability of space within the neglected old port areas. At these locations, the logistics service companies may find an interesting supply of space to turn into their activities.

From a functional point of view the three Latvian main ports are involved in an international maritime competition. A complementary set of functions should be promoted at each seaport site in order to lead to a better integration in the transportation chain, as well as in the road and rail links between the three seaports.

In fact, the transport links from the seaport site towards the hinterland have to perform an increasing efficiency in order to attract the shipping companies, and moreover the specialist total logistics provider.

All actors stress the necessity to build up an efficient transportation system by promoting the inter-modality patterns through the establishment of distribution and inter-modal centres. The seaport city-region should promote the settlement of such public logistics terminals at the local level in order to promote the local entrepreneurship, as well as to reduce the environmental impact of the freight transport within the urban area. The building of the inland logistics terminal at the more far hinterland locations should increase in efficiency the whole transport system because of the promotion of the inter-modality.

Many different and interdependent factors usually influence the location choice of an economic agent. Few decisional patterns may not be spatially relocated such as the transport infrastructure, the urban settlement, or the environment. Others are more flexible and may be subject to spatial relocation, e.g., the skilled labour force, the research centres, etc.

The accessibility to a seaport site is therefore strictly dependent on the optimal combination of all these elements. A seaport region might be consequently more or less attractive to the establishment of an economic activity or to the foreign investments in order to exploit its own local development potential.

In order to support the overall LC objectives a close co-operation with similar projects and programmes must be established:

- to strengthen the integration of spatial planning and regional transport development and develop a common regional approach to the issue of sustainable logistics solutions,
- to promote the use of transport corridors, modes and technologies which support a sustainable regional development providing the economic and social development of the regions in the south-east part of the Baltic. The trans-national co-operation aims at assessing trade and transport potentials and develops environmentally friendly transport solutions.

3.6. Framework for regional action

As it has been analysed it would be inadequate to recommend "one best way" for spatial planning within the context of port related interaction in general and in BSR in particular. The main reasons to be careful with strong recommendations may be summarised as follows:

1. The spatiality of transport and logistics activities has evolved from clearly delimited port areas to functional port regions and to port networks more recently. The functional interdependencies, creating the network, may consist on sequential relations (output of one node is the input for another, e.g., relation between port and in kind container depot), reciprocal relations (actors arc using each others output) and pooled relations (use of common resources). The term network suggests that these interdependencies may not be territorial and that modern port related activities have a strong tendency towards decentralisation.
2. The trend of a spatial decentralisation of port related transport chains is accompanied by attempts of the main actors involved to achieve control over the segments of the chains. Though it is not clear whether one actor will be the most influential one in the future, the entrepreneurial strategic are not predictable in relation to their spatial outcome. But it is rather obvious that the crucial factor within the transport chain will be the customer orientation while the transport space will be organized as flexible as possible. This interpretation supports decentralized hub and concepts with, ”footless” or shifting nodes. Based on some standardized norms the question of appropriate IT support will depend on the dominant position of an actor within the transport chain. Or to put it in other words: the inventions and early adaptation of new IT depends on the necessities to optimise integrated transport and logistics chains and the economic power of private actor constellations.

Following these lines of argumentation the existing ports have to deal with territorial decentralisation of transport and logistics activities and tendencies of economic centralization of private actors involved. Therefore the frames of independent action become more and more narrow. In more general terms, existing ports do not only have to create and sustain competitive infrastructure including IT but have to be prepared to offer far reaching services for foreign trade, transport and communication in order to be able to react as flexible as possible to new challenges. Beside an effective node of physical interchange successful ports will become LC regions for transport and communication offering systemic knowledge for integrated transport and logistics chains.

This strategy is open only for the existing main ports and those medium-sized ports are able to promote a certain specialisation because it presupposes very high investments and probably only indirect returns on welfare and employment. Small and the majority of medium-sized ports will function as possible nodes in future transport chains. This implies the latent danger that many ports try to invest in expensive infrastructure in order to compete with each other without being able to realize returns. A crucial element is finding a certain harmony between public investments in infra- and private engagement in the superstructure. Anyway, problems of public disinvestments are already on the agenda and there is a latent danger for continuous planning failures. To reduce an overall port competition in this segment institutionalised forms of information and co-operation between private and public actors should be promoted in order to avoid unnecessary public investments and to improve power balance.

Faced with the imminent enlargement of the European Union and the integration of Latvia as well as further states of the Baltic Sea Region a general strategy of the modernization of the maritime infrastructure is to be recommended including IT. The expected increases of transport will not be manageable country-sided in spite of great infrastructure projects like Via Baltica. The expansion and improvement of sea-based mobility of goods and supporting infrastructures should be emphasized in initiatives of spatial planning within the Baltic Sea Region.

Also in the transport and logistics sector the major players are changing. Former State Enterprises are privatised and must prepare themselves for the sudden competition. Just as the governmental telecommunications monopoly was eliminated in previous years, the state monopoly on the transportation of letters and parcels will now be eliminated too. These modifications of the general conditions lead to hectic activities within the sector. Many re-evaluate their middle- and long-term strategies, reposition themselves, co-operate and merge, withdraw from some markets and set themselves up in other ones. Co-operation with, or the incorporation of, other companies is the most usual reaction to the new conditions, in the transport and logistics sector as well.

But according to opinion of the actors involved, both growths are important as quantitative so as qualitative. The new demands of the information society and the "New Economy" on the transport and logistics sector, make it necessary to increase the "know how" as quickly as possible in the field of IT, and develop information systems with which the logistics chain can be controlled and checked. IT departments of individual companies are no longer able manage such a task, so that big actors (e.g.,

the Latvian Association of Railway International Electronic Documents Circulation Operators) buy up software enterprises throughout the world that develop information systems for the transport and logistics sector, or will be able to do so in the future. All actors participating in the transportation chain are convinced that the future leader of the information system will also dominate the material transportation chain and thereby gain the largest part of the increased value created by transportation. Furthermore, the evolution of such technologies is extremely capital-intensive: markets, which are becoming more and more transparent, involve ever-increasing costs for marketing and distribution. Smaller enterprises, endowed with a more limited capital, arc no longer able to make the investments necessary to remain competitive.

3.7. The City Logistics Spatial Impact

Inside the port area of Riga, mainly trucks operate the freight movements from a terminal to another. Also road carriers mainly make the distribution of goods towards the metropolitan region. The explanation is given by the higher efficiency of this transport modality on the short distances both in terms of time and of transport flexibility. But the negative externalities in terms of congestion and pollution are social costs, which have absolutely to be taken in account.

The distribution centres play a remarkable role not only from an economic point of view because of the higher efficiency and optimisation in the transport chain they realise, hence the distribution and transport costs are reduced: but also from an ecological point of view because of loosening of the traffic intensity and therefore of the polluting emissions from the motor vehicles.

Early in history Riga developed as a transit centre between the ports of Western Europe and the Russian hinterland. Riga enjoyed continuous growth as a merchant port. Today Riga is the main administrative, financial, industrial and transportation centre in Latvia. Embassies and consulates, a significant number of international organizations, who work in the Baltic States, have their headquarters located in Riga. Riga is also a significant financial centre in the Baltic region.

As other cities Riga did not have specific strategies and theme plans concerning "urban networks". The member of group from Riga studied the following documents: The Riga Official Plan or Master Plan (1995-2005), The Riga Development Strategy (2005-2018), The Riga Transport System Development Programme (2005-2018), Concept of Riga City Intelligent Transport System (2002-2008) and others placed emphasis on implementation of the transportation planning and economic development.

There was not anything concrete about urban networks in these strategies. These plans also describe advantages of development of Riga, admit a favourable geographical location of the city, determine the importance of Riga in the Baltic Region and also in the BSR. Riga has a remarkable growth potential in the future. To develop Riga as a transit centre is one of the priorities of Latvians development strategy and it is being promoted by improving elements of infrastructure and services in the Riga area. The main transport elements that make Riga a transit centre are the port, the international airport, and the bus and railway connections. Besides one of the most important tasks is to promote more profound collaboration with cities of the BSR. Finally Riga has to emphasise the environmental dimension of sustainable development.

4. CONCLUSIONS AND RECOMMENDATIONS

As discussed earlier in this paper, it is important to remember the market forces, even when discussing the development of sustainable transport solutions from a spatial planning perspective. The demand for freight transport services is generated and formulated by individual entrepreneurs and private companies, which operate on highly competitive markets. This obviously limits the possibilities to guide the development in a specific geographical area. It puts high demands on planning to be flexible and on the foresight of the planners. On the other hand good public infrastructure, e.g. the road system, also helps to attract business and to improve efficiency.

An attractive and competitive port is often considered as a regional, if not a national objective supporting the economic development of the region or the nation. Traditionally, the consequence of this view was as follows – the port operation and the related infrastructure was a public responsibility. Today, port operation is no more considered as a suitable or even acceptable task for public services.

Some regions are starting to question the need for any public involvement in port business. Why should a city own a port? It does not own the marshalling yard or the truck freight terminal.

Such ideas do not mean that the city should not plan for or care for its port, only that it must distinguish between public and business objectives. Local political opinions, competition with neighbouring regions and lack of overview might induce the city or the region to invest too much in relation to a realistic assessment of the commercial outcome.

Waterborne transport of high value goods needs to offer high frequency of regular services and stability over several years in order to be competitive to other modes and to really allow for the emergence of solid trade relations. A few well-served ports also make it easier to focus national investments in the hinterland infrastructure, which normally cannot be spread out to cater for too many alternatives. Competition between regions in this respect often delays the investment decisions. In addition, stable and big transport volumes also on land open for more attractive intermodal services.

In this context it might be worthwhile to question the benefit of transit traffic; through the port, the city or the region. The issue was raised in relation to the Russian transit traffic, but is also valid elsewhere. Investment needs and environmental impacts have to be assessed in relation to job opportunities and revenues against an appraisal of the stability of the traffic. Transit transport might help to develop new and highly needed services and skills, but it might also deviate resources better used elsewhere and might create e.g. environmental damages difficult to repair.

Co-operation between the parties in a transport chain, between ports, regions and authorities can give concrete improvements to everyday practical problems and thus contribute to the goals of cohesion and economic development in the Baltic Sea region. The results have been achieved in a highly competitive environment and indicate that there are areas for co-operation, which do not distort competition, but promote a sustainable transport system to the benefit for the society as well as the private players. Such areas are the following:

- Promotion of the use of IT among the port community and between the port and the world outside.
- Introducing IT in the business process is a complex issue affecting internal and external procedures, core business ideas and market positions. Building efficient IT relations between authorities and private organisations requires special attention. E-business development suggests that Internet will speed up the reorganisation of commercial relations and market behaviour. Apart from infrastructure, companies need some basic agreements on standards. The public sector on a national, regional or local level can act as a catalyst in this process.
- Co-operation between customs and other authorities in specific transport corridors
- Goodwill and mutual trust is a good basis for solving practical problems within an existing regulatory framework. Regional authorities along a transport corridor sector can together create the platform for such facilitation work. They can bring in all parties and moderate the work of creating a common understanding of the problem and hopefully also have finding a practical solution.
- Regional co-operation between public bodies and private companies in order to understand spatial needs based on the assessment of long term commercial trends for waterborne transport and other factors affecting future transport demand.
- A port is acting and reacting on developments far beyond the region in which it is situated. Infrastructure investments in competing transport corridors have to be assessed as well as new commercial constellations and technical development. Spatial and economic planners have to understand the needs and prospects of the port in order to be able to assess the consequences for the region.
- Implementing new networks between transport companies, scientific organisations and port cities.

  A modern LC can be characterised as an important node in a learning region, which in addition implies the need for co-operation with other, similar regions. What has been said earlier also indicates that there are other reasons for networking. A "market watch" in a wide sense is required not only by the commercial players, but also by other institutions in the region in order to be able to assess planning and investment needs. Another need for networking is generated by the many practical problems of becoming a true European Union. Knowledge, trust and common objectives across former borders could be better developed through co-operation around concrete problems.

The port region logistics restructuring process moved towards the development of new economic functions inside the port region itself. The aim of the local authorities has now become to offer a set of value added logistics services in order to integrate the port site into the transport logistics chain. The port location is not to be only a container floodgate but is to be transformed also in a logistics service centre.

It is not surprising, that logistics centres tend to be located near the transport corridors. Access to all transport modes is vital for the success of logistics centres. The closeness to ports and sea transportation is natural for establishing a logistics centre in Latvia.

Many aspects of the operation environment need to be taken into account in the planning of logistics centres. Co-operation between the logistics centres and the actors responsible for the design and production of infrastructure is important especially in planning infrastructure projects to be carried out on routes near logistics centres.

Attention should be paid to environmental protection and legislation at the early stages of the planning of logistics operations and infrastructure. Land use conflicts based on environmental regulations may otherwise delay the logistics development projects considerably. This is one of the main challenges for the development of the logistics centres in the Latvia. The possibilities for co-operation at the municipal level for the promotion of logistics should be thoroughly analysed.

Based on corridor analysis, it seems there are many possibilities for new logistics centres:

- the railway hubs in Rezekne, Daugavpils and Jelgava,
- the important port cities of Riga, Ventspils and Liepaja.

The success of these ports and logistics development projects depends strongly on the development of transit traffic.

Using waterborne transport implies to also use other modes. This means that integrated transport concepts must be developed providing efficient interfaces between transportation means, organisations and authorities. Computer based communication and information systems must be used to provide the necessary management and business support.

The harbour will form a core area in a wider concept of activities in the adjacent area of the city. Such activities might be many kinds of international, national and local commercial activities, logistic firms, consulting and transport services etc. Together with the harbour itself, this will form a logistic centre in the region as well as a transport hub (multi modal centre).

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CUMULATIVE INDEX

TRANSPORT and TELECOMMUNICATION, volume 6, No 5, 2005

(Abstracts)

Jörg Kundler. Service Level Management of the German Air Traffic Control. An Integral Part of the ITIL Process Landscape, *TRANSPORT and TELECOMMUNICATION,* vol. 6, No 5, 2005, pp. 4-16.

Standard-based approaches to managing the complex IT environment have been rapidly embraced by the IT community. The most popular framework being adopted is the IT Infrastructure Library (ITIL).

Originally developed by the British government in the late 1980s, ITIL is comprised of a growing series of publications that outline a process-based set of best practices for IT service and systems management.

ITIL promotes a quality approach to achieving business efficiency and effectiveness in the use of information systems. ITIL best practices are applicable to all IT organizations, no matter what their size or what technology they use. Today, ITIL is the world's most widely accepted approach to IT service management.

The distinction between business process and IT process needs to be well defined and communicated.

The Service Level Management (SLM) is one of the important and integral parts of the ITIL Standard. The goal of the SLM is to create IT-service modules from the customer point of view. The problem of System Management is that operations are only described from the technical or system point of view. Often the customer view is lost. This problem becomes obvious when dealing with such specific systems as Air Traffic Control (ATC) services. One of the decision-making approaches is discussed in this paper as a case study for DFS Deutsche Flugsicherung GmbH, which is the legal private company for the German ATC and navigation services.

The progressive introduction of the IT-Infrastructure Library (ITIL) process for the IT-System Management, has been planned since 2001.

For the DFS it was important to describe end-to-end services. As example the service chain "Representation of Radar Information". A major point is not only to create the complete chain, but also to define the right criteria and measurement methods. The SLM is responsible for the standardization and controlling of IT-Services. The services have to plan and to fix in a special IT-contract. One-success criteria for Service Provider and Customer are a long-term win-win connection. The SLM has to be arranging the permanent monitoring and reporting for the agreed Service Level.

The tasks and goals are as follows:

- Management of Customer Requirements for IT-Services;
- To create, plan and optimise customer oriented IT-Services;
- To maintain Service Modules and Service Catalogues;
- Standardization of Service Level and Services;
- Contract-Management, monitoring and reporting of Service Level Agreements.

A successful SLM has to equally focus on economical, technical and organizational Customer Requirements. The most important success criterion of SLM is standardization.

Keywords: IT Infrastructure Library – ITIL, Service Management, Service Level Agreements

Andrius Jaržemskis. Influence of Logistical Factors to the Transport Flows Distribution. Case Survey in Lithuania, *TRANSPORT and TELECOMMUNICATION,* vol. 6, No 5, 2005, pp. 17-20.

Many authors have analysed distribution of transport connections and transportation flows by internal characters of transport system, but very important are the external relations of transport system. The aim of this article is to find an answer - who really decides transport network structure, routes and warehouses positions, the volumes and directions of goods flows, and the selection of transport mode, etc.? Of course there are hypothetical answers - politicians, environment and transport engineers, transport companies, forwarders, and customers of transport and logistics services. Author has analysed many scientific and practical researches, but there are very different points of view.

Article author made survey in the following period – December 2003-January 2004 in 56 trading companies and 29 transport companies of Lithuania. The companies were selected casually from one of the biggest business catalogue "*Musų Lietuva-2003*" (Our Lithuania-2003).

All questions were divided according logical groups as 1) basic factors determining warehouses positions, 2) basic factors determining selection of routes, 3) parameters of time of delivery, 4) estimation of delivery quality characters, 5) structure of logistical channel, 6) type of contracts.

The basic conclusions of this survey are presented in the article. This survey could be very important for transport network development strategy of Lithuania and entire Baltic region as well.

Keywords: flows of goods, routes, warehouse positions, logistics channels, transport companies

Aldona Jarašūnienė. General Description of European Railway Traffic Management System (ERTMS) and Strategy of ERTMS Implementation in Various Railway Managements. *TRANSPORT and TELECOMMUNICATION,* vol. 6, No 5, 2005, pp. 21-27.

The paper presents the general overview of European railway traffic management system (ERTMS). Subsystems are described ETML, GSM-R with particular attention to ETCS.

The technological progress of application of national railway traffic control equipment, in the case of international trains, has enforced development of a unified ERTMS system. This paper describes the issue of ERTMS system implementation in various railway managements.

Keywords: ERTMS, railway traffic control, railway managements

Igor Kabashkin. Logistics Centres in the Baltic Sea Region. Case Study in Latvia, *TRANSPORT and TELECOMMUNICATION,* vol. 6, No 5, 2005, pp. 28-38.

The paper includes summary of interviews of transport policy makers, logistics operators, spatial planners in Latvia about the spatial planning need of logistics centres and about the state of co-operation between logistics operators and spatial planners in this question.

The main goal of interviews – identification vision of different actors involved in the process of planning and development of LC on real state and possible decisions in this area.

Keywords: interview, logistics centres, spatial planners, transport policy

TRANSPORT and TELECOMMUNICATION, 6.sējums, Nr.54, 2005
(Anotācijas)

Jorgs Kundlers. Vācijas gaisa satiksmes kontroles servisa līmeņa menedžments IT infrastruktūras bibliotēkas procesa ainavas integrālā daļa. *TRANSPORT and TELECOMMUNICATION*, 6.sēj., Nr.5, 2005, 4.-16. lpp.

Standartpamatotās pieejas vadīt IT kompleksa vidi ļoti ātri tika iekļautas IT pulkā. Vispopulārākā tika atzīta – IT Infrastruktūras bibliotēka.

Britu valdības radītā 80. gadu beigās IT Infrastruktūras bibliotēka (IT Infrastructure Library – ITIL) ietvēra sevī daudzās publikācijas, kuras atzīmēja IT servisa un sistēmas menedžmenta veselu rindu labākās prakses, kuras jau ir bijušas pielietotas.

IT Infrastruktūras bibliotēka izvirza kvalitāti kā galveno, lai sasniegtu efektīvu biznesu un efektivitāti informācijas sistēmu lietojumā. *ITIL* labākās prakses ir piemērojamas visās IT organizācijās, kur nav nozīmes, kāds ir to lielums vai kādas tehnoloģijas tās lieto. Šodien *ITIL* ir visplašāk akceptētā pieeja IT servisa menedžmentā.

ITIL vissvarīgākā un integrālā standarta daļa ir servisa līmeņa menedžments (SLM). SLM mērķis ir radīt IT servisa moduļus lietotāju skatījumā. Sistēmas menedžmenta problēma ir tā, ka darbības tiek parādītas tikai no tehniskā vai sistēmas viedokļa.

Bieži vien lietotāja viedoklis netiek ņemts vērā. Šī problēma kļūst acīmredzama, kad mēs apskatām tādu specifisku sistēmu kā gaisa satiksmes kontroles serviss.

Serviss ir jāplāno un jāfiksē speciālos IT līgumos, kur jāparedz servisa līmeņa mērķis un uzdevumi.

Atslēgvārdi: Informācijas tehnoloģiju infrastruktūras bibliotēka (IT Infrastructure Library – ITIL), servisa menedžments, servisa līmeņa vienošanās

Andrius Jaržemskis. Loģistikas faktoru ietekme uz transporta plūsmu sadali. Lietuvas piemērs. *TRANSPORT and TELECOMMUNICATION*, 6.sēj., Nr.5, 2005, 17.-20. lpp.

Daudzās publikācijās tiek analizēti tādi jautājumi kā transporta tīkls un transporta plūsmas transporta sistēmas iekšējos raksturojumos, bet bieži vien tas ir jāskata arī no transporta sistēmas ārējo faktoru iedarbības viedokļa. Dotā raksta mērķis ir atbildēt uz jautājumu – kurš tieši lemj par transporta tīkla struktūru, maršrutu un noliktavu izvietojumu, kravu plūsmu daudzumu un virzieniem utt.

Autors šajā kontekstā ir izanalizējis daudzas zinātniskas publikācijas un līdz ar to sastapies ar ļoti daudziem viedokļiem.

Rakstā autors dod pamata secinājumus par minētiem jautājumiem, kas varētu ļoti noderēt Lietuvas transporta tīkla stratēģijas attīstībai, kā arī to varētu izmantot visā Baltijas reģionā.

Atslēgvārdi: kravu plūsmas, maršruti, noliktavu izvietojums, loģistikas kanāli, transporta kompānijas

Aldona Jarašūnienė. Eiropas dzelzceļa satiksmes vadības sistēmas (EDZSVS) vispārīgs raksturojums un dažādu dzelzceļa menedžmentu (EDZSVS) ieviešanas stratēģija. *TRANSPORT and TELECOMMUNICATION*, 6.sēj., Nr.5, 2005, 21.-27. lpp.

Šajā rakstā autore sniedz vispārīgu pārskatu par Eiropas dzelzceļa satiksmes vadības sistēmas menedžmentiem un to ieviešanas stratēģiju. Tiek aprakstītas arī apakšsistēmas.

Nacionālās dzelzceļa satiksmes kontroles aprīkojuma tehnoloģiskais progress, īpaši starptautiskajos vilcienos, ir veicinājis unificētās Eiropas dzelzceļa satiksmes vadības sistēmas attīstību. Šis raksts parāda minētās sistēmas ieviešanu dažādos dzelzceļa vadības veidos.

Atslēgvārdi: Eiropas dzelzceļa satiksmes vadības sistēma, dzelzceļa satiksmes kontrole, dzelzceļa vadības veidi

Igor Kabashkin. Loģistikas centri Baltijas jūras reģionā. Latvijas piemērs. *TRANSPORT and TELECOMMUNICATION*, 6.sēj., Nr.5, 2005, 28.-38. lpp.

Rakstā ir iekļauti aptauju kopsavilkumi. Intervēti transporta politikas veidotāji, loģistikas operatori, kā arī telpas plānotāji Latvijā, kas skar jautājumus par loģistikas centru veidošanu valstī.

Aptauju galvenais mērķis ir dažādu dalībnieku vīziju apkopojums, kuri ir iesaistīti plānošanas procesā, kā arī loģistikas centru attīstība valstī un iespējamie to risinājumi.

Atslēgvārdi: aptauja, loģistikas centrs, telpas plānošana, transporta politika